KAISER-HILL
COMPANY,
LLC

FY2005 FINAL Historical Release Report

Volume I
Introduction – 600 Area

June 2006

KAISER-HILL
COMPANY,
LLC

FY2005 FINAL Historical Release Report

Volume II
700 Area – Appendices

June 2006

TABLE OF CONTENTS

VOLUME I

ACRONYMS AND ABBREVIATIONS XII

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Modifications to HRR Evaluation 9
1.2.1 Data Comparison Values 9
1.3 HRR Format 12
1.3.1 Conventions 12
1.4 Significant Events 14

2.0 REFERENCES 14

NE AREA 16
PAC REFERENCE NUMBER: NE-110 18
PAC REFERENCE NUMBER: NE-111.1 24
PAC REFERENCE NUMBERS: NE-111.2, NE-111.3, NE-111.5 – NE-111.8 30
PAC REFERENCE NUMBER: NE-111.4 37
PAC REFERENCE NUMBERS: NE-142.1 – 142.4 42
PAC REFERENCE NUMBERS: NE-142.5 – 142.9 48
PAC REFERENCE NUMBER: NE-142.12 55
PAC REFERENCE NUMBER: NE-156.2 59
PAC REFERENCE NUMBERS: NE-166.1, NE-166.2, and NE-166.3 62
PAC REFERENCE NUMBER: NE-167.1 65
PAC REFERENCE NUMBERS: NE-167.2 and NE-167.3 68
PAC REFERENCE NUMBER: NE-216.1 71
PAC REFERENCE NUMBER: NE-216.2 and NE-216.3 74
PAC REFERENCE NUMBER: NE-1400 77
PAC REFERENCE NUMBER: NE-1401 79
PAC REFERENCE NUMBER: NE-1402 81
PAC REFERENCE NUMBER: NE-1403 83
PAC REFERENCE NUMBER: NE-1404 85
PAC REFERENCE NUMBER: NE-1405 87
PAC REFERENCE NUMBER: NE-1406 89
PAC REFERENCE NUMBER: NE-1407 91
PAC REFERENCE NUMBER: NE-1408 93
PAC REFERENCE NUMBER: NE-1409 95
PAC REFERENCE NUMBER: NE-1410 98
PAC REFERENCE NUMBER: NE-1411 100
PAC REFERENCE NUMBERS: NE-1412 and NE-1413 102

NW AREA 106
PAC REFERENCE NUMBER: NW-114 107
PAC REFERENCE NUMBER: NW-170 113
PAC REFERENCE NUMBER: NW-174a 116
PAC REFERENCE NUMBER: NW-174b 119

PAC REFERENCE NUMBER: NW-195 121
PAC REFERENCE NUMBER: NW-203 123
PAC REFERENCE NUMBER: NW-1500 126
PAC REFERENCE NUMBER: NW-1501 128
PAC REFERENCE NUMBER: NW-1502 130
PAC REFERENCE NUMBER: NW-1503 132
PAC REFERENCE NUMBER: NW-1504 134
PAC REFERENCE NUMBER: NW-1505 136

SE AREA 138
PAC REFERENCE NUMBER: SE-142.10 139
PAC REFERENCE NUMBER: SE-142.11 143
PAC REFERENCE NUMBER: SE-209 147
PAC REFERENCE NUMBER: SE-1600 149
PAC REFERENCE NUMBERS: SE-1601.1 and SE-1601.2 151
PAC REFERENCE NUMBER: SE-1602 153

SW AREA 156
PAC REFERENCE NUMBER: SW-115 157
PAC REFERENCE NUMBERS: SW-133.1, SW-133.2, SW-133.3, SW-133.4, SW-1701, and SW-1702 162
PAC REFERENCE NUMBER: SW-133.5 167
PAC REFERENCE NUMBER: SW-133.6 173
PAC REFERENCE NUMBER: SW-196 175
PAC REFERENCE NUMBER: SW-1700 179

000 AREA 181
PAC REFERENCE NUMBER: 000-101 183
PAC REFERENCE NUMBER: 000-121 189
PAC REFERENCE NUMBER: 000-162 196
PAC REFERENCE NUMBER: 000-168 199
PAC REFERENCE NUMBER: 000-172 201
PAC REFERENCE NUMBER: 000-190 204
PAC REFERENCE NUMBER: 000-192 207
PAC REFERENCE NUMBER: 000-500 209
PAC REFERENCE NUMBER: 000-501 214
PAC REFERENCE NUMBER: 000-502 216
PAC REFERENCE NUMBER: 000-503 217
PAC REFERENCE NUMBER: 000-504 219
PAC REFERENCE NUMBER: 000-505 226

100 AREA 230
PAC REFERENCE NUMBER: 100-148 231
PAC REFERENCE NUMBER: 100-600 235
PAC REFERENCE NUMBER: 100-601 237
PAC REFERENCE NUMBER: 100-602 239
PAC REFERENCE NUMBER: 100-603 242
PAC REFERENCE NUMBER: 100-604 245
PAC REFERENCE NUMBER: 100-605 247

PAC REFERENCE NUMBER: 100-606 249
PAC REFERENCE NUMBER: 100-607 251
PAC REFERENCE NUMBER: 100-608 255
PAC REFERENCE NUMBER: 100-609 257
PAC REFERENCE NUMBER: 100-610 260
PAC REFERENCE NUMBER: 100-611 262
PAC REFERENCE NUMBER: 100-612 264
PAC REFERENCE NUMBER: 100-613 266

300 AREA 268
PAC REFERENCE NUMBER: 300-128 269
PAC REFERENCE NUMBERS: 300-134N and 300-134s 272
PAC REFERENCE NUMBER: 300-135 277
PAC REFERENCE NUMBER: 300-151 279
PAC REFERENCE NUMBER: 300-156.1 281
PAC REFERENCE NUMBER: 300-171 283
PAC REFERENCE NUMBER: 300-181 286
PAC REFERENCE NUMBER: 300-186 288
PAC REFERENCE NUMBER: 300-188 292
PAC REFERENCE NUMBER: 300-206 294
PAC REFERENCE NUMBER: 300-212 296
PAC REFERENCE NUMBER: 300-700 298
PAC REFERENCE NUMBER: 300-701 301
PAC REFERENCE NUMBER: 300-702 303
PAC REFERENCE NUMBER: 300-703 305
PAC REFERENCE NUMBER: 300-704 307
PAC REFERENCE NUMBER: 300-705 309
PAC REFERENCE NUMBER: 300-706 311
PAC REFERENCE NUMBER: 300-707 313
PAC REFERENCE NUMBER: 300-708 315
PAC REFERENCE NUMBER: 300-709 318
PAC REFERENCE NUMBER: 300-710 320
PAC REFERENCE NUMBER: 300-711 322
PAC REFERENCE NUMBER: 300-712 324
PAC REFERENCE NUMBER: 300-713 326
PAC REFERENCE NUMBER: 300-714 328
PAC REFERENCE NUMBER: 300-715 330

400 AREA 332
PAC REFERENCE NUMBER: 400-116.1 333
PAC REFERENCE NUMBER: 400-116.2 336
PAC REFERENCE NUMBER: 400-122 339
PAC REFERENCE NUMBER: 400-129 342
PAC REFERENCE NUMBERS: 400-136.1 and 400-136.2 345
PAC REFERENCE NUMBER: 400-157.1 348
PAC REFERENCE NUMBER: 400-157.2 351
PAC REFERENCE NUMBER: 400-182 355
PAC REFERENCE NUMBER: 400-187 357

PAC REFERENCE NUMBER: 400-191 359
PAC REFERENCE NUMBER: 400-193 361
PAC REFERENCE NUMBER: 400-204 363
PAC REFERENCE NUMBER: 400-205 365
PAC REFERENCE NUMBER: 400-207 368
PAC REFERENCE NUMBER: 400-208 371
PAC REFERENCE NUMBER: 400-800 374
PAC REFERENCE NUMBER: 400-801 376
PAC REFERENCE NUMBER: 400-802 379
PAC REFERENCE NUMBER: 400-803 382
PAC REFERENCE NUMBER: 400-804 384
PAC REFERENCE NUMBER: 400-805 386
PAC REFERENCE NUMBER: 400-806 388
PAC REFERENCE NUMBER: 400-807 390
PAC REFERENCE NUMBER: 400-808 392
PAC REFERENCE NUMBER: 400-809 394
PAC REFERENCE NUMBER: 400-810 396
PAC REFERENCE NUMBER: 400-811 399
PAC REFERENCE NUMBER: 400-812 401
PAC REFERENCE NUMBER: 400-813 404
PAC REFERENCE NUMBER: 400-814 407
PAC REFERENCE NUMBER: 400-815 409
PAC REFERENCE NUMBER: 400-820 412

500 AREA 413
PAC REFERENCE NUMBER: 500-117.1 414
PAC REFERENCE NUMBER: 500-117.2 417
PAC REFERENCE NUMBER: 500-158 420
PAC REFERENCE NUMBER: 500-159 423
PAC REFERENCE NUMBER: 500-169 427
PAC REFERENCE NUMBER: 500-197 430
PAC REFERENCE NUMBER: 500-900 434
PAC REFERENCE NUMBER: 500-901 437
PAC REFERENCE NUMBER: 500-902 440
PAC REFERENCE NUMBER: 500-903 443
PAC REFERENCE NUMBER: 500-904 445
PAC REFERENCE NUMBER: 500-905 448
PAC REFERENCE NUMBER: 500-906 451
PAC REFERENCE NUMBER: 500-907 454
PAC REFERENCE NUMBER: 500-908 456
PAC REFERENCE NUMBER: 500-909 458

600 AREA 460
PAC REFERENCE NUMBER: 600-117.3 461
PAC REFERENCE NUMBER: 600-120.1 464
PAC REFERENCE NUMBER: 600-120.2 467
PAC REFERENCE NUMBER: 600-152 469
PAC REFERENCE NUMBER: 600-160 472

PAC REFERENCE NUMBER: 600-161 476
PAC REFERENCE NUMBER: 600-164.1 479
PAC REFERENCE NUMBER: 600-189 482
PAC REFERENCE NUMBER: 600-1000 484
PAC REFERENCE NUMBER: 600-1001 487
PAC REFERENCE NUMBER: 600-1001(a) 490
PAC REFERENCE NUMBER: 600-1002 492
PAC REFERENCE NUMBER: 600-1003 495
PAC REFERENCE NUMBER: 600-1004 498
PAC REFERENCE NUMBER: 600-1005 501

VOLUME II

700 AREA 503
PAC REFERENCE NUMBER: 700-118.1 504
PAC REFERENCE NUMBER: 700-118.2 508
PAC REFERENCE NUMBER: 700-123.1 510
PAC REFERENCE NUMBER: 700-123.2 513
PAC REFERENCE NUMBER: 700-124.1, 700-124.2, 700-124.3 516
PAC REFERENCE NUMBER: 700-125 520
PAC REFERENCE NUMBERS: 700-126.1 and 700-126.2 521
PAC REFERENCE NUMBER: 700-127 524
PAC REFERENCE NUMBER: 700-131 527
PAC REFERENCE NUMBER: 700-132 530
PAC REFERENCE NUMBER: 700-137 535
PAC REFERENCE NUMBER: 700-138 539
PAC REFERENCE NUMBER: 700-139.1(S) 542
PAC REFERENCE NUMBER: 700-139.1(N)(a) 545
PAC REFERENCE NUMBER: 700-139.1(N)(b) 547
PAC REFERENCE NUMBER: 700-139.2 550
PAC REFERENCE NUMBER: 700-143 552
PAC REFERENCE NUMBERS: 700-144(N) and 700-144(S) 556
PAC REFERENCE NUMBERS: 700-146.1 – 700-146.6 559
PAC REFERENCE NUMBER: 700-147.1 562
PAC REFERENCE NUMBER: 700-149.1 564
PAC REFERENCE NUMBER: 700-149.2 567
PAC REFERENCE NUMBER: 700-150.1 570
PAC REFERENCE NUMBER: 700-150.2(N) 574
PAC REFERENCE NUMBER: 700-150.2(S) 577
PAC REFERENCE NUMBER: 700-150.3 580
PAC REFERENCE NUMBER: 700-150.4 583
PAC REFERENCE NUMBER: 700-150.5 585
PAC REFERENCE NUMBERS: 700-150.6 and 700-150.8 587
PAC REFERENCE NUMBER: 700-150.7 590
PAC REFERENCE NUMBER: 700-163.1 592
PAC REFERENCE NUMBER: 700-163.2 594
PAC REFERENCE NUMBER: 700-185 597
PAC REFERENCE NUMBER: 700-194 599

PAC REFERENCE NUMBER: 700-214 601
PAC REFERENCE NUMBER: 700-215 606
PAC REFERENCE NUMBER: 700-1100 608
PAC REFERENCE NUMBER: 700-1101 611
PAC REFERENCE NUMBER: 700-1102 614
PAC REFERENCE NUMBER: 700-1103 618
PAC REFERENCE NUMBER: 700-1104 621
PAC REFERENCE NUMBER: 700-1105 624
PAC REFERENCE NUMBER: 700-1106 627
PAC REFERENCE NUMBER: 700-1107 629
PAC REFERENCE NUMBER: 700-1108 631
PAC REFERENCE NUMBER: 700-1109 635
PAC REFERENCE NUMBER: 700-1110 637
PAC REFERENCE NUMBER: 700-1111 639
PAC REFERENCE NUMBER: 700-1112 642
PAC REFERENCE NUMBER: 700-1113 645
PAC REFERENCE NUMBERS: 700-1114a and 700-1114b 647
PAC REFERENCE NUMBER: 700-1115 649
PAC REFERENCE NUMBER: 700-1116 651
PAC REFERENCE NUMBER: 700-1117 654

800 AREA 657
PAC REFERENCE NUMBER: 800-102 658
PAC REFERENCE NUMBER: 800-103 660
PAC REFERENCE NUMBER: 800-104 662
PAC REFERENCE NUMBER: 800-105.1 and 800-105.2 664
PAC REFERENCE NUMBER: 800-106 666
PAC REFERENCE NUMBER: 800-107 669
PAC REFERENCE NUMBER: 800-145 672
PAC REFERENCE NUMBER: 800-147.2 674
PAC REFERENCE NUMBER: 800-164.2 676
PAC REFERENCE NUMBER: 800-164.3 679
PAC REFERENCE NUMBER: 800-177 682
PAC REFERENCE NUMBER: 800-178 685
PAC REFERENCE NUMBER: 800-179 687
PAC REFERENCE NUMBER: 800-180 690
PAC REFERENCE NUMBER: 800-211 693
PAC REFERENCE NUMBER: 800-217 695
PAC REFERENCE NUMBER: 800-1200 697
PAC REFERENCE NUMBER: 800-1201 700
PAC REFERENCE NUMBER: 800-1202 702
PAC REFERENCE NUMBER: 800-1203 704
PAC REFERENCE NUMBER: 800-1204 706
PAC REFERENCE NUMBER: 800-1205 709
PAC REFERENCE NUMBER: 800-1206 711
PAC REFERENCE NUMBER: 800-1207 713
PAC REFERENCE NUMBER: 800-1208 716

PAC REFERENCE NUMBER: 800-1209 719
PAC REFERENCE NUMBER: 800-1210 722
PAC REFERENCE NUMBER: 800-1211 725
PAC REFERENCE NUMBER: 800-1212 727

900 AREA 730
PAC REFERENCE NUMBER: 900-108 731
PAC REFERENCE NUMBER: 900-109 735
PAC REFERENCE NUMBER: 900-112 739
PAC REFERENCE NUMBER: 900-113 744
PAC REFERENCE NUMBER: 900-119.1 749
PAC REFERENCE NUMBER: 900-119.2 754
PAC REFERENCE NUMBER: 900-130 757
PAC REFERENCE NUMBER: 900-140 760
PAC REFERENCE NUMBER: 900-141 763
PAC REFERENCE NUMBER: 900-153 766
PAC REFERENCE NUMBER: 900-154 769
PAC REFERENCE NUMBER: 900-155 771
PAC REFERENCE NUMBER: 900-165 777
PAC REFERENCE NUMBER: 900-173 780
PAC REFERENCE NUMBER: 900-175 782
PAC REFERENCE NUMBER: 900-176 784
PAC REFERENCE NUMBER: 900-183 786
PAC REFERENCE NUMBER: 900-184 788
PAC REFERENCE NUMBER: 900-210 790
PAC REFERENCE NUMBER: 900-213 792
PAC REFERENCE NUMBER: 900-1300 795
PAC REFERENCE NUMBER: 900-1301 797
PAC REFERENCE NUMBER: 900-1302 799
PAC REFERENCE NUMBER: 900-1303 801
PAC REFERENCE NUMBER: 900-1304 803
PAC REFERENCE NUMBER: 900-1305 805
PAC REFERENCE NUMBER: 900-1306 807
PAC REFERENCE NUMBER: 900-1307 809
PAC REFERENCE NUMBER: 900-1308 811
PAC REFERENCE NUMBER: 900-1309 813
PAC REFERENCE NUMBER: 900-1310 816
PAC REFERENCE NUMBER: 900-1311 819
PAC REFERENCE NUMBER: 900-1312 822
PAC REFERENCE NUMBER: 900-1313 825
PAC REFERENCE NUMBER: 900-1314 827
PAC REFERENCE NUMBER: 900-1315 829
PAC REFERENCE NUMBER: 900-1316 831
PAC REFERENCE NUMBER: 900-1317 833
PAC REFERENCE NUMBER: 900-1318 835
PAC REFERENCE NUMBER: UBC 122 838
PAC REFERENCE NUMBER: UBC 123 841

PAC REFERENCE NUMBER: UBC 125 845
PAC REFERENCE NUMBER: UBC 331 847
PAC REFERENCE NUMBER: UBC 371 849
PAC REFERENCE NUMBER: UBC 374 852
PAC REFERENCE NUMBER: UBC 439 855
PAC REFERENCE NUMBER: UBC 440 857
PAC REFERENCE NUMBER: UBC 441 860
PAC REFERENCE NUMBER: UBC 442 863
PAC REFERENCE NUMBER: UBC 444 865
PAC REFERENCE NUMBER: UBC 447 868
PAC REFERENCE NUMBER: UBC 528 871
PAC REFERENCE NUMBER: UBC 559 874
PAC REFERENCE NUMBER: UBC 701 878
PAC REFERENCE NUMBER: UBC 707 881
PAC REFERENCE NUMBER: UBC 731 885
PAC REFERENCE NUMBER: UBC 770 887
PAC REFERENCE NUMBER: UBC 771 890
PAC REFERENCE NUMBER: UBC 774 894
PAC REFERENCE NUMBER: UBC 776 897
PAC REFERENCE NUMBER: UBC 777 902
PAC REFERENCE NUMBER: UBC 778 906
PAC REFERENCE NUMBER: UBC 779 909
PAC REFERENCE NUMBER: UBC 865 913
PAC REFERENCE NUMBER: UBC 881 916
PAC REFERENCE NUMBER: UBC 883 920
PAC REFERENCE NUMBER: UBC 886 924
PAC REFERENCE NUMBER: UBC 887 927
PAC REFERENCE NUMBER: UBC 889 929
PAC REFERENCE NUMBER: UBC 991 932

OFF-SITE AREA 936
PAC REFERENCE NUMBER: OFF-SITE AREAS 1, 2, 3, and 4 937

PICs 945
PIC REFERENCE NUMBER: 1 946
PIC REFERENCE NUMBER: 2 948
PIC REFERENCE NUMBER: 3 950
PIC REFERENCE NUMBER: 4 952
PIC REFERENCE NUMBER: 5 954
PIC REFERENCE NUMBER: 6 956
PIC REFERENCE NUMBER: 7 958
PIC REFERENCE NUMBER: 8 960
PIC REFERENCE NUMBER: 9 962
PIC REFERENCE NUMBER: 10 964
PIC REFERENCE NUMBER: 11 966
PIC REFERENCE NUMBER: 12 968
PIC REFERENCE NUMBER: 13 970
PIC REFERENCE NUMBER: 14 972

PIC REFERENCE NUMBER: 15 974
PIC REFERENCE NUMBER: 16 976
PIC REFERENCE NUMBER: 17 978
PIC REFERENCE NUMBER: 18 980
PIC REFERENCE NUMBER: 19 982
PIC REFERENCE NUMBER: 20 984
PIC REFERENCE NUMBER: 21 986
PIC REFERENCE NUMBER: 22 988
PIC REFERENCE NUMBER: 23 990
PIC REFERENCE NUMBER: 24 992
PIC REFERENCE NUMBER: 25 994
PIC REFERENCE NUMBER: 26 996
PIC REFERENCE NUMBER: 27 998
PIC REFERENCE NUMBER: 28 1000
PIC REFERENCE NUMBER: 29 1002
PIC REFERENCE NUMBER: 30 1004
PIC REFERENCE NUMBER: 31 1006
PIC REFERENCE NUMBER: 32 1008
PIC REFERENCE NUMBER: 33 1010
PIC REFERENCE NUMBER: 34 1012
PIC REFERENCE NUMBER: 35 1014
PIC REFERENCE NUMBER: 36 1016
PIC REFERENCE NUMBER: 37 1018
PIC REFERENCE NUMBER: 38 1020
PIC REFERENCE NUMBER: 39 1022
PIC REFERENCE NUMBER: 40 1024
PIC REFERENCE NUMBER: 41 1026
PIC REFERENCE NUMBER: 42 1028
PIC REFERENCE NUMBER: 43 1030
PIC REFERENCE NUMBER: 44 1032
PIC REFERENCE NUMBER: 45 1034
PIC REFERENCE NUMBER: 46 1036
PIC REFERENCE NUMBER: 47 1038
PIC REFERENCE NUMBER: 48 1040
PIC REFERENCE NUMBER: 49 1042
PIC REFERENCE NUMBER: 50 1044
PIC REFERENCE NUMBER: 51 1046
PIC REFERENCE NUMBER: 52 1048
PIC REFERENCE NUMBER: 53 1050
PIC REFERENCE NUMBER: 54 1052
PIC REFERENCE NUMBER: 55 1054
PIC REFERENCE NUMBER: 56 1056
PIC REFERENCE NUMBER: 57 1058
PIC REFERENCE NUMBER: 58 1060
PIC REFERENCE NUMBER: 59 1062
PIC REFERENCE NUMBER: 60 1064

PIC REFERENCE NUMBER: 61 1066

CDPHE BUFFER ZONE CONTAMINATION REPORTS 1069

INDEX..... 1077

APPENDIX 1 HRR SITES AT RFETS

APPENDIX 2 CORRESPONDENCE

LIST OF FIGURES

Figure 1 Rocky Flats Environmental Technology Site..... 2
Figure 2 Rocky Flats Environmental Technology Site IHSSs..... 3
Figure 3 Rocky Flats Environmental Technology Site PACs 4
Figure 4 Rocky Flats Environmental Technology Site UBC Sites..... 5
Figure 5 Operable Units..... 8
Figure 6 Rocky Flats Environmental Technology Site Groundwater and Surface Water Monitoring Locations..... 11
Figure 7 HRR Area Boundaries..... 13
Figure 8 HRR Northeast Buffer Zone Area IHSSs and PACs 16
Figure 9 HRR Northeast Buffer Zone Area IHSSs and PACs Close-up View 17
Figure 10 HRR Northwest Buffer Zone Area IHSSs and PACs 106
Figure 11 HRR Southeast Buffer Zone Area IHSSs and PACs 138
Figure 12 HRR Southwest Buffer Zone Area IHSSs and PACs 156
Figure 13 HRR 000 Area Storm Drains and Sanitary Sewers..... 181
Figure 14 HRR 000 Area OPWL, NPWL, IHSSs, and PACs 182
Figure 15 HRR 100 Area IHSSs and PACs..... 230
Figure 16 HRR 300 Area IHSSs and PACs..... 268
Figure 17 PAC 300-700 299
Figure 18 HRR 400 Area IHSSs and PACs..... 332
Figure 19 HRR 500 Area IHSSs and PACs..... 413
Figure 20 HRR 600 Area IHSSs and PACs..... 460
Figure 21 HRR 700 Area IHSSs and PACs..... 503
Figure 22 HRR 800 Area IHSSs and PACs..... 657
Figure 23 HRR 900 Area IHSSs and PACs..... 730
Figure 24 HRR UBCs 837
Figure 25 HRR Operable Unit 3 936
Figure 26 PIC Locations 945
Figure 27 Buffer Zone Contamination Report Site Locations..... 1068

LIST OF TABLES

Table 1 RFCA Consolidation of IAG OUs..... 6
Table 2 Final RFCA OUs (April 2004) 7

ACRONYMS AND ABBREVIATIONS

µg/100 cm^2	micrograms per 100 square centimeters
µCi	microcuries
µCi/g	microcuries per gram
µg/cm^2	micrograms per square centimeter
µg/kg	micrograms per kilogram (also µg/kg)
µg/L	micrograms per liter (also µg/L)
µg/m^3	micrograms per cubic meter
µmhos/cm	micromhos per centimeter
ACM	asbestos-containing material
AL	action level
AOC	Area of Concern
AOI	analyte of interest
AR	Administrative Record
ARA	Accelerated Response Action
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene, and xylenes
BZ	Buffer Zone
BZCR	Buffer Zone Contamination Report
BZSAP	Buffer Zone Sampling and Analysis Plan
CAD/ROD	Corrective Action Decision/Record of Decision
CCR	Code of Colorado Regulations
CDH	Colorado Department of Health
CDPHE	Colorado Department of Public Health and Environment
CEARP	Comprehensive Environmental Assessment and Response Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
cm	centimeter
COC	contaminant of concern

CPIR	Contingency Plan Implementation Report
cpm	counts per minute
cpm/ft^2	counts per minute per square feet
CRA	Comprehensive Risk Assessment
CSU	Colorado State University
CSV	Central Storage Vault
CWTS	Caustic Waste Treatment System
cy	cubic yard
D&D	decontamination and decommissioning
DNAPL	dense nonaqueous phase liquid
dpm/100 cm^2	disintegrations per minute per 100 square centimeters
dpm/m^2	disintegrations per minute per square meter
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
dpm	disintegrations per minute
dpm/g	disintegrations per minute per gram
dpm/kg	disintegrations per minute per kilogram
dpm/L	disintegrations per minute per liter
DQO	data quality objective
DRT	dirt, rubble, and trash
EG&G	EG&G Rocky Flats, Inc.
EM	electromagnetic
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation
ERA	Ecological Risk Assessment
FIDLER	Field Instrument for Detection of Low-Energy Radiation
ft	foot or feet
ft^2	square foot
ft^3	cubic foot
FY	Fiscal Year

g	gram
gpm	gallons per minute
GPR	ground penetrating radar
GPS	Global Positioning System
HAZMAT	Hazardous Materials
HDPE	high-density polyethene
HEPA	high efficiency particulate air
HHRA	Human Health Risk Assessment
HI	hazard index
HNO_3	nitric acid
HPGe	High Purity Germanium
HQ	hazard quotient
HRC®	Hydrogen Release Compound
HRICP/MS	High-Resolution Inductively Coupled Plasma Mass Spectrometry
HRR	Historical Release Report
IA	Industrial Area
IABZSAP	Industrial Area and Buffer Zone Sampling and Analysis Plan
IAG	Interagency Agreement
IASAP	Industrial Area Sampling and Analysis Plan
IBC	intermediate bulk container
IDM	investigation-derived material
IGD	Implementation Guidance Document
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IMP	Integrated Monitoring Plan
IRIS	Integrated Risk Information System
ITPH	Interceptor Trench Pump House
ITS	Interceptor Trench System
IWCP	Integrated Work Control Program
K-H	Kaiser Hill Company, L.L.C.
kg	kilogram
KOH	potassium hydroxide
lb	pound

LHSU	lower hydrostratigraphic unit
LLMW	low-level mixed waste
LLW	low-level waste
LRA	Lead Regulatory Agency
LTTD	low-temperature thermal desorption
M&TE	Measurement and Test Equipment
mCi	millicurie
MCL	maximum contaminant level
MDC	maximum detected concentration
MDL	method detection limit
MEK	methyl ethyl ketone
mg/100 cm	milligrams per 100 centimeters
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MPL	maximum permissible limit
mrem	millirem
mrem/hr	millirems per hour
mrem/yr	millirems per year
MRI	Midwest Research Institute
MS	matrix spike
MSDS	Material Safety Data Sheet
MST	modular storage tank
N	nitrogen
NaOH	sodium hydroxide
NAPL	nonaqueous phase liquid
nCi/g	nanocuries per gram
NFA	No Further Action
NFAA	No Further Accelerated Action
NLR	no longer representative
NPDES	National Pollutant Discharge Elimination System
NPWL	New Process Waste Line

NTS	Nevada Test Site
OPWL	Original Process Waste Line
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PA	Protected Area
PAC	Potential Area of Concern
PAH	polynuclear aromatic hydrocarbon or polyaromatic hydrocarbon
PAM	Proposed Action Memorandum
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi/g	picocuries per gram
pCi/L	picocuries per liter
pCi/m^3	picocuries per cubic meter
pCi/mL	picocuries per milliliter
PCOC	potential contaminant of concern
PDSR	Pre-Demolition Survey Report
PEL	permissible exposure limit
pg/g	picograms per gram
PIC	Potential Incident of Concern
POC	Point of Compliance
POE	Point of Evaluation
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPRG	proposed preliminary remediation goal
ppt	parts per trillion
PQL	practical quantitation limit
PRG	preliminary remediation goal
PSZ	Perimeter Security Zone
PU&D	Property Utilization and Disposal
PVC	polyvinyl chloride
R&D	Research and Development
RAO	remedial action objective

RAS	Risk Assessment Screen
RBC	risk-based concentration
RCA	Radiologically Controlled Area
RCR	Regulatory Contact Record
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFCA Parties	DOE, CDPHE, EPA
RFETS or Site	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RFP or Plant	Rocky Flats Plant
RFPO	Rocky Flats Project Office
RI	Remedial Investigation
RL	reporting limit
RMRS	Rocky Mountain Remediation Services
RO	reverse osmosis
RQ	reportable quantity
RSOP	RFCA Standard Operating Protocol
S&W	Swinerton and Walberg
S-R	Stacker-Retriever
SAP	Sampling and Analysis Plan
SDWA	Safe Drinking Water Act
SEP	Solar Evaporation Ponds
SID	South Interceptor Ditch
SNM	special nuclear material
SOE	Stationary Operating Engineer
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
STP	Sewage Treatment Plant
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWD	Soil Water Database
SWMU	Solid Waste Management Unit

TAL	Target Analyte List
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TDEM	time-domain electromagnetic
TDS	total dissolved solids
TEF	toxicity equivalency factor
TEQ	toxicity equivalency
TIMS	Thermal Ionization Mass
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TRU	transuranic
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UBC	Under Building Contamination
UCL	upper confidence limit
UHSU	upper hydrostratigraphic unit
USDA	U.S. Department of Agriculture
UST	underground storage tank
VOA	volatile organic analyte
VOC	volatile organic compound
WEPP	Water Erosion Prediction Project
WHO	World Health Organization
WIPP	Waste Isolation Pilot Plant
WRW	wildlife refuge worker
WSRIC	Waste Stream and Residue Identification and Characterization
WWTF	Waste Water Treatment Facility
XRF	x-ray fluorescence

1.0 INTRODUCTION

The Fiscal Year (FY) 2005 Final Historical Release Report (HRR) for the U.S. Department of Energy's (DOE's) Rocky Flats Environmental Technology Site (RFETS or Site) in Jefferson County, Colorado, is the final update to the HRRs (DOE 1992 - 2004). The location of RFETS is shown on Figure 1. The FY2005 Final HRR presents a summary of information on all Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), and Under Building Contamination (UBC) Sites identified at RFETS. The locations of IHSSs, PACs, and UBC Sites are shown on Figures 2, 3, and 4, respectively. Additional map detail is shown on individual HRR Area maps (Section 1.3). Additionally, this FY2005 Final HRR updates the Potential Incidents of Concern (PICs) and includes information on the disposition of areas identified by the Colorado Department of Public Health and Environment (CDPHE). The purpose of the FY2005 Final HRR is to summarize previously collected information from quarterly and annual updates and from recent sampling, analysis, and accelerated actions into one final PAC narrative. The FY2005 Final HRR supercedes all previous HRRs; however, all previous updates are retained as references for this HRR.

1.1 Background

RFETS began operation in 1951. During Plant operations, materials defined as hazardous substances, pollutants, and contaminants by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and materials defined as hazardous waste and hazardous constituents by the Resource Conservation and Recovery Act (RCRA) and/or the Colorado Hazardous Waste Act (CHWA), were produced, purchased, stored, consumed, disposed, and released at various locations at RFETS.

RCRA regulations require that all Solid Waste Management Units (SWMUs) be identified. This became applicable on July 31, 1986, when DOE, Colorado Department of Health (CDH), and the U.S. Environmental Protection Agency (EPA) entered into a Compliance Agreement (DOE et al. 1986). At that time, the exact definition of a SWMU had not been formalized; therefore, guidance from the State of Colorado and the regional office of EPA was used. The SWMU terminology is a RCRA designation consisting of inactive waste disposal sites, accidentally contaminated sites, and sites found to pose environmental concern due to past or current waste management practices. The State of Colorado and EPA required the identification of all areas where environmental releases may have occurred, including hazardous waste and nonhazardous waste-related releases. Also included were single-release areas and long-term waste management areas where waste storage may (or was known to) have occurred.

SWMUs at RFETS were initially identified in 1985 by the DOE Los Alamos Operations Office and are presented in the Draft Comprehensive Environmental Assessment and Response Program (CEARP) Phase I: Installation Assessment (DOE 1986a). The study consisted of a records search, open literature survey, and interviews with RFETS employees. Inspections were conducted at each site. The first identification of RFETS SWMUs, consistent with the guidance provided by the State of Colorado and the regional EPA, was presented as an appendix to the November 1986 RCRA Part B Permit Application (DOE 1986b).

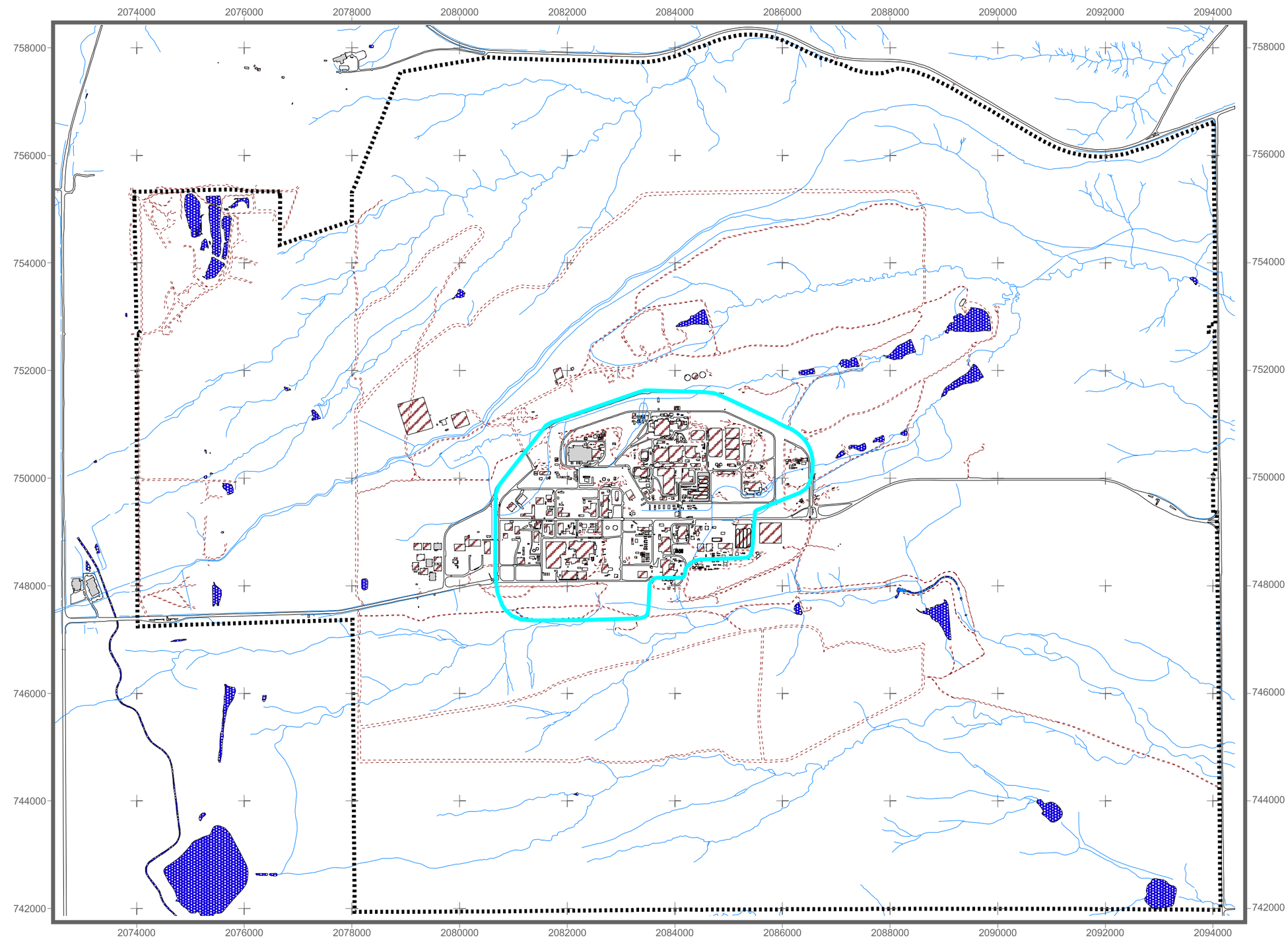

Figure 1
Rocky Flats Environmental Technology Site

KEY

- IA boundary
- Site boundary
- Stream
- Dirt road
- Paved road
- Lake
- Demolished structure
- Structure

N
W E
S

1000 0 1000 Feet

Scale = 1: 22,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.26.2005

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_fig_1.apr

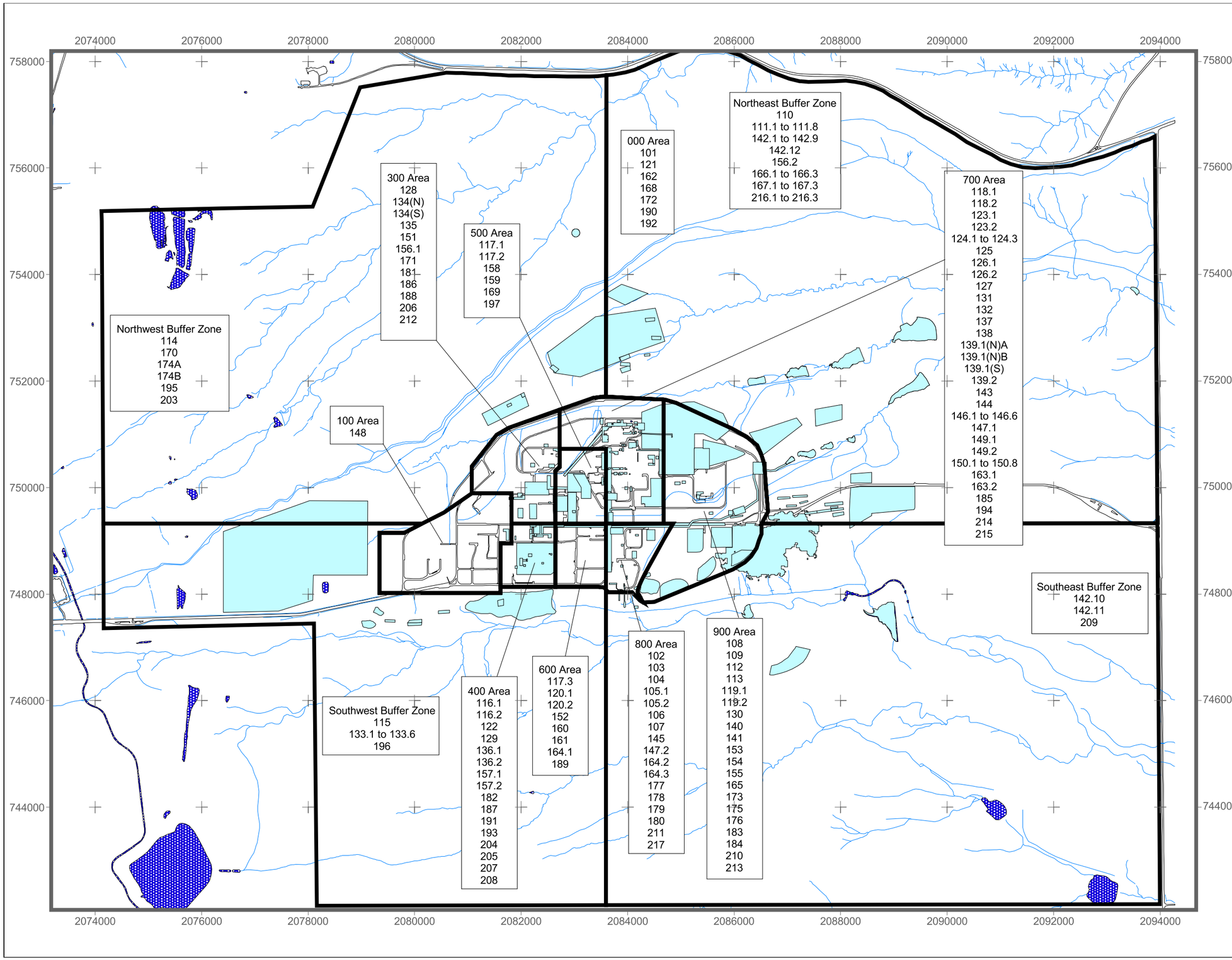

Figure 2
Rocky Flats Environmental Technology Site IHSSs

KEY

- Stream
- Dirt road
- Asphalt
- IHSS
- HRR area boundary
- Lake

N
W E
S

1000 0 1000 2000 Feet

Scale = 1: 21,500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.20.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_fig_2_3_4.apr

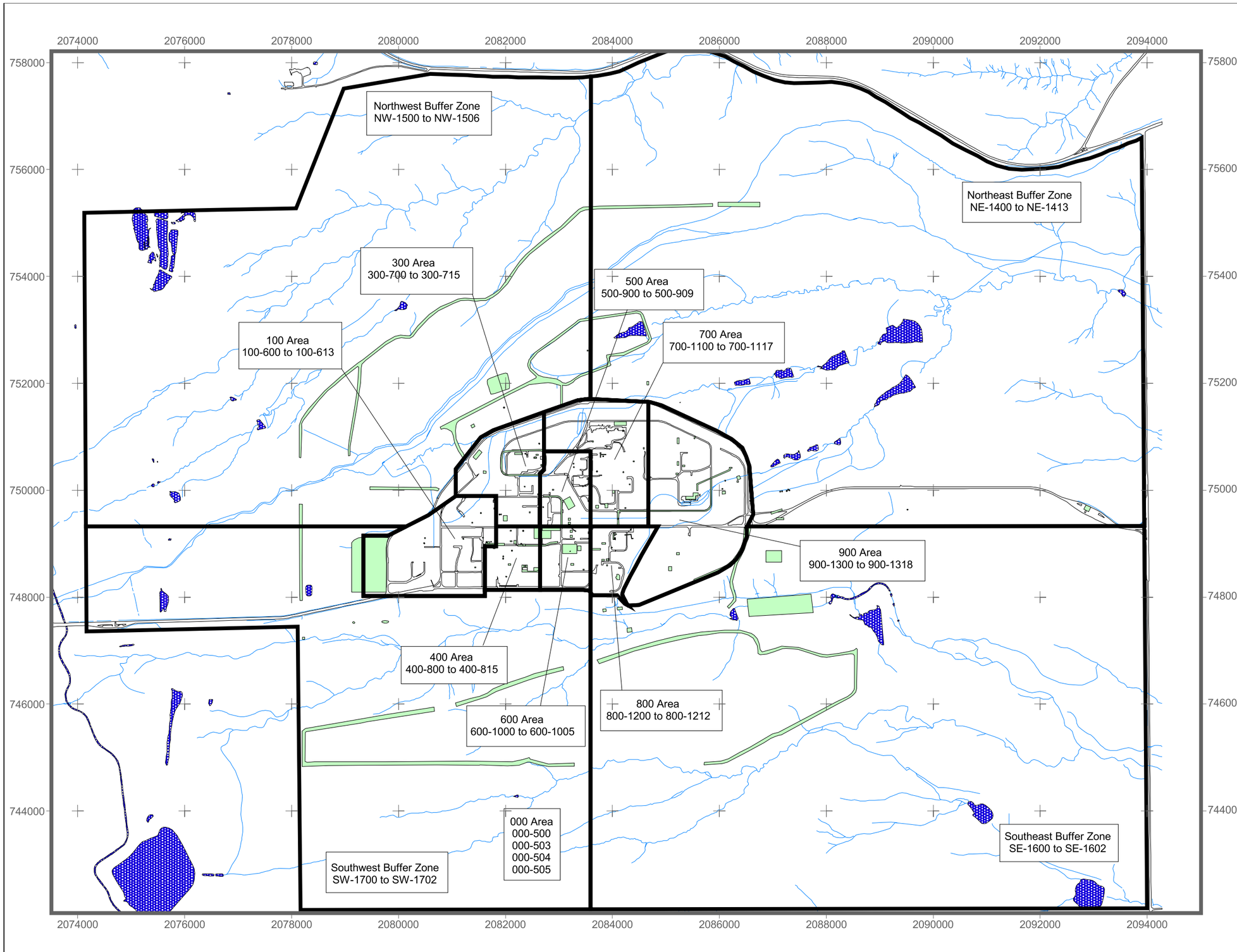

Figure 3
Rocky Flats Environmental Technology Site PACs

KEY

- Stream
- Dirt road
- Asphalt
- PAC
- HRR area boundary
- Lake

N
W E
S

1000 0 1000 2000 Feet

Scale = 1: 21,500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.20.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_fig_2_3_4.apr

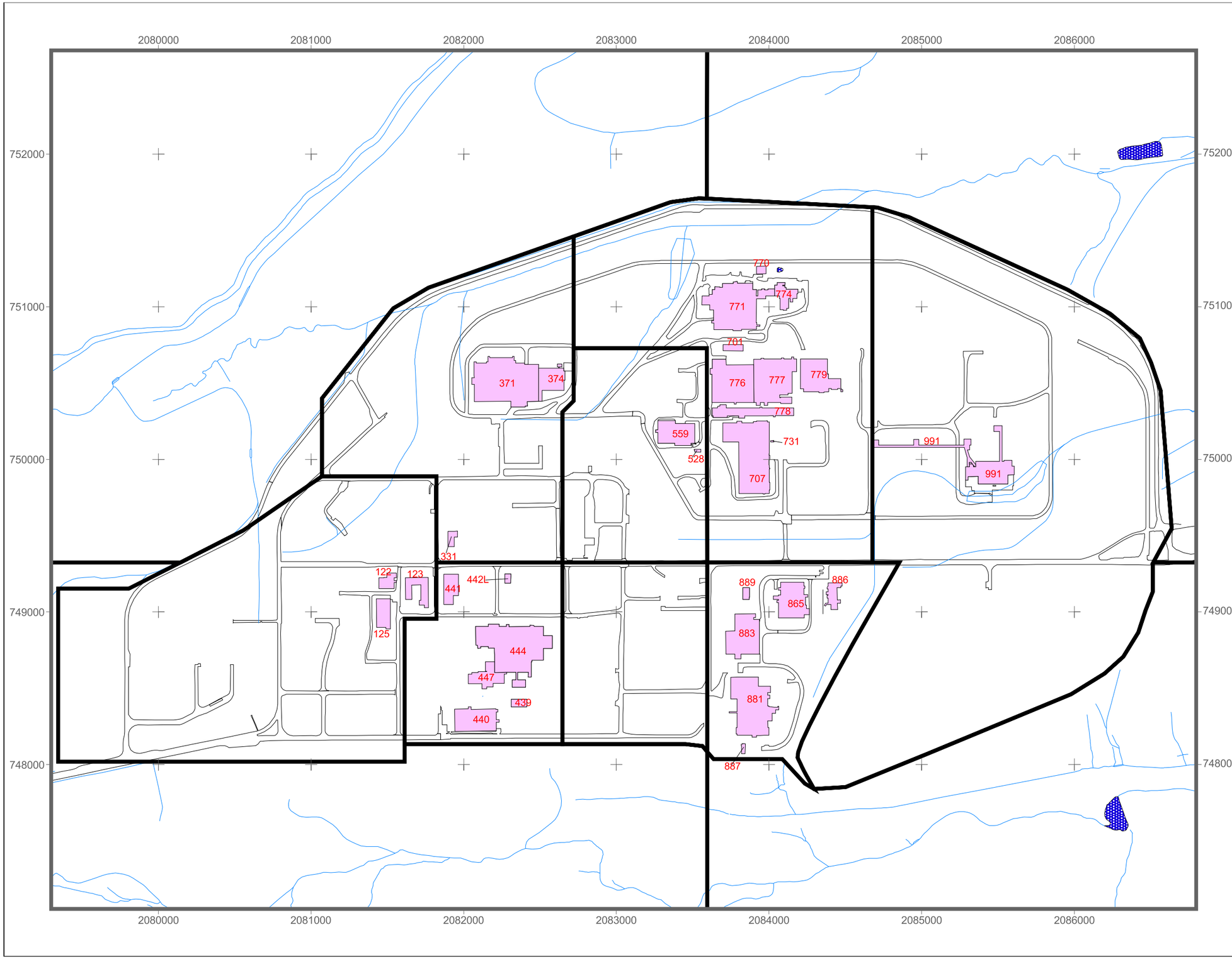

Figure 4
Rocky Flats Environmental Technology Site UBCs

KEY

- Stream
- Dirt road
- Asphalt
- UBC
- HRR area boundary
- Lake

N
W E
S

400 0 400 800 Feet

Scale = 1: 7,500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.20.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_fig_2_3_4.apr

Formal efforts to document the extent of Site contamination were established with the signing of the Interagency Agreement (IAG) in 1991 (DOE et al. 1991). At that time, SWMUs at RFETS were renamed IHSSs. IHSS is a term defined in the IAG as "locations associated with a release or threat of release of hazardous substances that may cause harm to human health/or the environment." The IAG grouped IHSSs by similar contaminant or geographic location into 16 Operable Units (OUs), and schedules were developed for further characterization. In accordance with the IAG, an HRR was developed. The original intent of the HRR was to capture existing information on historical incidents and Plant practices involving hazardous substances at RFETS. Additionally, the IAG prescribed that the HRR reporting process continue quarterly for reporting of new or newly identified releases of hazardous substances to the environment (identified as PACs). The HRR was also used to provide updated information on data collection and remediation activities, and to disposition IHSSs, PACs, and UBC Sites as necessary.

Information used in the preparation of the initial HRR was compiled and interpreted over an 8-month period beginning in 1991. The initial information evaluation consisted of the following:

- File review, including internal memoranda, letters, reports, log books, meeting minutes, photographs, press releases, and other written documentation of RFETS operations, incidents, and past practices. More than 4,000 documents were used in the preparation of the 1992 HRR.
- Interviews with current and past employees.

Additional information on how the initial HRR was developed is found in the 1992 HRR (DOE 1992).

In 1996, the Rocky Flats Cleanup Agreement (RFCA) (DOE et al. 1996), signed by DOE, CDPHE, and EPA (the RFCA Parties), superceded the IAG. RFCA incorporated the earlier IAG requirements for updating the HRR; however, it was agreed that reporting would be required annually instead of quarterly. The first Annual Update was submitted in September 1996.

The 16 OUs designated in the IAG were consolidated into 10 OUs during the RFCA negotiation process to reduce field and administrative requirements. The consolidation of IAG OUs is presented in Table 1.

Table 1
RFCA Consolidation of IAG OUs

IAG OU Designation	RFCA OU Designation
OU 1	Unchanged Under RFCA
OU 2	Incorporated into Buffer Zone (BZ) OU
OU 3	Unchanged Under RFCA
OU 4	Incorporated into Industrial Area (IA) OU
OU 5	Unchanged Under RFCA
OU 6	Unchanged Under RFCA
OU 7	Unchanged Under RFCA
OU 8	Incorporated into IA OU
OU 9	Incorporated into IA OU

IAG OU Designation	RFCA OU Designation
OU 10	Incorporated into IA OU except for IHSSs 170, 174a, and 174b
OU 11	Closed Under CAD/ROD
OU 12	Incorporated into IA OU
OU 13	Incorporated into IA OU
OU 14	Incorporated into IA OU
OU 15	Closed Under CAD/ROD
OU 16	Closed Under CAD/ROD

At that time, Corrective Action Decisions/Records of Decision (CADs/RODs) for OUs 11, 15, and 16 were already complete and CADs/RODs for OUs 1, 3, and 7 were in process or expected to be completed.

On April 13, 2004, DOE, EPA, and CDPHE determined that the 1996 OU Consolidation Plan should be modified to reflect the current status. The changes were based on the following:

1. OUs 1 and 3 were closed in accordance with the final CAD/RODs for these OUs.
2. The RFCA Parties believed that the IHSSs contained in OUs 5, 6, and 7 (as modified in July 1996) could be efficiently consolidated into the BZ OU to reduce the number of OUs that may need individual CADs/RODs.

As a result, the 10 OUs were consolidated into 7 OUs as shown in Table 2. The location of the OUs is shown on Figure 5.

Table 2
Final RFCA OUs (April 2004)

Former RFCA OU	Final RFCA OU	Description	Consisting of
1	1	881 Hillside Area	Current OU 1 IHSSs; CAD/ROD completed
3	3	Off-site Areas	Current OU 3 IHSSs; CAD/ROD completed
11	11	West Spray Field	Current OU 11 IHSSs; CAD/ROD completed
15	15	Inside Building Closures	Current OU 15 IHSSs; CAD/ROD completed
16	16	Low-Priority Sites	Current OU 16 IHSSs; CAD/ROD completed
IA	IA	IHSSs located within the IA	All current IHSSs associated with OUs 4, 8, 9, 12, 13, and 14; IHSSs 115 and 196 from OU 5; IHSSs 143 and 165 from OU 6; plus all OU 10 IHSSs except IHSSs 170, 174a, and 174b
BZ and OUs 5, 6, and 7	BZ	IHSSs located within the BZ	All current IHSSs associated with OUs 2 and 5 except IHSSs 115 and 196; OU 6 except IHSSs 143 and 165; OU 7; and IHSSs 170, 174a, and 174b from OU 10

The former and current OU for each PAC is identified in the PAC writeup.

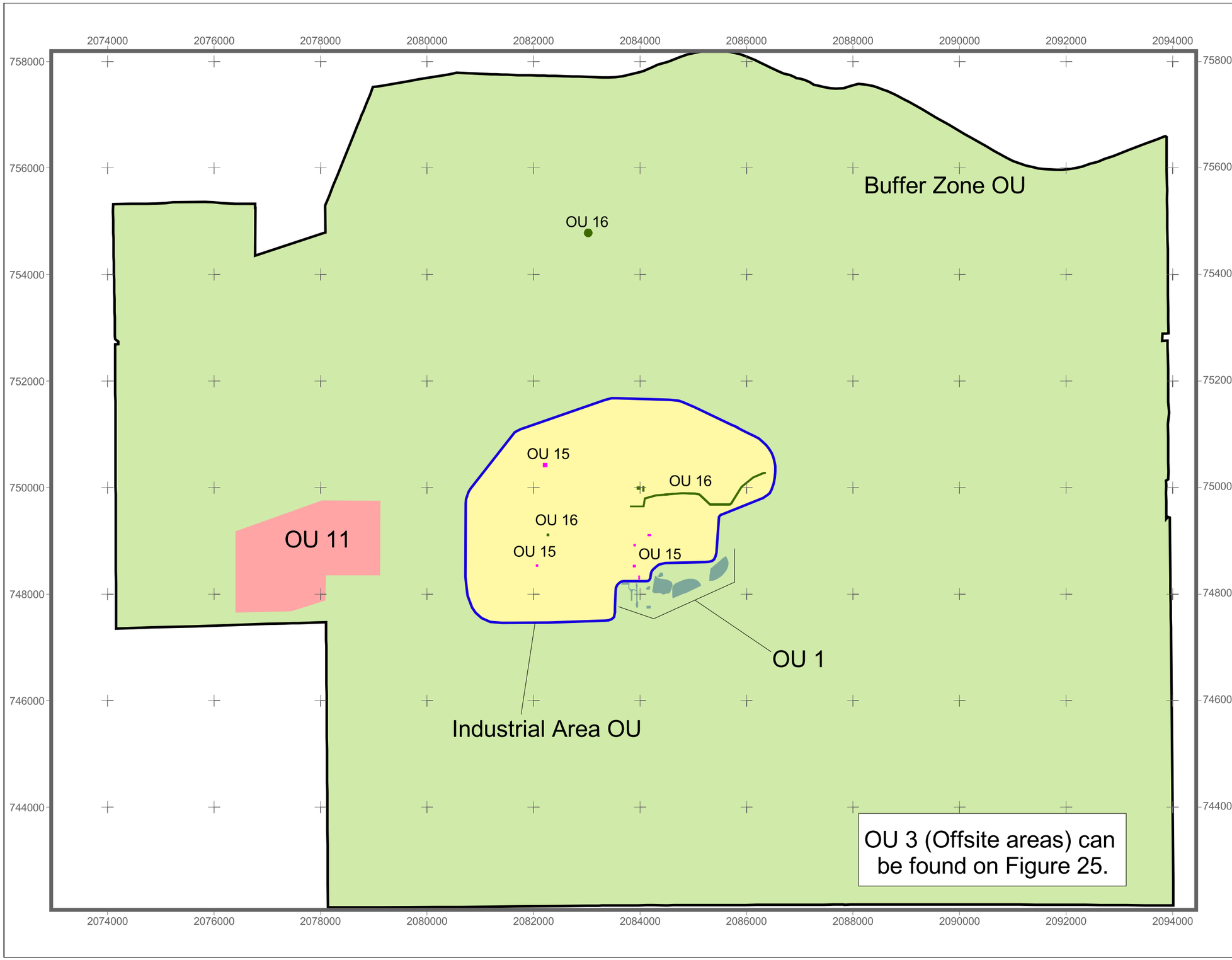

Figure 5
Rocky Flats Environmental Technology Site
Operable Units

KEY

- OU 1
- OU 11
- OU 15
- OU 16
- IA OU
- BZ OU

N
W E
S

1000 0 1000 Feet

Scale = 1: 21,500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.26.2005

File: W:\Projects\FY2005\HRR Update\Figures\hrr_fig_5.apr

1.2 Modifications to HRR Evaluation

Since 1992, when the first HRR was released, changes to the RFETS regulatory requirements have resulted in changes to the data evaluation requirements. These changes are described in the following sections.

1.2.1 Data Comparison Values

Data comparison values used in the initial, quarterly, and annual updates of the HRR are specific to the regulatory agreement in force at the time of the data review. The FY2005 HRR Update includes and references this information as appropriate.

Proposed preliminary remediation goals (PPRGs) or preliminary remediation goals (PRGs) were developed for several projects that were characterized in accordance with the IAG. PPRGs and PRGs were risk-based values calculated for various scenarios to obtain contaminant- and medium-specific levels protective of human health. The risk-based concentrations (RBCs) were based on the residential exposure scenario for the soil ingestion pathway. The PPRGs are described in Programmatic Risk-Based Preliminary Remediation Goals for the Rocky Flats Plant (DOE 1994).

RFCA (DOE et al. 1996) established action levels (ALs) for groundwater, surface soil, and subsurface soil and ALs and cleanup standards for surface water. Surface water ALs and standards included standards associated with surface water use classifications. Groundwater ALs were based on maximum contaminant levels (MCLs) (Tier II) or 100 times MCLs (Tier I). Subsurface soil ALs were based on calculated leachability at Tier I groundwater ALs. For surface soil, Tier I and Tier II ALs were risk based. Portions of RFCA, including the soil ALs, were modified in 2003. The 2003 soil ALs were selected to achieve a lifetime excess cancer risk not greater than 1×10^{-5} for a wildlife refuge worker (WRW). These ALs are listed in RFCA, Attachment 5, Table 3 (DOE et al. 2003).

Prior to the 2003 RFCA modification surface soil was defined as ground surface to 6 inches below ground surface (bgs). The 2003 RFCA Modification established accelerated action requirements based on exceedance of the plutonium-239/240 or americium-241 WRW soil AL within 0 to 3 feet (ft) bgs. These WRW soil ALs were calculated based on a surface soil (0-6 inches) model. Surface soil for nonradionuclides (and uranium) was defined as ground surface to 6 inches bgs. A Subsurface Soil Risk Screen (SSRS) was established for soil below 3 ft for plutonium-239/240 and americium-241, and below 6 inches for uranium and nonradionuclides.

Prior to 2000, characterization sampling was conducted in accordance with regulatory agency-approved Sampling and Analysis Plans (SAPs) for a specific IHSS or group of IHSSs within relatively close geographic proximity. To streamline the regulatory review process, existing IA and BZ characterization data were summarized (DOE 2000, 2001a), and two SAPs were developed, in accordance with RFCA, to direct the soil characterization activities: the Industrial Area Sampling and Analysis Plan (IASAP) (DOE 2001b) and the Buffer Zone Sampling and Analysis Plan (BZSAP) (DOE 2002). In 2004, the IA and BZ SAPs were combined into one Sitewide SAP titled the Industrial Area and Buffer Zone Sampling and Analysis Plan (IABZSAP) (DOE 2004). These SAPs, which were approved by the regulatory agencies, include detailed data quality objectives (DQOs) and methods for data analysis. Several other soil data

evaluation methods were used under RFCA (DOE et al. 2003) and include the sum of ratios (SORs), the hot spot methodology, the Stewardship Evaluation, and the SSRS.

SORs

In accordance with the IASAP and BZSAP, SORs were calculated for radionuclides and nonradionuclides for both Tier I and Tier II ALs. In response to the 2003 RFCA Modification, the SOR methodology was changed and described in the IABZSAP. In accordance with the IABZSAP, SORs were calculated for radionuclide and nonradionuclides separately, for surface soil only. Only analytes with concentrations greater than reporting limits (RLs) (for organic) or background means plus two standard deviations (metals and radionuclides) were included. Analytes were included in the SOR for nonradionuclides if their concentration was greater than 10 percent of the WRW soil AL. Additionally, analytes that are commonly found at RFETS that are not generally associated with past operations (aluminum, arsenic, iron, manganese, and polyaromatic hydrocarbons [PAHs]) were excluded.

Stewardship Evaluation

A Stewardship Evaluation was included in the Environmental Restoration (ER) RFCA Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2003) notifications to evaluate whether additional removal actions would be required to protect surface water resources. As part of the Stewardship Evaluation the relationship between contaminants in soil and corresponding contaminants in groundwater and surface water were assessed. The locations of current groundwater wells and surface water monitoring stations are shown on Figure 6.

Short- and long-term stewardship recommendations included in closeout or data summary reports are not reiterated in the HRR. Stewardship requirements will be included in the CAD/ROD for the Site.

Subsurface Soil Risk Screen

The 2003 RFCA Modification (DOE et al. 2003) included an SSRS to determine whether additional removal actions would be required to protect surface water resources. The SSRS is described in RFCA Attachment 5, Figure 3. As the title suggests, the SSRS is applicable to subsurface soil only—more than 3 ft bgs for americium-241 and plutonium-239/240, and more than 6 inches bgs for uranium and nonradionuclides.

Hot Spot Methodology

A hot spot methodology was developed for RFCA (DOE et al. 2003) accelerated actions and was described in the IASAP and BZSAP and slightly modified in the IABZSAP (DOE 2004). The hot spot methodology was used to determine whether action was required for isolated areas of elevated analyte concentrations in surface soil. In the hot spot methodology, the 95% upper confidence limit (UCL) was compared to the WRW soil AL and considered an area-weighting factor. Because the hot spot methodology included an area-weighting component, results for very small hot spots could have indicated action was not necessary for very high contaminant concentrations. To reduce this effect, if the concentration of the contaminant at a hot spot was three times the RFCA WRW soil AL, action was indicated. The “three times the AL” concept did not apply to ALs based on acute toxicity (DOE 2004).

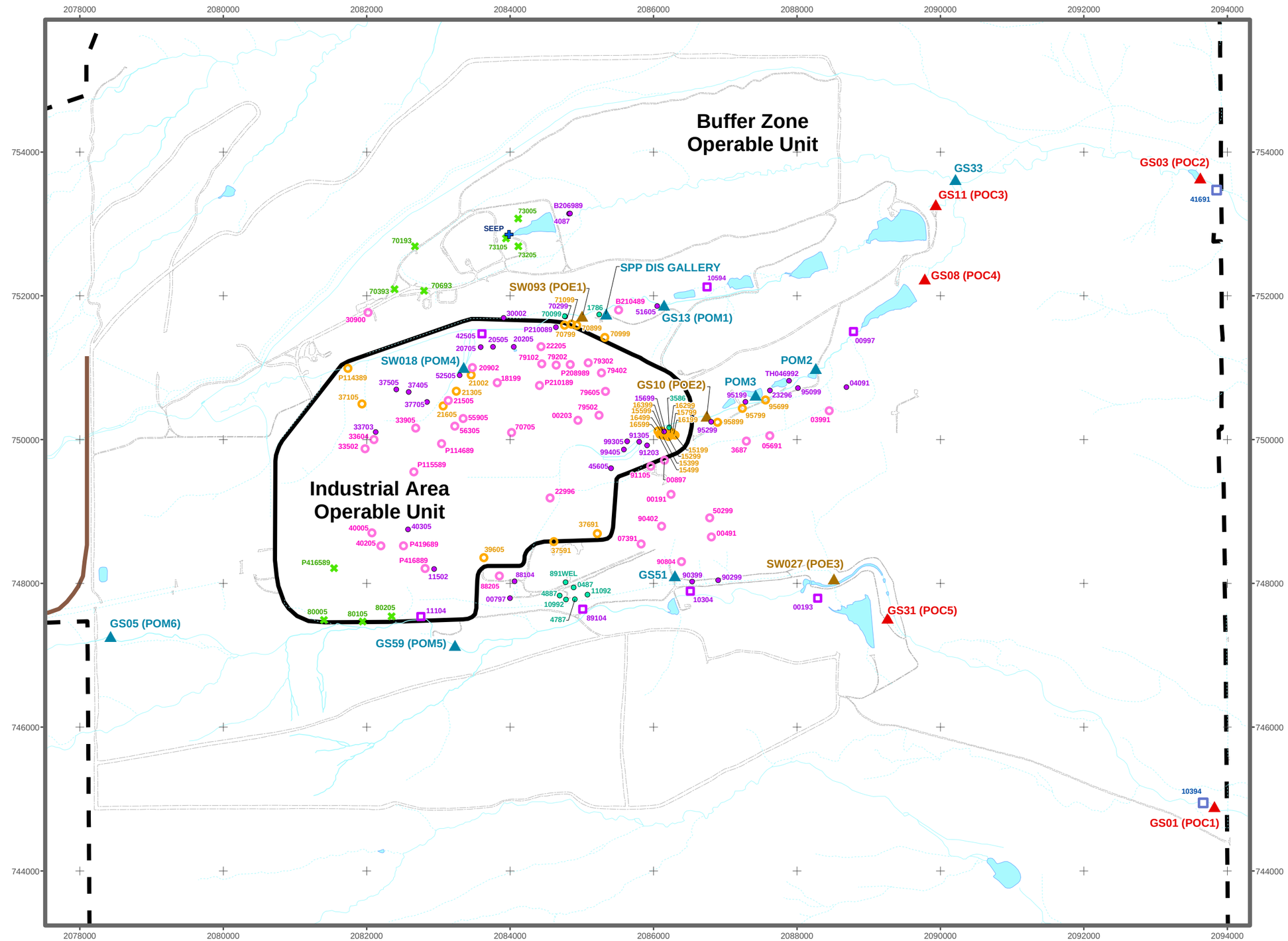

Figure 6

Rocky Flats Environmental Technology Site Groundwater and Surface Water Monitoring Locations FY05 IMP

Key

- AOC well
- Boundary well
- Sentinel well
- Decision Document well
- RCRA well
- Evaluation well
- Water Level well
- Surface water POM (Point of Measurement)
- Surface water POE (Point of Evaluation)
- Surface water POC (Point of Compliance)
- Seep

Note:
As of 8/1/05, some well installation/ replacements and surface water station removals have yet to be completed to reach the "final" network shown.

Source:
FY05, Rev. 1, Integrated Monitoring Plan, September 2005.

Standard Map Features

- Pond
- Site boundary
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Gravel road
- Dirt road

N
W E
S

0 1,400 2,800 Feet

Scale 1:16,800

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\05-0016\Dayton\HRR version Composite Mon Ntwks.mxd

September 29, 2005

1.3 HRR Format

In the original HRR, the Site was divided into Areas. These Areas form the basis of the PAC numbers. For example, PAC 900-112 is in the 900 Area. These area designations were retained for this Final HRR and are shown on Figure 7. Figures illustrating the IHSSs and PACs in each area are shown on individual figures at the beginning of each Area section.

The format of the FY2005 Final HRR has changed so that the information can be consolidated into a more useful format. Changes are briefly described below.

- Approximate Location - Deleted, new PAC locations are correctly shown on figures.
- Description of Operation or Occurrence – Consolidated into a new section, Historical Summary.
- Physical/Chemical Description of Constituents Released – Consolidated into a new section, Historical Summary.
- Response to Operation or Occurrence – Consolidated into new sections, Historical Summary or IHSS/PAC/UBC Investigations as appropriate.
- Fate of Constituents Released to the Environment – Consolidated into new sections, Historical Summary or IHSS/PAC/UBC Investigations as appropriate.
- Former Operable Unit number was added.
- HRR Update list was added.
- A brief summary was added.
- A section on IHSS/PAC/UBC Investigations was added that describes environmental investigations and applicable analytical results.
- No Further Accelerated Action (NFAA) Justification was added to summarize the NFAA justification.

1.3.1 Conventions

Where possible, maps and tables are referenced to the appropriate HRR update, closeout, or data summary report and are not shown in this update. References and discrepancies were checked and corrected as necessary. Document database references from the initial HRR were checked to determine their relevance to the No Further Action (NFA)/NFAA decision. If these references were part of the NFA/NFAA decision they were added to the reference list. All references cited were check to ensure that they were in the Administrative Record (AR).

There were several name changes since 1992 when the first HRR was released. Names and other designations used in the HRR are the names used at the time of the description or occurrence. For example, some writeups will reference the Rocky Flats Plant (RFP or Plant) in the historical section and RFETS in the IHSS/PAC/UBC Investigations section.

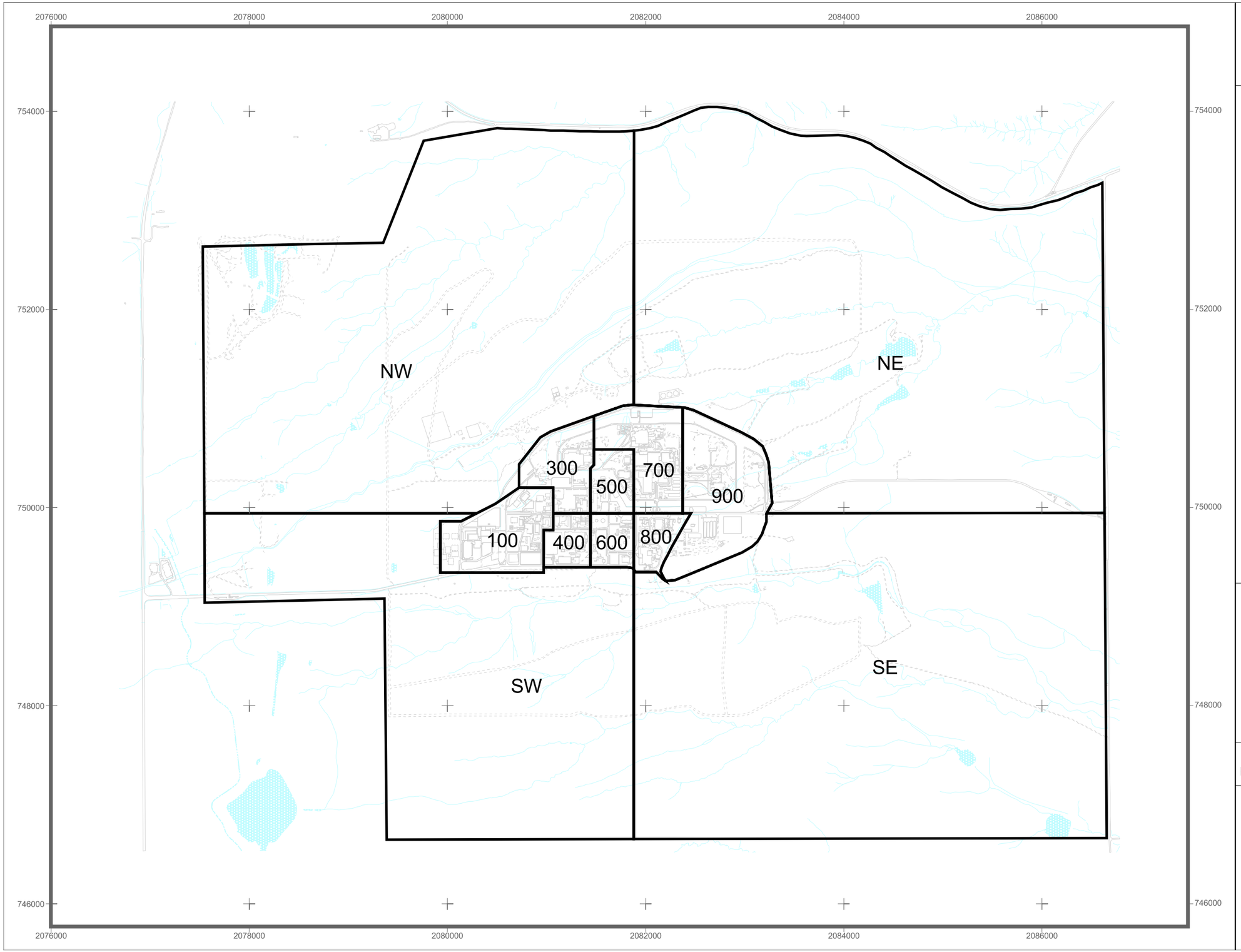

Figure 7
HRR Area Boundaries

KEY

- Area Boundary
- Asphalt
- Dirt Road
- Stream
- Lake
- Building

N
W E
S

1000 0 1000 2000 Feet

Scale = 1: 29500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_PAC_Areas.apr

RFETS vs RFP

In July 1994, the RFP was renamed the Rocky Flats Environmental Technology Site (RFETS).

NFA vs NFAA

Beginning in FY2003, the NFA designation was changed to No Further Accelerated Action (NFAA) to denote that other actions as determined in the CAD/ROD may be conducted.

CDH vs CDPHE

In a State government agency reorganization, CDH was legislatively abolished and its authority was transferred to a new agency, CDPHE, effective July 1, 1994.

RFFO vs RFPO

DOE Rocky Flats Field Office (RFFO) was used until 2005 when it was changed to Rocky Flats Project Office (RFPO).

1.4 Significant Events

Two significant events occurred at RFETS that are not captured in the FY2005 HRR writeups. These include the following:

- All buildings and structures were removed to at least 3 ft below grade. Building disposition documents are referenced in the FY2005 Final HRR if applicable to the PAC.
- The Site was recontoured and revegetated.

2.0 REFERENCES

DOE, 1986a, Draft Comprehensive Environmental Assessment and Response Program (CEARP) Phase I: Installation Assessment, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1986b, RCRA Part B Operating Permit Application for U.S. DOE-Rocky Flats Plant, Hazardous and Radioactive Mixed Wastes CO7890010526 RCRA 3004(u) Waste Management Units, November.

DOE, 1992-2004, Historical Release Reports for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, Quarterly and Annual Updates, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 1994, Programmatic Risk-Based Preliminary Remediation Goals for the Rocky Flats Plant, Golden, Colorado, October.

DOE, 2000, Rocky Flats Environmental Technology Site Industrial Area Data Summary Report, Golden, Colorado, September.

DOE, 2001a, Draft Rocky Flats Environmental Technology Site Buffer Zone Data Summary Report, Golden, Colorado, July.

DOE, 2001b, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Modification 1, Environmental Restoration RFCA Standard Operating Protocol Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Industrial Area and Buffer Zone Sampling and Analysis Plan, Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, EPA, and CDH, 1986, 1986 Compliance Agreement, CERCLA VIII-86-08 and RCRA VIII 86-06, July.

DOE, EPA, and CDH, 1991, Interagency Agreement (IAG), Rocky Flats Plant, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996 Rocky Flats Cleanup Agreement (RFCA), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

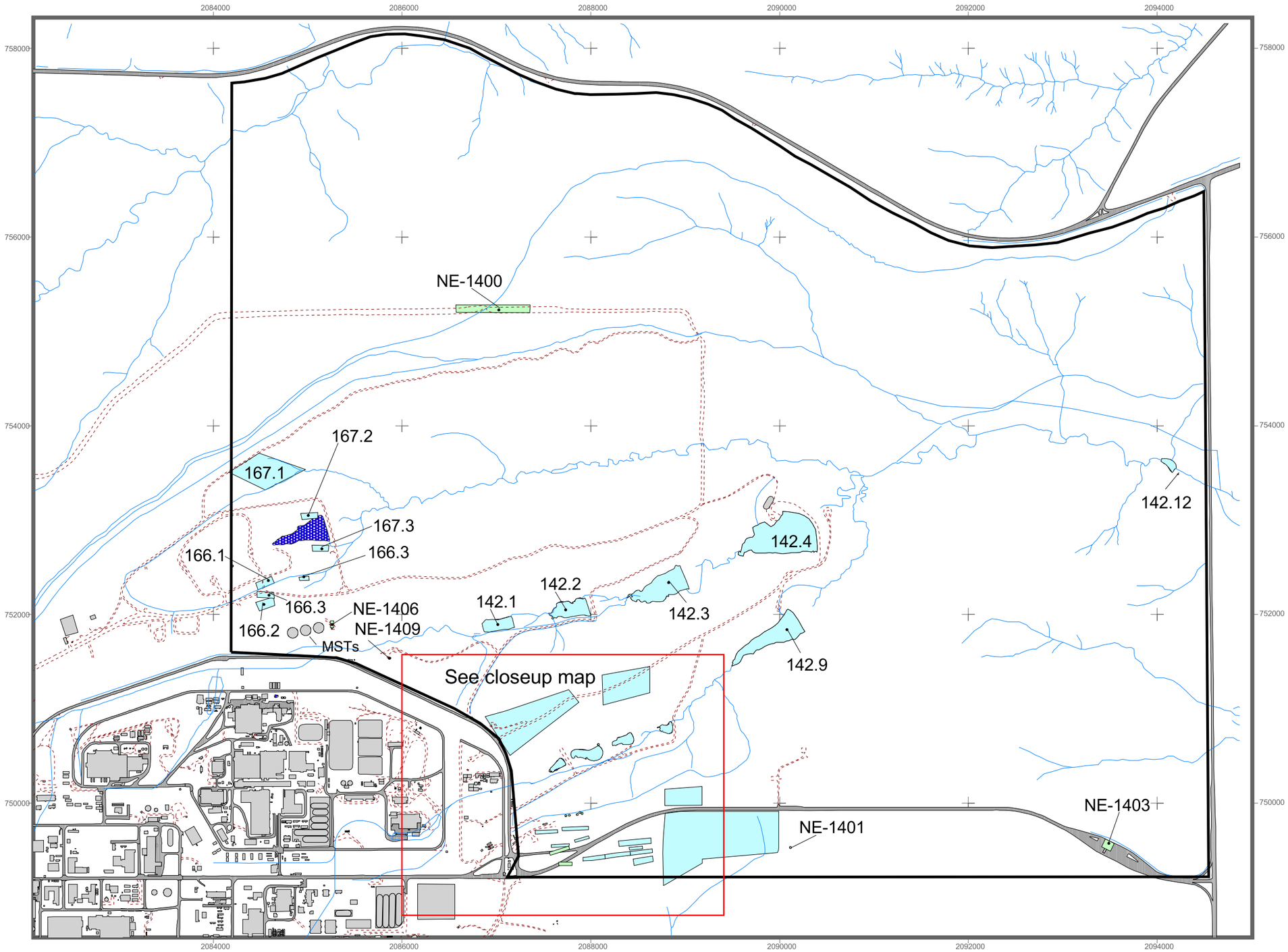

Figure 8
Northeast Buffer Zone Area
IHSSs and PACs

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

750 0 750 Feet

Scale = 1: 16500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_ne_bz_farout.apr

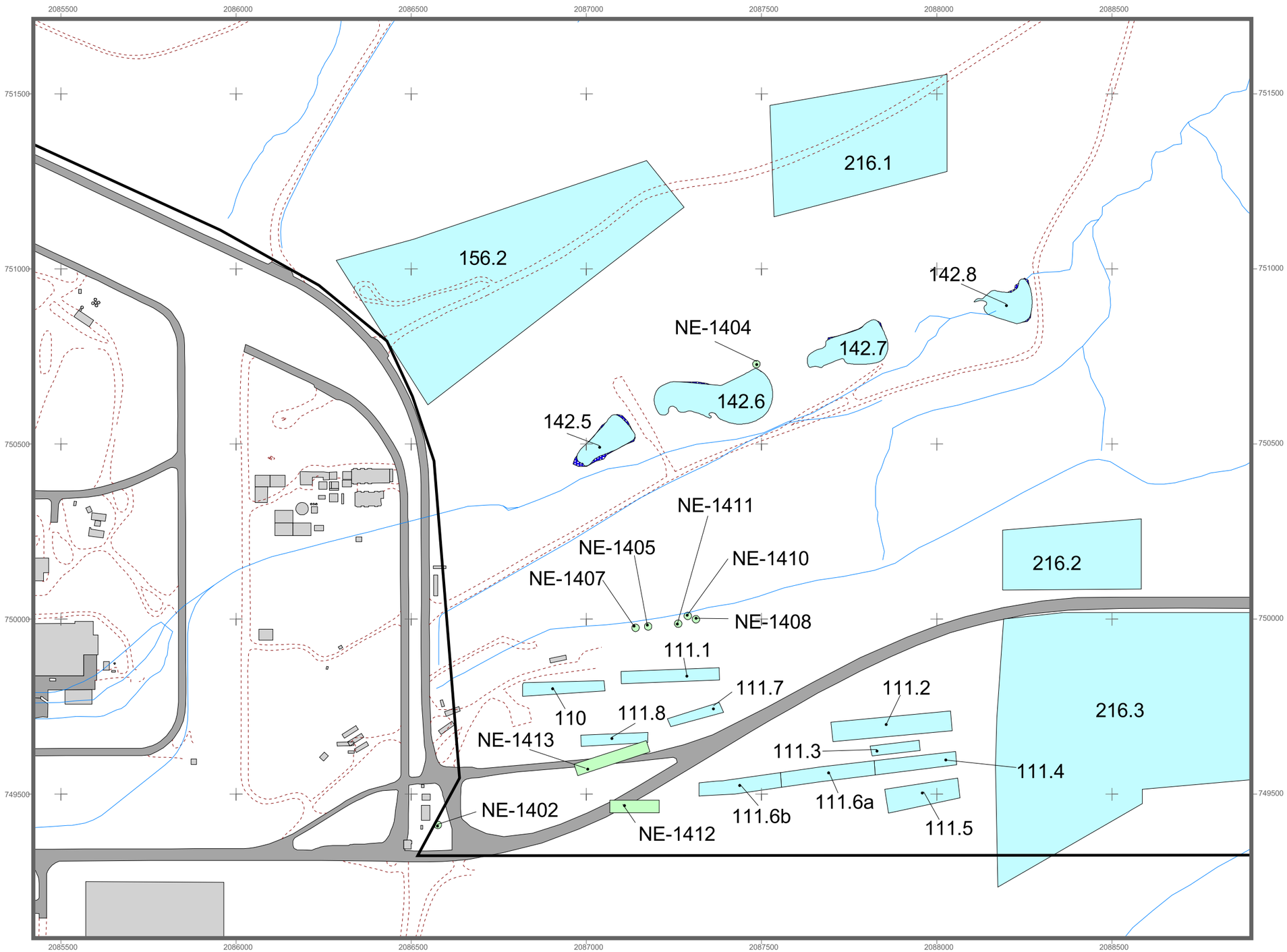

Figure 9
Northeast Buffer Zone Area
IHSSs and PACs Closeup View

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

250 0 250 Feet

Scale = 1: 5125

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_ne_bz_closeup.apr

PAC REFERENCE NUMBER: NE-110

IHSS Number:	110
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Trench T-3

This Final Update to the HRR for PAC NE-110 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 110 is summarized in this update. The following HRR volumes contain IHSS 110 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Annual (DOE 2000a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

After July 1954 to August 1968

Historical Summary

The term "East Trenches" refers to a group of disposal trenches that are located east of the IA and within approximately 400 ft north and south of the East Access Road. The location of IHSS 110 is shown on Figures 8 and 9. All of the East Trenches have similar operational histories. The trenches are variable in length, with the average length being approximately 250 ft (DOE 1992). The trenches are reported to be approximately 10 ft deep and are provided with 2 ft of soil cover.

The East Trenches (T-3 through T-13 [PACs NE-110, NE-111.1 - NE-11.8, NE-1412, and NE-1413]) were used primarily for the disposal of sanitary wastewater treatment plant sludge, which consisted primarily of concentrated organic matter. Sludge removed from the wastewater treatment plant was placed on sludge drying beds (PAC 900-1300) and the dried material removed from the sludge drying beds was placed in disposal trenches. An estimated 125,000 kilograms (kg) of sludge is buried in Trenches T-2 through T-13 (DOE 1992).

Some uranium and plutonium contamination is present in the sludge disposed in the trenches. It is reported that the older sludge would have primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination. Total reported long-lived alpha activity present in the sludge ranged from a minimum of 382 picocuries per gram (pCi/g) in August 1964 to a maximum of 3,591 pCi/g in June 1960 (DOE 1992).

Uranium contamination may also be present in as many as 300 flattened drums that may have been disposed in any of Trenches T-2 through T-11. Contaminated oils that had previously been held in the drums were burned in Oil Burn Pit No. 2 (PAC 900-153) from March 1957 to mid-1965 (DOE 1992).

On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. This waste had an average activity of 150,000 disintegrations per minute per liter (dpm/L). It is believed that this is total alpha activity. The activity of this material was reported as 1.35 x 10^8 disintegrations per minute (dpm) with approximately 1.3 kg of depleted uranium present in the waste. It is unknown whether this material was in drums (DOE 1992).

Trench T-3 was used primarily for the disposal of sanitary wastewater and sewage treatment plant (STP) sludge. Miscellaneous waste including crushed drums, asphalt planking, and construction debris was also disposed of in Trench T-3 (DOE 1996a). Flattened drums contaminated with uranium were buried in Trench T-3 (DOE 1996a).

IHSS Investigations

OU 2 RFI/RI Activities

IHSS 110 was investigated as part of the OU 2 RCRA Facility Investigation/Remedial Investigation (RFI/RI) in accordance with the OU 2 RFI/RI Work Plans (DOE 1991a, 1991b). Three soil boreholes, four monitoring wells, and eight soil vapor extraction (SVE) boreholes were drilled and sampled to characterize the nature and extent of contamination in Trench T-3. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and radionuclides were considered contaminants of concern (COCs) for this IHSS. Results of the Phase II RFI/RI can be found in the OU 2 Phase II RFI/RI Report (DOE 1995).

Surface Soil

Surface soil in OU 2 was investigated by sampling randomly selected plots. One of these plots was in the IHSS 110 area, and was sampled for SVOCs, pesticides/polychlorinated biphenyls (PCBs), metals, and radionuclides. Five SVOCs and all PAHs were detected at relatively low concentrations. No pesticides or PCBs were detected, and calcium was the only metal detected above background. Seven radionuclides were detected above background levels, but all were well below RFCA soil ALs (DOE et al. 1996).

Subsurface Soil

Thirteen VOCs were detected in subsurface samples collected at Trench T-3. Tetrachloroethene was detected in 49 percent of all samples, and chlorinated methanes (methylene chloride, chloroform, and carbon tetrachloride) were each detected in approximately one-third of all samples.

Other detected VOCs include 2-butanone, acetone, trichloroethene, 1,1,1-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, and 1,2-dichloroethene. The highest detections were of tetrachloroethene at 13,000,000 micrograms per kilogram (µg/kg) and carbon tetrachloride at 700,000 µg/kg.

“Free product” was reportedly encountered in one borehole drilled in IHSS 110, and nonaqueous phase liquid (NAPL) was encountered and sampled from an SVE pilot test boring. Results

indicated the NAPL was composed chiefly of tetrachloroethene and trichloroethene with lesser amounts of other chlorinated solvents, gasoline and diesel, and SVOCs such as naphthalene, phthalate esters, n-nitrosodimethylamine, phenanthrene, and anthracene.

Bis(2-ethylhexylphthalate) was detected in 100 percent of IHSS 110 subsurface soil samples that were analyzed for SVOCs. One other phthalate ester, two naphthalene compounds, and one PAH were detected at frequencies of approximately 5 to 10 percent.

Metals detected above background levels in IHSS 110 included arsenic and cadmium in 19 percent and 30 percent of samples, respectively. Barium, calcium, lead, manganese, and silver were also elevated in 4.8 to 9.5 percent of samples analyzed.

Plutonium-239/240, americium-241, and radium-226 were detected above subsurface soil background levels in 68 percent, 42 percent, and 40 percent of all samples respectively. Strontium-89/90 and uranium-238 were each elevated in 15.8 percent of samples, while tritium, uranium-233/234, and uranium-235 were elevated in approximately 5 to 10 percent of samples.

Groundwater

Groundwater was sampled in the T-3 and T-4 area. The COCs included VOCs, SVOCs, pesticides, metals, and radionuclides. Chlorinated solvents were the primary contaminants in groundwater, with trichloroethene, carbon tetrachloride, and tetrachloroethene at concentrations greater than RFCA groundwater ALs (DOE et al. 1996). Other contaminants detected included metals and radionuclides at levels exceeding background but not exceeding RFCA groundwater ALs.

Installation of a mobile SVE and treatment system began in August 1993. The purpose of the treatment system was to evaluate SVE treatment at the Site. Pilot testing was conducted between February and June 1994 (DOE 1994). A full-scale system was never constructed and instead, a source removal was conducted in 1996.

The East Trenches Plume Treatment System collects and treats VOC-contaminated groundwater emanating from the area around Trench T-3 and Trench T-4. The treatment system, which was completed in September 1999, consists of a 1,200-ft-long collection system, and two reactive iron treatment cells. This project is described in the Final East Trenches Plume Project Closeout Report (DOE 2000b).

Trench T-3 Source Removal

Results of the OU 2 RFI/RI at Trenches T-3 and T-4 indicated a source of chlorinated solvent contamination in groundwater was present at these trenches in the form of NAPL and contaminated subsurface soil.

Based on these findings, a source removal action was conducted in summer 1996 to excavate and treat contaminated material using low-temperature thermal desorption (LTTD). This action was in accordance with the Proposed Action Memorandum (PAM) for the Source Removal at Trenches T-3 and T-4, dated March 28, 1996 (DOE 1996b). Approximately 1,706 cubic yards (cy) of VOC-contaminated material was removed from Trench T-3 and treated.

Excavation was completed July 3, 1996, and treatment of Trench T-3 material was completed by July 11, 1996. The completion report for the project details the treatment process, contaminants removed, condition of the trench following the removal action, and analytical results (DOE 1996c).

Approximately 200 cy of debris (primarily crushed drums) were removed from the trench, treated if contaminated with VOCs, and packaged for off-site disposal. During packaging, 1 to 2 pounds of a black material was released from a drum and spread over a small work area. The material was radioactive and may have been depleted uranium. Two roll-off containers and two waste crates were used to contain the soil contaminated with this material (DOE 1996c). The containers were shipped to an approved off-site disposal facility.

Soil treated as part of the source removal action was returned to the trench upon review of the post-treatment analytical data to confirm cleanup ALs were met. Debris excavated from the trench was characterized, treated, size-reduced, and containerized. Containerized debris was shipped to the Nevada Test Site (NTS) in September 1997. The source removal action for Trench T-3 removed contamination sources in accordance with cleanup values stipulated in the PAM. Review of the analytical data from this removal action indicated disposal of the 2,400 gallons of water and lathe coolant from Building 444 did not occur in Trench T-3. Analytical data for this project are documented in the Completion Report for the Source Removal at Trenches T-3 and T-4, IHSSs 110 and 111.1 (DOE 1996c).

Accelerated Action Activities

In 2004, early accelerated action results for samples collected in the backfill overlying Trenches T-6 and T-8 indicated this material was contaminated with plutonium-239/240 at activities exceeding the WRW soil AL (DOE et al. 2003). Because OU 2 and the Trench and Mound Site Characterization sampling programs focused on the contents of the trenches and not the backfill covering them, sampling data for the backfill were limited. Therefore, DOE and the regulatory agencies agreed that additional samples would be collected at Trenches T-3, T-4, T-5, T-10, and T-11 in the A and B depth intervals (0-0.5 ft bgs and 0.5-2.5 ft bgs). Radionuclides were the only analytes. The additional sampling was documented in a Regulatory Contact Record (RCR) dated September 2, 2004, and was conducted as part of the accelerated action sampling for IHSS Group 900-12 (DOE 2005).

For Trench T-3, a total of six samples were collected from three locations. All results were less than RFCA WRW soil ALs (DOE et al. 2003), and therefore no additional remediation was required (DOE 2005).

No Further Action Recommendation

The post-treatment levels of VOCs in the treated soil returned to Trench T-3 were less than the thermal desorption unit performance standards specified in the PAM (DOE 1996b), as documented in the completion report (DOE 1996c). Additionally, the excavation verification sample results for the COCs from Trench T-3 were less than the cleanup values stipulated in the PAM (DOE 1996c). These cleanup values were consistent with the RFCA Tier I subsurface soil ALs (DOE et al. 1996). Detectable VOCs in the excavation verification samples for Trench T-3 included carbon tetrachloride in one sample at a concentration of 1.8 parts per million (ppm) and tetrachloroethene in three samples with concentrations ranging from 0.74 ppm to 6.3 ppm. Approved cleanup levels for carbon tetrachloride and tetrachloroethene were 11 ppm and 11.5 ppm, respectively (DOE 1996c).

IHSS 110 was proposed for NFA in the 1997 and 2000 Annual Updates to the HRR because the source removal and treatment goals specified in the PAM (DOE 1996b) were achieved and were consistent with the ALs agreed upon in RFCA (DOE et al. 1996). In accordance with the PAM

(DOE 1996b), the source removal was considered complete because the verification sample concentrations were below cleanup levels and/or completed upon reaching groundwater or bedrock.

The regulatory agencies approved an NFA as proposed for IHSS 110 on October 2, 2001. The NFA agreement, however, was conditional based upon clarification regarding why an original HRR (DOE 1992) reference pertaining to 2,400 gallons of lathe coolant was deleted from the PAC NE-110 Narrative Update in the Annual Update for FY2000. As agreed, an explanation is provided in the Comments section below. Regulatory agency concurrence of NFA status for IHSS 110 was received in 2003 (EPA 2003).

Following accelerated action sampling of Trench T-3 cover material in 2004, NFAA was again proposed for Trench T-3 in an Addendum to the No Further Action Justification for Trenches T-3 and T-4 (DOE 2005). DOE received EPA (the Lead Regulatory Agency [LRA]) approval of the NFAA status for NE-110 on March 7, 2005 (EPA 2005).

Comments

The PAC Narrative Update for PAC NE-110 submitted in the 1997 Annual Update to the HRR states that no evidence could be found either from physical excavation or analytical data review to support the 1992 HRR reference pertaining to 2,400 gallons of lathe coolant being disposed of in one of the East Trenches. Recent additional review of referenced material supporting the 1992 HRR did not provide further details as to where the lathe coolant was disposed. The 2000 Annual Update removed text regarding the lathe coolant because the PAC Narrative was site-specific to current information regarding Trench T-3. The 1992 HRR for the East Trenches is generally comprehensive, grouping all the information for all the trenches and is not site-specific. It is also possible that the liquid potentially disposed of in one of the East Trenches was diluted sufficiently so that no residual effect was identified, or that the coolant never reached the East Trenches.

References

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, OU 2 Subsurface IM/IRA Site No. 1, Soil Vapor Extraction Pilot Test Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1995, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Proposed Action Memorandum for the Source Removal at Trenches T-3 and T-4 IHSSs 110 and 111.1, Revision 2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1996c, Completion Report for the Source Removal at Trenches T-3 and T-4 IHSSs 110 and 111.1, Revision 2, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000b, Final East Trenches Plume Project Closeout Report, Fiscal Year 1999, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Addendum No Further Accelerated Action Justification for Trenches T-3 and T-4 PAC Reference Numbers NE-110 and NE-111.1, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to J. Legare, DOE Rocky Flats Field Office, from T. Rehder, EPA Region VIII, RE: No Further Action Justification for Ash Pits PAC Reference Numbers SW 133.1, SW-133.2, SW-133.4, and 1702 (dated June 11, 2003), NFAA Justification for Trench T-7 PAC Reference Number: NE-111.4 (dated May 21, 2003), NFAA Justification for Trenches T-3 and T-4 PAC Reference Numbers 110 and 111.1 (dated May 21, 2003), June 12.

EPA, 2005, Correspondence to J. Legare, DOE Rocky Flats Project Office, from C. M. Aguilar, EPA Region VIII, RE: Draft Addendum No Further Accelerated Action Justification for Trenches T-3 and T-4, March 7, 2005.

PAC REFERENCE NUMBER: NE-111.1

IHSS Number:	111.1
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Trench T-4

This Final Update to the HRR for PAC NE-111.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 111.1 is summarized in this update. The following HRR volumes contain IHSS 111.1 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2003 Annual (DOE 2003).

Date(s) of Operation or Occurrence

July 1954 to August 1968

Historical Summary

The term "East Trenches" refers to a group of disposal trenches that are located east of the IA and within approximately 400 ft north and south of the East Access Road. The location of Trench T-4 is shown on Figures 8 and 9. All of the East Trenches have similar operational histories. The trenches are variable in length, with the average length being approximately 250 ft (DOE 1992). The trenches are reported to be approximately 10 ft deep and are provided with 2 ft of soil cover.

Not all documents pertaining to the East Trenches have presented a consistent numbering system. Current trench numbering reflects several modifications. Comparisons of a 1983 document to earlier documents indicate a trench that had previously been referred to as Trench T-4 became T-11, while the T-4 designation was applied to an extension of T-3 (DOE 1992).

The East Trenches (T-3 through T-13 [PACs NE-110, NE-111.1 - NE-11.8, NE-1412, and NE-1413]) were used primarily for the disposal of sanitary wastewater treatment plant sludge, which consisted primarily of concentrated organic matter. Sludge removed from the wastewater treatment plant was placed on sludge drying beds and the dried material removed from the sludge drying beds was placed in disposal trenches. An estimated 125,000 kg of sludge is buried in trenches T-2 through T-13 (DOE 1992).

Some uranium and plutonium contamination is present in the sludge disposed in the trenches. It is reported that the older sludge would have primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination. Total reported long-lived alpha

activity present in the sludge ranged from a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960 (DOE 1992).

Uranium contamination may also be present in as many as 300 flattened drums that may have been disposed in any of Trenches T-2 through T-11. Contaminated oils that had previously been held in the drums were burned in Oil Burn Pit No. 2 (IHSS 153) from March 1957 to mid-1965 (DOE 1992).

Other materials disposed in the East Trenches include approximately 130,000 square feet (ft^2) of asphalt planking from the Solar Evaporation Ponds (SEP) (PAC 000-101), which were disposed in T-4 and T-11 in 1963. On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. This waste had an average activity of 150,000 dpm/L. It is believed that this is total alpha activity. The activity of this material was reported as 1.35×10^8 dpm with approximately 1.3 kg of depleted uranium present in the waste. It is unknown whether this material was in drums (DOE 1992).

Trench T-4 was used primarily for the disposal of sanitary wastewater and STP sludge. Miscellaneous waste including crushed drums, asphalt planking, and construction debris was also disposed of in Trench T-4 (DOE 1996a). Flattened drums were identified in Trench T-4 (DOE 1996b).

IHSS Investigations

OU 2 RFI/RI Activities

IHSS 111.1 was investigated as part of the OU 2 RFI/RI in accordance with the OU 2 RFI/RI Work Plans (DOE 1991a, 1991b). Two soil boreholes and one monitoring well were drilled and sampled to characterize the nature and extent of contamination in Trench T-4. VOCs, SVOCs, metals, and radionuclides were considered COCs for this IHSS. The results of the Phase II RFI/RI can be found in the OU 2 RFI/RI Report (DOE 1995).

Surface Soil

Surface soil in OU 2 was investigated by sampling randomly selected plots. One of these plots was in the IHSS 111.1 area, and was sampled for SVOCs, pesticides/PCBs, metals, and radionuclides. Five SVOCs and all PAHs, were detected at relatively low concentrations. No pesticides or PCBs were detected, and calcium was the only metal detected above background. Seven radionuclides were detected above background levels, but all were well below RFCA soil ALs (DOE et al. 1996).

Subsurface Soil

Six VOCs were detected in subsurface samples collected at Trench T-4 (IHSS 111.1). Detected VOCs include 1,1,2,2-trichloroethane, acetone (140 µg/kg), dichloromethane, tetrachloroethene (12,000 µg/kg), trichloroethene (1,000 µg/kg), and toluene; 4,4-DDT and Aroclor-1254 were detected at one location. Metal COCs included arsenic and cadmium, although most metals were detected at concentrations greater than background.

Plutonium-239/240, americium-241, and uranium-233/234, uranium-235, and uranium-238 were detected above subsurface soil background levels. Maximum activities include plutonium-239/240 at 15 pCi/g, americium-241 at 3 pCi/g, uranium-233/234 at 192 pCi/g, uranium-235 at 11.5 pCi/g, and uranium-238 at 113 pCi/g.

Groundwater

Groundwater was sampled in the IHSS 111.1 area where the COCs included VOCs, SVOCs, pesticides, metals, and radionuclides. Chlorinated solvents were the primary contaminants in groundwater, with trichloroethene, carbon tetrachloride, and tetrachloroethene at concentrations greater than RFCA groundwater ALs. Other contaminants detected included metals and radionuclides at levels exceeding background but not exceeding RFCA groundwater ALs (DOE et al. 1996).

The East Trenches Plume Treatment System collects and treats VOC-contaminated groundwater emanating from the area around Trench T-3 and Trench T-4. The treatment system, which was completed in September 1999, consists of a 1,200-ft-long collection system, and two reactive iron treatment cells. This project is described in the Final East Trenches Plume Project Closeout Report (DOE 2000).

Trench T-4 Source Removal

Results of the OU 2 RFI/RI at both Trenches T-3 and T-4 indicated a source of chlorinated solvents was present at these trenches in the form of NAPL and contaminated soil, and that groundwater had been contaminated as a result.

Based on these findings, a source removal action was conducted in summer 1996 to excavate and treat contaminated material using LLTD. This action was conducted in accordance with the PAM for the Source Removal at Trenches T-3 and T-4 (dated March 28, 1996) (DOE 1996c). Approximately 2,090 cy of VOC-contaminated material was removed from Trench T-4 (IHSS 111.1) and treated. The completion report for the project details the treatment process, contaminants removed, condition of the trench following the removal action, and analytical results (DOE 1996b).

Approximately 150 cy of debris—primarily crushed drums and miscellaneous construction debris—was also removed from Trench T-4, treated by low-temperature thermal desorption if contaminated with VOCs, and packaged for off-site disposal. The soil treated as part of the source removal action was returned to the trench. Debris excavated from the trench was also treated, size reduced, containerized, and characterized. The containerized debris was shipped to NTS in September 1997.

The source removal action for Trench T-4 resulted in the removal of contamination sources with concentrations greater than the cleanup values stipulated in the PAM with the exception of one area. As detailed in the PAM, excavation at Trench T-4 would stop if bedrock were encountered (DOE 1996b). Bedrock was encountered in the excavation at approximately 20 ft bgs. With concurrence from EPA and CDPHE, excavation ceased and verification samples were collected. The results for these samples indicated the cleanup levels specified in the PAM (DOE 1996b) were achieved in all but 1 of the 16 sampling grids. A level of 22 ppm of trichloroethene was detected in the sample from primary grid 32 (DOE 1996c).

In accordance with an agreement with the regulatory agencies, approximately 250 cy of soil from Trenches T-3 and T-4 with radiological activity greater than RFCA Tier II soil ALs were returned to Trench T-4 within a geotextile liner (DOE 1996b). The maximum activities of radionuclides in the geotextile were 4.36 pCi/g of uranium-234, 5.75 pCi/g of uranium-235, 358.44 of uranium-238, 3.11pCi/g of americium-241, and 15.57 pCi/g of plutonium-239/240 (DOE 2003).

Accelerated Action Activities

In 2004, early accelerated action results for samples collected in the backfill overlying Trenches T-6 and T-8 indicated this material was contaminated with plutonium-239/240 at activities exceeding the WRW soil AL (DOE et al. 2003). Because OU 2 and the Trench and Mound Site Characterization sampling programs focused on the contents of the trenches and not the backfill covering them, sampling data for the backfill were limited. Therefore, DOE and the regulatory agencies agreed that additional samples would be collected at Trenches T-3, T-4, T-5, T-10, and T-11 in the A and B depth intervals (0-0.5 ft bgs and 0.5-2.5 ft bgs). Radionuclides were the only analytes. The additional sampling was documented in an RCR dated September 2, 2004, and was conducted as part of the accelerated action sampling for IHSS Group 900-12.

For Trench T-4, a total of six samples were collected from three locations on September 23, 2004. The plutonium-239/240 result for the 0- to 0.5-ft sample collected at CW42-009 was 74.39 pCi/g, which exceeded the WRW AL of 50 pCi/g. The hot spot identified at CW42-009 was remediated in October 2004. A volume of soil occupying 4 ft by 4 ft by 1.3 ft was removed. Five confirmation samples were collected from the excavation and analyzed by alpha spectroscopy. All results were below WRW soil ALs (DOE 2005).

No Further Action Recommendation

The SSRS and RFCA Tier II soil ALs were applied to the buried soil that is enveloped in a geotextile liner in this IHSS. Uranium-238 is the only analyte whose concentration in the soil exceeds the soil ALs, and it exceeds the uranium-238 RFCA Tier II soil AL (DOE et al. 1996) in only one sample (and only by 2 percent). Furthermore, Trench T-4 is not in an area prone to landslides where the soil could become exposed at the surface in the future; and there is a downgradient groundwater collection and treatment system to capture contamination, if any, that may be released at Trench T-4. There is no potential for surface water standards to be exceeded at a Point of Compliance (POC) because of the downgradient groundwater treatment system and the insignificance of the erosional pathway. Accordingly, removal of the buried soil in Trench T-4 was not required.

NFAA for Trench T-4 was proposed in the 1997 Annual Update for the HRR (DOE 1997), and DOE obtained regulatory agency approval of the NFAA status of Trench T-4 on July 9, 1999 (CDPHE and EPA 1999). Comments provided with the approval letter indicated the approval may need to be reviewed if the ALs were revised in the future. New soil ALs, for protection of a WRW, were approved in June 2003 (DOE et al. 2003). The buried soil in Trench T-4 that is enveloped in a geotextile fabric was reassessed using the new ALs and the SSRS.

DOE received EPA (the LRA) and CDPHE approval of NFAA status for PAC NE-111.1 on July 12, 2003 (CDPHE and EPA 2003).

Following accelerated action sampling and soil removal, NFAA was again proposed for IHSS 111.1 in an Addendum to the NFAA Justification for NE-110 and NE-111.1 (DOE 2005). DOE received EPA (the LRA) approval of the Addendum on March 7, 2005 (EPA 2005).

References

CDPHE and EPA, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: No Further Action Justification for Ash Pits PAC Reference Numbers SW 133.1, SW-133.2, SW-133.4, and 1702 (dated June 11, 2003), NFAA

Justification for Trench T-7 PAC Reference Number: NE-111.4 (dated May 21, 2003), NFAA Justification for Trenches T-3 and T-4 PAC Reference Numbers 110 and 111.1 (dated May 21, 2003), June 12.

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Completion Report for the Source Removal at Trenches T-3 and T-4 IHSSs 110 and 111.1, Revision 2, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996c, Proposed Action Memorandum for the Source Removal at Trenches T-3 and T-4 IHSSs 110 and 111.1, Revision 2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1996d, Letter from S. Slaten, DOE Rocky Flats Field Office, to T. Rehder, EPA, RE: Agreements reached regarding disposition of soils excavated from Ryan's Pit, T-3, and T-4, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Final East Trenches Plume Project Closeout Report, Fiscal Year 1999, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Addendum No Further Accelerated Action Justification for Trenches T-3 and T-4 PAC Reference Numbers NE-110 and NE-111.1, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE RFPO, from C. M. Aguilar, EPA Region VIII, RE: Draft Addendum No Further Accelerated Action Justification for Trenches T-3 and T-4, March 7, 2005.

EPA and CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Region VIII, and S. Gunderson, CDPHE, RE: 1997 Annual HRR Review, July 9.

PAC REFERENCE NUMBERS: NE-111.2, NE-111.3, NE-111.5 – NE-111.8

IHSS Reference Numbers: 111.2, 111.3, 111.5 – 111.8

Current Operable Unit: BZ

Former Operable Unit: 2

IHSS Group: 900-12

Unit Names: Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11.

This Final Update to the HRR for PACs NE-111.2, NE-111.3, NE-111.5, NE-111.6a, NE-111.6b, NE-111.7, and NE-111.8 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8 is summarized in this update. The following HRR volumes contain information for IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

July 1954 to August 1968

Historical Summary

The term "East Trenches" refers to a group of disposal trenches that were located east of the IA and within approximately 400 ft north and south of the East Access Road. All of the East Trenches have similar operational histories, but some have been written up separately for purposes of the Final Update to the HRR. This writeup pertains only to Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11 (IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8). Other trenches in the East Trenches are considered separately in this HRR Update because of having been remediated or proposed for NFAA as separate entities. These other trenches include T-3, T-4, T-7, T-12, and T-13 (IHSSs 110, 111.1, and 111.4, and PACs NE-1412 and NE-1413). Figures 8 and 9 indicate the locations of the trenches.

The trenches are variable in length, with the average length being approximately 250 ft (DOE 1992). The trenches are reported to be approximately 10 ft deep and are provided with 2 ft of soil cover.

The East Trenches (T-3 through T-13) were used primarily for the disposal of sanitary wastewater treatment plant sludge, which consisted primarily of concentrated organic matter. Sludge removed from the wastewater treatment plant was placed on sludge drying beds and the dried material removed from the sludge drying beds was placed in disposal trenches. An estimated 125,000 kg of sludge is buried in Trenches T-2 through T-13 (DOE 1992).

Uranium and plutonium contamination were in the sludge. Total reported long-lived alpha activity present in the sludge ranged from a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960 (DOE 1992). Uranium contamination may also be present in 300 flattened drums that may have been disposed in any of East Trenches.

Other materials that may be present in the East Trenches include contaminated oils, approximately 130,000 ft^2 of asphalt planking from the redesign of SEP Pond 207A (PAC 000-101) in Trench T-11, lathe coolant generated in Building 444 with an average activity of 150,000 dpm/L, depleted uranium, and scrap metal and junk in Trench T-9a (DOE 1992).

Between 1977 to1983, soil samples were collected from Trenches T-9a, T-10, and T-11. Soil from Trench T-9a was found to vary from 0.40 to 68 pCi/g in plutonium activity, and from 2.4 to 450 pCi/g uranium activity. Trench T-10 was found to contain from 0.18 to 14 pCi/g plutonium activity and from 40 to 126 pCi/g uranium activity. Trench T-11 was found to contain 4.5 to 50 pCi/g plutonium activity and 0.9 to 158 pCi/g in uranium activity (DOE 1992).

IHSS Investigations

OU 2 RFI/RI Activities

In accordance with the OU 2 RFI/RI Work Plans (DOE 1991a, 1991b), the East Trenches were characterized during the Phase I and Phase II OU 2 RFI/RI Investigations, but these investigations did not provide the data necessary to determine dimensions and boundaries of the trenches, or areas of high concentration of contaminants in the trenches (DOE 1995a). For example, while at least one borehole was drilled into each trench, drilling through the base of the trenches into the underlying soil was excluded because of the uncertainties in the trench contents, and in whether the area beneath the trenches was contaminated. Drilling through the trenches could potentially have created pathways for contaminants to migrate downward into uncontaminated areas.

Trenches and Mound Site Characterization Activities

In 1995 and 1996, further investigations of the East Trenches area were conducted in accordance with the Trenches and Mound Site Characterization Work Plan (DOE 1995b). This investigative program used several approaches to meet project objectives: historical data were compiled to identify potential contaminants, trench location, and size; aerial photographs were examined to identify disturbed areas, verify trench dimensions, and determine dates of operation; a visual survey was conducted to identify features on the ground and to lay out a geophysical sampling grid; two electromagnetic surveys were conducted to delineate magnetic anomalies and trench boundaries; ground penetrating radar (GPR) surveys were conducted to better determine trench depth and extent; soil gas surveys were conducted to identify and delineate VOC plumes; and subsurface soil sampling was conducted to verify soil gas survey results and to better define the extent of metal and radionuclide contamination (DOE 1996).

With regard to Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11 (IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8), the Trenches and Mound Site Characterization Report concluded that there were no contaminant concentrations or activities in subsurface soil exceeding the applicable 1996 RFCA soil ALs (DOE et al. 1996), and no groundwater contaminant plumes originating from these particular trenches. Upper hydrostratigraphic unit (UHSU) monitoring wells installed in the T-5 through T-9a/b area were frequently dry, indicating the frequent absence of a groundwater pathway. Based on the absence of both sources at Trenches T-5, T-6, and T-8 through T-11 and viable pathways, it was recommended that these trenches not be remediated.

Accelerated Action Activities

Accelerated action sampling in accordance with BZSAP Addendum #BZ-04-2 (DOE 2003a) was conducted at Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11 in order to fill gaps in the existing data (DOE 2003b). Soil from Trenches T-6, T-8, T-9a, and T-9b was collected at multiple depths and analyzed for multiple analyte groups because limited historical data were available. Soil from Trenches T-5, T-10, and T-11 was sampled only from the surface and near-surface intervals (less than 2.5 ft bgs) because sufficient historical data existed for deeper soil. Radionuclides were the only COCs identified for these samples (DOE 2005).

IHSS 111.2, Trench T-5

Based on results of the OU 2 RFI/RI, seven VOCs were detected in subsurface soil including acetone at a maximum concentration of 2,400 µg/kg and 1,2-dichloroethane at 100 µg/kg. All other VOC concentrations were close to detection limits. SVOC concentrations were also low. The maximum arsenic concentration was 14.6 milligrams per kilogram (mg/kg) and the maximum cadmium concentrations was 3.8 mg/kg. Americium-241, cesium-137, and plutonium-239/240 were the only radionuclides at activities greater than background with maximum activities of 0.53, 0.1, and 6 pCi/g, respectively (DOE 1995a).

The results of the Trenches and Mound Site characterization (DOE 1996) indicated the maximum concentrations of arsenic was 14.6 mg/kg, nickel was 173 mg/kg, and cadmium was 20.8 mg/kg. The maximum radionuclide activities were 2.09 pCi/g of americium-241 and 11.8 pCi/g of plutonium-239/240.

Results of accelerated action soil sampling (DOE 2005) indicated that maximum activities of radionuclides were americium-241 at 1.30 pCi/g, plutonium-239/240 at 5.54 pCi/g, uranium-234 at 3.84 pCi/g, uranium-235 at 0.27 pCi/g, and uranium-238 at 3.84 pCi/g in soil from 0 to 3 ft below the surface. Soil removal was not required at Trench 5.

IHSS 111.3, Trench T-6

Based on results of the OU 2 RFI/RI (DOE 1995a), five VOCs were detected. Toluene had the highest concentration at 56 µg/kg. The rest of the VOCs and SVOCs were near detection limits. All metals were at concentrations less than background. The maximum activity of americium-241 was 0.042 pCi/g, and the maximum activity of plutonium-239/240 was 0.39 pCi/g.

The maximum activities of radionuclides found during the Trenches and Mound Site characterization (DOE 1996) were 0.04 pCi/g of americium-241, 0.39 pCi/g of plutonium-239/240, 6.93 pCi/g of uranium-233/234, and 0.23 pCi/g of uranium-235.

Accelerated action soil sampling results (DOE 2005) indicated RFCA WRW soil AL (DOE et al. 2003) exceedances were present in soil collected from one sampling location at Trench T-6. Plutonium-239/240 was present at 237.0 pCi/g from 0 to 0.5 ft bgs, at 195.68 pCi/g from 0.5 to 2.5 ft bgs, and 123.18 pCi/g from 2.5 to 4.5 ft bgs. Based on characterization results, a RFCA (DOE et al. 1996) accelerated action to remove plutonium-239/240 contaminated soil from Trench T-6 (IHSS 111.3) was conducted in accordance with ER RSOP Notification #04-13 (DOE 2004). The Trench T-6 excavation was approximately 115 ft by 23 ft by 3 ft (DOE 2005). After soil removal activities, plutonium-239/240 activities ranged from 3.41 to 14.12 pCi/g in soil from 0 to 3 ft bgs.

IHSS 111.5, Trench T-8

Nine VOCs and SVOCs were detected during the Phase II RFI/RI (DOE 1995a); however, other than acetone (maximum concentration of 1,700 μg/kg) their concentrations were near or below quantitation limits. Metals were detected with maximum concentrations of 28.4 mg/kg of arsenic, 5.6 mg/kg of cadmium, and 45.6 mg/kg of lead. Americium-241, plutonium-239/240, and uranium-235 had maximum activities of 0.05, 0.24, and 0.13 pCi/g, respectively.

Maximum concentrations of metals greater than background values detected in soil characterized during the Trenches and Mound Site investigation include 30.8 mg/kg of arsenic, 5.5 mg/kg of cadmium, 193 mg/kg of chromium, and 45.6 mg/kg of lead. Additionally, maximum radionuclide activities include 104.9 pCi/g of americium-241, 642.4 pCi/g of plutonium-239/240, 9.38 pCi/g of uranium-233/234, and 0.37 pCi/g of uranium-235 (DOE 1996).

Accelerated action characterization results (DOE 2005) indicated that plutonium-239/240 activities exceeded the RFCA WRW soil ALs at 0.5 to 2.5 (84.59 pCi/g), 2.5 to 4.5 (756.30 pCi/g), and 4.5 to 6.5 ft (695.40 pCi/g) bgs. Americium-241 activities also exceeded the RFCA WRW soil at 132.70 pCi/g at 0.5 to 2.5 ft and at 122.00 pCi/g at 2.5 to 4.5 ft bgs. Based on characterization results a RFCA (DOE et al. 1996) accelerated action to remove plutonium-239/240 and americium-241 contaminated soil from Trench T-8 (IHSS 111.5) was conducted in accordance with ER RSOP Notification #04-13 (DOE 2004). The Trench T-8 excavation was approximately 122 ft by 20 ft and 3 to 4.5 ft deep (DOE 2005). Residual contamination in Trench T-8 includes plutonium-239/240 and americium-241 activities exceeding the RFCA WRW soil AL (DOE et al. 2003) at depths ranging from 3 to 10 ft bgs. Americium-241 is present at an activity of 104.9 pCi/g below 3 ft. Plutonium-239/240 is present at depths greater than 3 ft at three locations and ranges from 98.84 to 642 pCi/g. These exceedances do not require remediation under RFCA because they are greater than 3 ft bgs. Trench T-8 also contains a chromium exceedance (4,600 mg/kg) in the 3 to 8 ft depth interval.

IHSSs 111.6 and 111.6b, Trenches 9a and 9b

Twelve VOCs and eight SVOCs were detected in subsurface soil samples during the Phase II RFI/RI (DOE 1995a). The maximum concentrations are 230 μg/kg of total xylenes, 47 μg/kg of toluene, 710 μg/kg of acetone, 90 μg/kg of 1,2-dichloroethene, 34 μg/kg of 1,2-dichloroethane, and 570 μg/kg of pyrene. All other VOCs and SVOCs were close to or less than quantification limits. One sample contained soil with 250 μg/kg of Aroclor-1254. Maximum metal concentrations were 18.5 mg/kg of arsenic, 3.6 mg/kg of cadmium, and 33.6 mg/kg of lead. The maximum activities of radionuclides included americium-241 at 0.04 pCi/g, plutonium-239/240 at 2.88 pCi/g, uranium-233/234 at 0.18 pCi/g, uranium-235 at 0.18 pCi/g, and uranium-238 at 2.95 pCi/g.

During the Trenches and Mound characterization (DOE 1996), one sample contained 16,000 μg/kg of trichloroethene that exceeded the RFCA Tier I subsurface soil AL (DOE et al. 1996). Maximum concentrations of metals greater than background included 22.8 mg/kg of arsenic, 3.6 mg/kg of cadmium, 39.5 mg/kg of lead, 1.4 mg/kg of mercury, and 219 mg/kg of silver. Americium-241 was detected at a maximum activity of 0.04 pCi/g, plutonium-239/240 at 0.15 pCi/g, uranium-233/234 at 11.4 pCi/g, uranium-235 at 0.53 pCi/g, and uranium-238 at 11.95 pCi/g.

Accelerated action characterization results (DOE 2005) indicated that americium-241 activities ranged from 0.50 to 6.8 pCi/g and plutonium-239/240 activities ranged from 3.69 pCi/g to 38.73 pCi/g. Benzo(a)pyrene at one location concentration exceeded the RFCA WRW soil AL (DOE et al. 2003) at 0.5 to 2.5 ft bgs with a concentration of 4,700 µg/kg. Based on the elevated measurements comparison and SSRS, this exceedance did not require remediation under RFCA (DOE 2005).

IHSS 111.7, Trench 10

The highest concentrations of VOCs found during the Phase II RFI/RI investigation (DOE 1995a) were 190 µg/kg of 1,1,1-trichloroethane and 270 µg/kg of acetone. The maximum concentration of other analytes greater than background was 6.2 mg/kg of cadmium. The maximum activities of radionuclides greater than background were 0.03 pCi/g of americium-241, 0.28 pCi/g of plutonium-239/240, and 1.5 pCi/g of uranium-238.

Maximum concentrations and activities detected during the Trenches and Mound Site characterization (DOE 1996) include 6.1 mg/kg of cadmium, 7.67 pCi/g of americium-241, and 34.79 pCi/g of plutonium-239/240.

Accelerated action characterization results (DOE 2005) indicated americium-241 was detected at a maximum activity of 2.47 pCi/g, plutonium-239/240 at 14.06 pCi/g, uranium-234 at 3.08 pCi/g, uranium-235 at 0.19 pCi/g, and uranium-238 at 3.08 pCi/g in soil between 0 and 3 ft deep.

IHSS 111.8, Trench 11

Nine VOCs and four SVOCs were detected in subsurface soil samples collected as part of the OU 2 Phase II RFI/RI (DOE 1995a). The maximum concentrations were 360 µg/kg of acetone, 430 µg/kg of toluene, 130 µg/kg of 1,1,1-trichloroethene, 210 µg/kg of methylene chloride, 130 µg/kg of 2-butanone, and 630 µg/kg of bis(2-ethylhexyl)phthalate. Other VOCs and SVOCs were at or below quantitation limits. Americium-241 and plutonium-239/240 were greater than background with maximum activities of 0.05 pCi/g and 0.25 pCi/g, respectively.

Maximum concentrations of metals found during the Trenches and Mound Site characterization include 3.6 mg/kg of cadmium and 163 mg/kg of nickel. The maximum activities of radionuclides include 0.07 pCi/g of americium-241 and 0.25 pCi/g of plutonium-239/240 (DOE 1996).

Accelerated action characterization results (DOE 2005) indicated americium-241 was detected at a maximum activity of 0.50 pCi/g, plutonium-239/240 at 2.84 pCi/g, uranium-234 at 3.48 pCi/g, uranium-235 at 0.24 pCi/g, and uranium-238 at 3.48 pCi/g in soil between 0 and 3 ft deep.

<u>No Further Action Recommendation</u>

In 2003, prior to accelerated action, Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11 (IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8) were recommended for NFAA designation based on the conclusions of the Trenches and Mound Site Characterization Report (DOE 2003b, 1996). All subsurface soil COC concentrations and activities were less than 1996 RFCA ALs. Plutonium-239/240 was present in the buried waste at a maximum concentration of 642 pCi/g, which is well below the 3 nanocuries per gram (nCi/g) limit that triggers further evaluation and potential soil removal. There was little potential for contaminated runoff because

the sites were located in a relatively flat area and the waste was buried. The VOC concentrations in the East Trenches waste material were very low, and accordingly, the trenches did not appear to be sources for groundwater contamination. The dry conditions at Trench T-5, T-6, T-8, T-9a, and T-9b would substantially limit any contaminant migration by groundwater. Contaminants observed in groundwater at Trenches T-10 and T-11 appeared to originate from other sources and are captured by the East Trenches Passive Reactive Barrier system.

Following accelerated action, Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11 (IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8) were again proposed for NFAA as part of the Closeout Report for IHSS Group 900-12 (East Trenches).

DOE received approval from EPA (the LRA) of the NFAA status of IHSSs 111.2, 111.3, 111.5, 111.6a, 111.6b, 111.7, and 111.8 on February 23, 2005 (EPA 2005).

Comments

None

References

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Final Phase II RFI/RI Report 903 Pad, Mound, and East Trenches Area OU 2 Volumes 1-13, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995b, Trenches and Mound Site Characterization Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996, Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Buffer Zone Sampling and Analysis Plan Addendum #BZ-04-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003b, No Further Accelerated Action Justification for the East Trenches, Rocky Flats Environmental Technology Site, Golden, Colorado, September 4.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-13 IHSS Group 900-12 East Trenches, Rocky Flats Environmental Technology Site, Golden Colorado, June.

DOE, 2005, Closeout Report for IHSS Group 900-12 East Trenches T-5 (IHSS NE-111.2), T-6 (IHSS NE 111.3), T-8 (IHSS NE-111.5), T-9a (IHSS NE-111.6a), T-9b (IHSS NE-111.6b) T-10 (IHSS NE-111.7), and T-11 (IHSS NE-111.8), Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE Rocky Flats Project Office, from M. Aguilar, EPA Region VIII, RE: Closeout Report for IHSS Group 900-12, East Trenches, T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11, February 23.

PAC REFERENCE NUMBER: NE-111.4

IHSS Number: 111.4

Current Operable Unit: BZ

Former Operable Unit: 2

IHSS Group: NE-1

Unit Name: Trench T-7

This Final Update to the HRR for PAC NE-111.4 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 111.4 is summarized in this update. The following HRR volumes contain IHSS 111.4 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1962 to 1963

Historical Summary

Trench T-7 was located approximately 1,400 ft east of the inner east guard gate and 290 ft south of the East Access Road as shown on Figures 8 and 9. It is one of several trenches referred to as the East Trenches (T-3 through T-11; PACs NE-110 and 111.1 through 111.8) (DOE 1992). The trenches were used primarily for the disposal of sanitary wastewater treatment plant sludge. Flattened empty drums and asphalt planking from the SEP, both of which may have been contaminated with uranium and plutonium, may have been disposed in the Trenches. In addition, it is believed that water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. No documentation has been found that records the exact time frame during which any particular trench was receiving waste (DOE 1992).

Trench T-7 was approximately 115 ft long, 14 to 16 ft wide and 12 ft in depth (based on 10 ft of waste material plus 2 ft of soil cover). The volume of waste material in the trench is estimated at 798 cy (DOE 2003a).

Some uranium and plutonium contamination was present in the sludge disposed in the trenches. It is reported that the older sludge would have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination. Total long-lived alpha activity present in the sludge was reported between a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960. Uranium contamination may also be present in flattened drums that may have been disposed in any of Trenches T-2 through T-11 following burning of the contaminated oils in Oil Burn Pit No. 2 (PAC 900-153). These flattened drums, estimated at up to 300 total, could be present in any of Trenches T-3 through T-11 (DOE 1992).

It is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was also disposed in one of the East Trenches. This waste had an average activity of 150,000 dpm/L. It is believed that this is total alpha activity. The activity of this material was reported as

1.35 x 10^8 dpm with approximately 1.3 kg of depleted uranium present in the waste. It is unknown whether this material was disposed in drums.

IHSS Investigations

OU 2 RFI/RI Activities

Subsurface Soil

In accordance with the OU 2 RFI/RI work plans (DOE 1991a, 1991b), seven boreholes were drilled and sampled to characterize the nature and extent of contamination at Trench T-7. The target analytes were VOCs, SVOCs, metals, and radionuclides. Acetone was detected in more than 60 percent of the 43 samples analyzed for VOCs, and 1,2-dichloroethane was detected in 35 percent. Toluene, a suspected field contaminant, was detected in 28 percent of all samples. Other detections included 1,1,2,2-tetracholorethane, chloroform, tetrachloroethene, and xylenes, each detected in fewer than 5 percent of all samples.

Of 32 samples analyzed for SVOCs, di-n-butylphthalate was detected in 59 percent and N-nitrosodimethylamine was detected in 28 percent. However, both of these compounds were also detected in laboratory blank samples. Bis(2-ethylhexyl)phthalate and pentachlorophenol were each detected in one sample.

Arsenic, cadmium, calcium, and zinc were the only metals detected in excess of background levels. The mean of the five arsenic detections slightly exceeded the 22.2 mg/kg WRW soil AL (DOE et al. 2003) for arsenic. All other metals concentrations were below WRW soil ALs.

Plutonium-239/240 and americium-241 were each detected in at least 16 out of 40 samples, but none of the activities exceeded the WRW soil ALs for these compounds. Strontium-90 was detected in 4 of 6 samples in which it was analyzed. There is no established soil background level or WRW soil AL for strontium-90 at RFETS.

Surface Soil

No SVOCs, pesticides, or PCBs were detected in surface soil samples collected in the T-7 area, and no metals were detected at concentrations exceeding Site background. Radionuclide activities were slightly in excess of background levels but were well below WRW soil ALs.

Groundwater

Only limited UHSU groundwater samples could be collected in the vicinity of Trench T-7 during the OU 2 RFI/RI, because the well was dry in that area throughout much of the investigation time frame. No organics, radionuclides, cyanide, or nitrate/nitrite were detected at levels exceeding RLs or background in that sample. Two lower hydrostratigraphic unit (LHSU) monitoring wells were sampled on a quarterly basis in the T-7 area. Aluminum, iron, and uranium-235 were detected in both wells at levels exceeding background and lead was detected in one well at concentrations exceeding background.

Trenches and Mound Site Characterization Activities

In accordance with the Trenches and Mound Site Characterization Work Plan (DOE 1995), IHSS 111.4 was further characterized. The goal of the program was to delineate those areas of the trenches with high concentrations of VOCs so that those areas could be targeted for remediation. Geophysical surveys and analysis of historical aerial photographs were used to

delineate trench boundaries and guide the placement of sampling locations. Results of this investigation are described in the Draft Trenches and Mound Site Characterization Report (DOE 1996).

Three boreholes were drilled within the boundaries of Trench T-7. Tetrachloroethene was detected at 14,000 µg/kg, which exceeded the then-applicable RFCA subsurface soil AL. No other organics were detected above their ALs or PRGs. Cadmium, calcium, chromium, nickel, silver, sodium, and strontium were detected at concentrations exceeding background levels but below PRGs for subsurface soil. Americium-241, plutonium-239/240, radium-226, radium-228, and uranium-233/234 activities in subsurface soil exceeded PRGs. In particular, americium-241 was detected at 208.7 pCi/g and plutonium-239/240 was detected at 1,744 pCi/g. Groundwater sampled in the Trench T-7 area contained carbon tetrachloride at 9 micrograms per liter (µg/L), tetrachloroethene at 320 µg/L, and trichloroethene at 22 µg/L. The RFCA Tier II groundwater AL (DOE et al. 1996) for all of these compounds is 5 µg/L.

Accelerated Action Activities

In 2004, early accelerated action results for samples collected in the backfill overlying trenches T-6 and T-8 indicated this material was contaminated with plutonium-239/240 at activities exceeding the RFCA WRW soil AL (DOE et al. 2003). Because OU 2 RFI/RI and the Trench and Mound Site Characterization sampling programs focused on the contents of the trenches and not the backfill covering them, sampling data for the backfill were limited. Therefore DOE and the regulatory agencies agreed that additional samples would be collected in the backfill overlying several of the East Trenches. Radionuclides were the only COCs. The sampling was conducted under BZSAP Addendum #BZ-04-02 (DOE 2003b) and is documented in an ER RCR dated October 21, 2004. Samples were collected in the A and B depth intervals (0-0.5 ft bgs and 0.5-2.5 ft bgs) from three biased sampling locations.

Analytical results indicated radionuclides were present at activities less than RFCA WRW soil ALs with two exceptions. At sampling location CZ41-011, plutonium-239/240 was detected at 65.72 pCi/g in the A interval (0-0.5 ft bgs) and at CZ41-010, plutonium-239/240 was detected 108.59 pCi/g in the B interval (0.5-2.5 ft bgs).

The two hotspots identified in Trench T-7 soil were remediated in November 2004. This RFCA (DOE et al. 1996) action was conducted in accordance with the ER RSOP and an ER RCR dated November 10, 2004. The initial excavation at each hotspot was 5 ft by 5 ft. The eastern hotspot (CZ41-011) was initially excavated to 0.5 ft, and the western hotspot (CZ41-010) was excavated to 3 ft. Eight confirmation samples were collected on November 24, 2004, from the sidewalls of each excavation. Gamma spectroscopy results indicated all plutonium-239/240 activities were below the RFCA WRW soil AL (DOE et al. 2003), but subsequent alpha spectroscopy results indicated confirmation samples from the northern and southern sidewalls of the eastern hotspot had plutonium-239/240 activities exceeding the RFCA WRW soil AL (DOE et al. 2003). Additional excavation therefore occurred at the eastern hotspot on January 6 and 10, 2005. Confirmation samples were again collected at the northern and southern sidewalls and both gamma and alpha spectroscopy results were less than RFCA WRW soil AL (DOE et al. 2003).

<u>No Further Accelerated Action Recommendation</u>

Based on the results of OU 2 RFI/RI sampling and the Trench and Mound Characterization, an NFAA justification was prepared for Trench T-7 in May 2003 (DOE 2003c). Plutonium-239/240

is present in the buried waste at a maximum activity of 2.45 nCi/g, which is less than the 3 nCi/g limit that triggers further evaluation and potential soil removal. There is little potential for contaminated runoff because the site is located in a relatively flat area and the waste is buried. The dry conditions at Trench T-7 substantially limit contaminant migration by way of groundwater. When groundwater is present, contaminants migrating to the north will be captured by the East Trenches plume treatment system. VOC contamination immediately south of Trench T-7 has not been observed; however, should contaminants migrate in this direction, degradation is expected to prevent discharge of these contaminants to surface water. DOE received EPA approval of NFAA for Trench T-7 (IHSS 111.4) on June 12, 2003 (EPA 2003).

Following accelerated action sampling and remediation in the backfill overlying Trench T-7, an Addendum to the earlier NFAA Justification document was prepared (DOE 2005). DOE received EPA approval of the Addendum on February 23, 2005 (EPA 2005).

References

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996, Draft Trenches and Mound Site Characterization Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2003a, Historical Release Report 2003, Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Buffer Zone Sampling and Analysis Plan Addendum #BZ-04-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003c, No Further Accelerated Action Justification for Trench T-7, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Addendum to the No Further Accelerated Action Justification for Trench T-7, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to R. DiSalvo, DOE RFFO, from T. Rehder, EPA Region VIII, RE: No Further Accelerated Action (NFAA) Justification for Ash Pits PAC Reference Numbers SW-133.1, SW-133.2, SW133.4, and 1702 (dated June 11, 2003); NFAA Justification for Trench T-7

PAC Reference Number NE-111.4 (dated May 21, 2003) NFAA Justification Trenches T-3 and T-4 PAC Reference Numbers 110 and 111.1 (dated May 21 2003); June 12, 2003.

EPA, 2005, Correspondence to J. Legare, DOE RFPO from C. M. Aguilar, EPA Region VIII, RE: Draft Addendum No Further Accelerated Action Justification for Trench T-7, February 23, 2005.

PAC REFERENCE NUMBERS: NE-142.1 – 142.4

IHSS Number: 142.1 – 142.4

Current Operable Unit: BZ

Former Operable Unit: 6

IHSS Group: NE-1

Unit Name: Walnut Creek (Priority) Drainage

This Final Update to the HRR for PACs NE-142.1 through NE-142.4 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS NE-142.1 – NE-142.4 is summarized in this update. The following HRR volumes contain NE-142.1 – NE-142.4 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1997 Annual (DOE 1997).

Date(s) of Operation or Occurrence

January 1954 to Present

Historical Summary

The A-Series Ponds are located in the North Walnut Creek Drainage as shown on Figure 8. The A-Series Ponds were designed and constructed to collect surface runoff and allow for management and controlled off-site discharge of water. The ponds served three main purposes: storm water management, holding water for sampling and treatment (if necessary), and emergency spill control if a spill could not be adequately managed without use of the ponds. Because the Site is no longer in operation the ponds are no longer used for emergency spill control.

In the A-Series Ponds, Ponds A-1 and A-2 were considered nondischarge ponds and were seldom released. During periods of heavy rain, or if water was needed downstream, there was an occasional movement of water. North Walnut Creek was routed around the upper A-Series Ponds so flow went into Pond A-3 and then into Pond A-4. Pond A-4, the Terminal Pond, is the largest of the surface water ponds on Rocky Flats, and discharge occurs on a regular basis. The ponds currently operate in this configuration.

Pond A-5 (PAC NE-141.12) is a small pond west of where Walnut Creek crosses Indiana Street. Pond A-5 retains several thousand gallons but is not a Site retention pond in the same sense as A-4 or B-5 because it cannot be used to retain a storm surge and regulate discharge.

In the past, wastewater streams were directly or indirectly released to the A-Series Drainage (the A-Series Ponds in the North Walnut Creek Drainage) (nonemergency and nonspill-related) during the history of RFETS. Building 771 waste discharged to a storm drain (PAC 700-143) north and west of Building 771, and flowed to the A-Series Drainage. Waste streams included untreated wastewater from Building 771, cooling tower and roof drain water from Building 774, Building 774 evaporator condensate water, and footing drain flows. The Building 771 wastewater primarily consisted of decontamination laundry wastewater; however, it also

contained water from the analytical laboratory, radiography operations, personnel decontamination room, and storm runoff. In 1971, it was reported that the Building 774 evaporator condensate drain typically released 20,000 gallons of water per day at 100 dpm/L, with 5 milligrams per liter (mg/L) of nitrate.

In 1973, it was estimated that 14 microcuries (µCi) of plutonium-239/240 were present in Pond A-1 sediment. In response to this problem, a series of trenches and pumps to collect contaminated groundwater and seepage was constructed between the SEP (PAC 000-101) and the A-Series Drainage. Other response actions to contamination in the A-Series Drainage included the removal of contamination near the Building 771 Outfall (PAC 700-143), rerouting of discharges to other facilities, and elimination of flows from Building 774.

Historically, the primary concern with contamination in the A-Series Drainage was high concentrations of nitrates in groundwater originating from the SEP area that impacted surface water. In response, a series of trenches were constructed to collect contaminated groundwater and seepage was constructed between the SEP and the A-Series Drainage. This was followed by installation of the Interceptor Trench System (ITS), then by installation of the SEP Plume Treatment System. Other response actions included the removal of contaminated soil and sediment near the Building 771 outfall (PAC 700-143) (DOE 2004a), removal of contaminated sediments in and around Bowman's Pond (PAC 700-1108) (DOE 2005a), and rerouting of wastewater discharges (DOE 1997).

Results of the routine predischarge sampling for Pond A-4, on November 3, 2004, yielded elevated americium-241 activities. These elevated activities were seen in samples collected by both DOE and CDPHE. These activities exceeded the RFCA surface water ALs for americium-241, and as a result the pond water was not discharged.

In early December 2004, DOE collected a number of surface water samples in the North Walnut Creek Drainage to investigate the source of elevated americium-241activity noted in Ponds A-3 and A-4. The sampling was concentrated in the area where Buildings 771/774 formerly stood. One sample, collected from a pool of water in an Original Process Waste Line (OPWL) manway, northwest of former Building 771, contained elevated americium-241 activities without significant plutonium-239/240 activity, which is the same americium/plutonium signature that was observed in Ponds A-3 and A-4. This manway received the outfall from former Building 771.

Based on this sampling result, actions to stop any additional water from this source from entering North Walnut Creek were taken. The manway, which had been covered with soil as a result of the site grading activities at former Building 771, was excavated and flows from the incoming pipes were intercepted, analyzed, and treated as needed. Pipes to and from the manway were either removed or disrupted and grouted. The manway was removed. Subsequently, the water in Pond A-4 was treated using a co-precipitation and filtration process and met stream standards for discharge. The Pond A-4 treatment system was removed in June 2005.

IHSS Investigations

IHSSs 142.1 – 142.4 were initially investigated under the Phase I RFI/RI Work Plan for Walnut Creek Drainage, OU 6 (DOE 1992b). Recent characterization data were collected in accordance with the IABZSAP (DOE 2004b), and the Comprehensive Risk Assessment (CRA) SAP Addendum #05-01 – Phase 2 Targeted Sampling (DOE 2004c) and IABZSAP Addendum

#IABZ-05-06 (DOE 2005b). Samples collected in accordance with CRA SAP Addendum #05-01 were intended to collect the full sediment column. Sampling locations, in accordance with the IABZSAP Addendum #IABZ-05-06, were selected to target inlets, outlets, and the deepest part of the pond. Actual sampling locations were determined based on the consultative process taking into account pond topography and field conditions.

IHSS 142.1 – Pond A-1

In accordance with the OU 6 Phase I RFI/RI Work Plan (DOE 1992b), four sediment samples were collected from Pond A-1 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Four additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs (DOE et al. 2003).

Surface and subsurface sediment and subsurface soil samples were collected from two sampling locations at Pond A-1 in accordance with CRA SAP Addendum #05-01 (DOE 2004c). All samples were analyzed for radionuclides, metals, PCBs, SVOCs, VOCs, and dioxin/furan. The surface sediment from one location was lost because of the liquidity of the sediment. Samples were collected from four additional locations in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005b). At Pond A-1, 2 surface sediment and 2 surface and subsurface sediment samples were collected and analyzed for radionuclides, metals, PCBs, and SVOCs. Results indicated all concentrations and activities were less than RFCA WRW soil ALs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005c). Aroclor-1254 was detected at concentrations ranging from 1,331 to 5,200 µg/kg in subsurface sediment, but was not detected in surface sediment or subsurface soil. Americium-241 was detected at activities ranging from 2.0 to 6.9 pCi/g in surface sediments, and 0.1 to 13.2 pCi/g in subsurface sediments. Americium-241 was not detected in subsurface soil. Plutonium-239/240 was detected at activities ranging from 5.882 to 22.4 pCi/g in surface sediment, 23.3 to 36.2 in subsurface sediment and was not detected in subsurface soil. Aroclor-1254, americium-241, and plutonium-239/240 were detected at concentrations or activities less than RFCA WRW soil ALs. Dioxins and furans were detected in subsurface sediment at concentrations only slightly greater than the RL. SVOCs were detected at concentrations greater than RLs but much less than WRW soil ALs in surface and subsurface sediment.

IHSS 142.2 – Pond A-2

Three sediment samples were collected from Pond A-2 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs in accordance with the Phase I RFI/RI Work Plan (DOE 1992b). Three additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Surface and subsurface sediment and subsurface soil samples were collected from one sampling location at Pond A-2 in accordance with CRA SAP Addendum #05-01 (DOE 2004c). All samples were analyzed for radionuclides, metals, PCBs, SVOCs, VOCs, and dioxin/furan. Additionally, three surface and one subsurface sample were collected in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005b) and analyzed for radionuclides, metals,

PCBs, and SVOCs. Results indicated all concentrations and activities were less than RFCA WRW soil ALs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005c). Aroclor-1254 was detected at concentrations ranging from 35.0 to 36.0 µg/kg in subsurface sediment but was not detected in surface sediment or subsurface soil. Americium-241 was detected at activities ranging from 1.4 to 2.0 pCi/g in surface sediment, 2.1 to 3.5 pCi/g in subsurface sediment, and at 1.4 pCi/g in subsurface soil. Plutonium-239/240 was detected at activities from 4.3 to 7.4 pCi/g in surface sediment, 5.2 to 10.5 pCi/g in subsurface sediment, and at 2.6 pCi/g in subsurface soil. Aroclor-1254, americium-241, and plutonium-239/240 were detected at concentrations or activities less than RFCA WRW soil ALs. Only a few dioxins or furans were detected in surface and subsurface sediment and only one was detected in subsurface soil. SVOCs were detected at concentrations greater than RLs but much less than WRW soil ALs in surface and subsurface sediment.

IHSS 142.3 – Pond A-3

Four sediment samples were collected from Pond A-3 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs in accordance with the Phase I RFI/RI Work Plan (DOE 1992b). Four additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Surface sediment samples were collected from four locations at Pond A-3 in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005b). Samples were analyzed for radionuclides and metals. Results indicated all concentrations and activities were less than RFCA WRW soil ALs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005c). PCBs were not detected in surface or subsurface sediment at Pond A-3. Americium-241 was detected at activities ranging from 0.42 to 0.47 pCi/g in surface sediment and from 0.47 to 0.67 pCi/g in subsurface sediment. Plutonium-239/240 was detected at 2.05 pCi/g in subsurface sediment but was not detected in surface sediment. Americium-241 and plutonium-239/240 were detected at activities less than RFCA WRW soil ALs.

IHSS 142.4 – Pond A-4

Four sediment samples were collected from Pond A-4, in accordance with the Phase I RFI/RI Work Plan (DOE 1992b), from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Four additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Five surface and three subsurface sediment samples were collected from at Pond A-4 in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005b). Samples were analyzed for radionuclides and metals. Results indicated all concentrations and activities were less than RFCA WRW soil ALs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005c). Neither PCBs, americium-241, nor plutonium-239/240 were detected in any samples from Pond A-4. Several metals were detected but at concentrations only

slightly greater than background means plus two standard deviations. Bis(2-ethylhexyl)phthalate was the only SVOC detected at concentrations only slightly greater than RLs.

No Further Accelerated Action Recommendation

Based on analytical results and the SSRS, accelerated action was not required and an NFAA determination was justified for IHSSs 141.1, 141.2, 141.3, and 141.4 for the following reasons:

- Activities and concentrations of COCs were uniformly below RFCA WRW soil ALs.
- Migration of soil or sediment contaminants to surface water is unlikely to impact water quality because little contamination is present. Routine surface water monitoring results indicate surface water standards are met and that pond sediments are not impacting surface water. The ponds are also configured to protect off-site water sources. Stormwater runoff is retained in Terminal Pond A-4, sampled, and if the surface water results meet applicable standards, the water is released. Erosion of the pond sediments because of a large influx of water (from a storm) is not likely because the ponds are currently and expected to remain as low-energy ponds and less water will be available after Site closure. Additionally, predictions of contaminant migration based on the integration of the Watershed Erosion Prediction Project (WEPP) (USDA 1995) and HEC-6T (Thomas 1999) models are conservative. Site empirical data indicate contaminant migration is less than model predictions.
- Contaminants originating in IHSSs 141.1, 141.2, 141.3, and 141.4 soil and sediment are not likely to impact surface water through transport in groundwater because soil contamination levels in these IHSSs are very low. Groundwater was evaluated as part of the Groundwater Interim Measure/Interim Remedial Action (IM/IRA) (DOE 2005d).

The NFAA recommendation for Ponds A-1 (IHSS 142.1), A-2 (IHSS 142.2), A-3 (IHSS 142.3), and A-4 (IHSS 142.4), presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005c), was approved by EPA (the LRA) on October 18, 2005 (EPA 2005).

Comments

In the 1997 HRR (DOE 1997), IHSS 142.4 (Pond A-4) was recommended for NFA based on conclusions presented the Phase I RFI/RI Report for OU 6 (DOE 1996). The NFA request was denied (CDPHE and EPA 1999).

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1996, Final Phase I RFI/RI Report Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, No Further Accelerated Action Justification for 771 Outfall, PAC Reference Number 700-143, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Industrial Area and Buffer Zone Sampling and Analysis Plan, Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004c, Comprehensive Risk Assessment SAP Addendum #05-01 – Phase 2 Targeted Sampling, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2005a, Closeout Report for IHSS Group 700-11, PAC 700-1108 – Bowman's Pond, and IHSS 139.1(N)(a) – Steam Condensate Tanks, Rocky Flats Environmental Technology Site Golden, Colorado, February.

DOE, 2005b, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-06, Rocky Flats Environmental Technology Site Golden, Colorado, July.

DOE, 2005c, Data Summary Report for IHSS Group NE-1, Rocky Flats Environmental Technology Site Golden, Colorado, October.

DOE, 2005d, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site Golden, Colorado, June

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Rampe, DOE, from C. M. Aguilar, EPA Region 8, RE: Data Summary Report (DSR) for IHSS Group NE-1; Ponds A-1, A-2, A-3, A-4, A-5, B-4, B-5, C-1, and C-2; September 2005, October 18.

Thomas, W.A., 1999, Sedimentation in Stream Networks (HEC-6T). Mobile Boundary Hydraulics, Clinton, Mississippi.

USDA, 1995, Water Erosion Prediction Project Hillslope Profile and Watershed Model Documentation, NERSL Report No. 10. D.C. Flanigan, M.A. Nearing, and J.M. Laflin, eds, USDA-ARS National Soil Erosion Research Laboratory, West Lafayette, Indiana.

PAC REFERENCE NUMBERS: NE-142.5 – 142.9

IHSS Number: 142.5 – 142.9

Current Operable Unit: BZ

Former Operable Unit: 6

IHSS Group: NE-1

Unit Name: Walnut Creek Drainage

This Final Update to the HRR for PACs NE-142.5 through NE-142.9 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs NE-142.5 – NE-142.9 is summarized in this update. The following HRR volumes contain NE-142.5 – NE-142.9 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1997 Annual (DOE 1997).

Date(s) of Operation or Occurrence

Before July 1953 through Present

Historical Summary

The B-Series Ponds are located in the South Walnut Creek drainage, downstream of the 900 Area, and include Pond B-1 (IHSS NE-142.5), Pond B-2 (IHSS NE-142.6), Pond B-3 (IHSS NE-142.7), Pond B-4 (IHSS NE-142.8), and Pond B-5 (IHSS NE-142.9). The location of these IHSSs is shown on Figures 8 and 9. The B-Series Ponds were designed and constructed to collect surface runoff and allow for management and controlled off-site discharge of water. The ponds served three main purposes: stormwater management, holding water for sampling and treatment (if necessary), and emergency spill control if a spill could not be adequately managed without use of the ponds. However, because the Site is no longer in operation, the ponds are no longer used for emergency spill control

In the B-Series Ponds, Ponds B-1 and B-2, are nondischarge ponds and water from them was seldom released. Flow in South Walnut Creek is diverted around the first three ponds directly to Pond B-4, which flows to Pond B-5, the Terminal Pond in the B-Series. Pond B-3 discharges to Pond B-4, which formerly received discharge from the Rocky Flats wastewater treatment plant. Water from Pond B-5 was previously pumped to Pond A-4, where all the water was sampled and held until the results confirmed compliance with applicable stream standards. In 1998, direct discharge of Pond B-5 was allowed under an agreement reached with the neighboring cities and other stakeholders. Currently, Ponds B-1, B-2, and B-3 are not configured to receive water except for local area runoff or to discharge. These ponds were converted to wetlands after the accelerated action sediment removal activities that concluded in 2005 (see discussion below). Ponds B-1, B-2, and B-3 are now a flow through system. Pond B-4 is still connected to the bypass and South Walnut Creek flows continue to go through Ponds B-4 and B-5.

A sediment study conducted by Colorado State University (CSU) found elevated radionuclide activities in sediments in the B-Series Drainage (the B-Series Ponds in the Walnut Creek

Drainage). Pond reconstruction activities from 1971 to 1973 caused resuspension and downstream migration of contaminated sediment. This resulted in an increase in plutonium-239/240 activity in Pond B-1 sediment from 0.085 curie in 1971 to 2.9 curies in 1973. Based on the CSU sampling, plutonium-239/240 activities in Pond B-1 sediment in June 1973 ranged from 10 to 502 pCi/g of dry sediment.

A Rocky Flats study completed in June 1973 indicated elevated plutonium-239/240 activity in sediments upstream from the drainage ponds. This study found an average activity of 40 disintegrations per gram (dpm/g) from the culvert west of Building 995 to the culvert immediately east of the Building 995 outfall. The area of contaminated soil/sediment was estimated to cover approximately 3,900 ft^2.

In response, a study was conducted to ascertain the source of the plutonium-239/240 contamination present in the B-Series Drainage. This study indicated approximately 88 percent of the total activity released by Building 995 was due to the release of laundry decontamination water to the sanitary sewer. After December 21, 1973, laundry water was only discharged to Pond B-2, and some may have been diverted to Pond A-2. In fall and winter 1973, contaminated soil and sediment were removed from the streambed below the Building 995 outfall.

Both footing drains and storm drains have discharged into the B-Series Drainage. Releases to the B-Series Drainage included treated and untreated decontamination laundry water from Buildings 442, 771, 774, 778, and 881 to Pond B-1, a sodium hydroxide (NaOH) discharge from a bulk caustic storage tank that was diverted to Pond B-1 for temporary holding, a steam condensate line break in the Building 707 area that discharged to Pond B-4 and South Walnut Creek downgradient of Pond B-4, release of approximately 155 gallons of a 25 percent solution of ethylene glycol (antifreeze), and a release of chromic acid to Pond B-3 from the STP (Building 995) that occurred on February 22 and 23, 1989. It is believed that approximately 4.7 lbs of chromium were released to Pond B-3. Prior to this incident, the water from Pond B-3 was sprayed on the East Spray Fields (PACs NE-216.1 - 216.3). Samples collected from the pond sediment and the East Spray Fields at that time found that concentrations of leachable chromium were far below the RCRA Extraction Procedure (EP) Toxicity limits.

The National Pollutant Discharge Elimination System (NPDES) Permit system was initiated in 1974 at the Plant. The HRRs (DOE 1992a, 1997) detail the NPDES permit exceedances for the B-Series Drainage at the Plant.

In the early 1980s actions were taken at Pond B-5 to reduce the potential for off-site movement of contaminated sediments. The discharge structure for this pond was modified by adding a vertical standpipe and a perforated pipe along the bottom of the pond surrounded by granular material. Some sediment present in Pond B-5 was also removed from the drainage and deposited in the Soil Dump Area in the northeastern BZ (PAC NE-156.2 which received NFAA approval in 1999 [CDPHE and EPA 1999]). These activities helped minimize the off-site transport of contaminated sediments (DOE 1992a).

In response to leaching of contaminants out of pondcrete, which led to the presence of contaminants in the B-Series Drainage, two RCRA Contingency Plan Implementation Reports (CPIRs), 88-001 and 88-002, were filed. These events are more fully discussed in PAC 900-213 (DOE 1992a).

IHSS Investigations

IHSSs 142.5 – 142.9 were initially investigated under the OU 6 Phase I RFI/RI Work Plan for Walnut Creek Drainage, OU 6 (DOE 1992b). Recent characterization data were collected in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a) at Ponds B-4 and B-5. Sampling locations were selected to target inlets, outlets, and the deepest part of the pond. Actual sampling locations were determined based on the consultative process taking into account pond topography and field conditions. Additionally, a RFCA accelerated action was conducted at Ponds B-1, B-2, and B-3. Each pond is briefly described below.

IHSS 142.5 – Pond B-1

In accordance with Phase I RFI/RI Work Plan (DOE 1992b), six surface and nine subsurface sediment samples were collected from Pond B-1 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Aroclor-1254 ranged from nondetect to 1,700 µg/kg in surface sediment and 140 to 310 µg/kg in subsurface sediment. Americium-241 ranged from 0.6 to 72 pCi/g in surface sediment and 5.5 to 194.5 pCi/g in subsurface sediment. Plutonium-239/240 ranged from 28.19 to 440 pCi/g in surface sediment and from 31.4 to 87.38 pCi/g in subsurface sediment. Both americium-241 and plutonium-239/240 activities were greater than WRW soil ALs (DOE et al. 2003). SVOCs were detected at concentrations greater than RLs but less than WRW soil ALs in surface and subsurface sediment.

Based on these data, ER RSOP FY04 Notification #04-11 (DOE 2004) was prepared to describe RFCA (DOE et al. 1996) planned accelerated actions at the B-1, B-2, and B-3 Ponds. Prior to accelerated actions, two additional samples were collected outside of Pond B-1 and analyzed for radionuclides to better define the areal extent of contamination. Neither americium-241 nor plutonium-239/240 was detected in these samples.

The accelerated action was described in the Closeout Report for IHSS Group NE-1 (DOE 2005b). Approximately 7,600 cy of sediment and soil, over an 113,900-ft2 area, was removed from Pond B-1 and the upgradient drainage leading into the pond, and disposed offsite. The deepest point of the excavation was 19.4 ft below the original sediment surface. Fifty-two confirmation samples were collected in Pond B-1 and the drainage upstream of Pond B-1. After remediation, all results were less than RFCA WRW soil ALs. Americium-241 ranged from 0.14 to 8.4 pCi/g and plutonium-239/240 ranged from 0.052 to 36.3 pCi/g in subsurface soil. Aroclor-1254 was detected at two locations at a concentration of 9.2 and 80 µg/kg.

IHSS 142.6 – Pond B-2

In accordance with Phase I RFI/RI Work Plan (DOE 1992b), six surface and nine subsurface sediment samples were collected from Pond B-2 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Aroclor-1254 ranged from nondetected to 3,800 µg/kg in surface sediment and nondetected to 666 µg/kg in subsurface sediment. Americium-241 ranged from 4.9 to 160 pCi/g in surface sediment and 8.7 to 27.1 pCi/g in subsurface sediment. Plutonium-239/240 ranged from 13.10 to 939.43 pCi/g in surface sediment and from 36.9 to 154.58 pCi/g in subsurface sediment. Both americium-241 and plutonium-239/240 were detected at activities greater than WRW soil ALs at a sampling location near the former OPWL discharge point into Pond B-2. OPWL had previously been

removed from this area (DOE 2005b, DOE 2005c). SVOCs were detected at concentrations greater than RLs but less than WRW soil ALs in surface and subsurface sediment.

Based on these data, ER RSOP Notification #04-11 (DOE 2004) was prepared to describe RFCA (DOE et al. 1996) planned accelerated actions at the B-1, B-2, and B-3 Ponds. Prior to accelerated actions, two additional samples were collected outside of Pond B-2 and analyzed for radionuclides to better define the areal extent of contamination. Neither americium-241 nor plutonium-239/240 was detected in these samples.

The accelerated action was described in the Closeout Report for IHSS Group NE-1 (DOE 2005b). Approximately 20,900 cy of sediment and soil, over an 52,100-ft2 area, was removed from Pond B-2 and disposed offsite. The deepest point of the excavation was 18.3 ft below the original sediment surface. Fifty-three confirmation samples were collected in Pond B-2. After remediation, all results were less than RFCA WRW soil ALs. Americium-241 ranged from 0.18 to 8.53 pCi/g and plutonium-239/240 ranged from 0.323 to 48.62 pCi/g in subsurface soil. Aroclor-1254 was detected at two locations at concentrations of 320 and 360 μg/kg.

IHSS 142.7 – Pond B-3

In accordance with Phase I RFI/RI Work Plan (DOE 1992b), three surface and nine subsurface sediment samples were collected from Pond B-3 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Aroclor-1254 ranged from nondetected to 1,300 μg/kg in surface sediment and nondetected to 2,900 μg/kg in subsurface sediment. Americium-241 ranged from 0.395 to 63.07 pCi/g in surface sediment and 0.673 to 63.07 pCi/g in subsurface sediment. Plutonium-239/240 was not detected in surface sediment, but ranged from 7.57 to 188.2 pCi/g in subsurface sediment. Plutonium-239/240 was detected at activities greater than WRW soil ALs. SVOCs were detected at concentrations greater than RLs but less than WRW soil ALs in surface and subsurface sediment.

Based on these data, ER RSOP Notification #04-11 (DOE 2004) was prepared to describe RFCA (DOE et al. 1996) planned accelerated actions at the B-1, B-2, and B-3 Ponds. The accelerated action was described in the Closeout Report for IHSS Group NE-1 (DOE 2005b). Approximately 12,000 cy of sediment and soil, over a 26,700-ft2 area, was removed from Pond B-3 and disposed offsite. The deepest point of the excavation was 14.6 ft below the original sediment surface. Thirty-one confirmation samples were collected in Pond B-3. After remediation, all results were less than RFCA WRW soil ALs. Americium-241 ranged from 0.13 to 4.28 pCi/g, where detected, and plutonium-239/240 ranged from 0.215 to 9.70 pCi/g, where detected in subsurface soil. Aroclor-1254 was detected at two locations at concentrations of 68 and 220 μg/kg.

IHSS 142.8 – Pond B-4

In accordance with OU 6 Phase I RFI/RI Work Plan (DOE 1992b), nine sediment samples were collected from Pond B-4 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Five additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Surface and subsurface sediment and subsurface soil samples were collected from six sampling locations at Pond B-4 in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a). At

Pond B-4, five surface sediment and seven subsurface sediment samples were collected and analyzed for radionuclides, metals, PCBs, and SVOCs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005d). Aroclor-1254 was detected at a concentration of 160 μg/kg at one location in surface sediment and ranged from 9.21 to 3,100 μg/kg in subsurface sediment. Americium-241 was detected at activities ranging from 0.598 to 0.76 pCi/g in surface sediments, and 8.27 to 56.50 pCi/g in subsurface sediments. Plutonium-239/240 was detected once in surface soil at an activity of 2.06 pCi/g. In subsurface sediment, plutonium-239/240 ranged from 40.10 to 217.00 pCi/g where detected. The plutonium-239/240 activity of 217.00 pCi/g is at a depth of 3.0 to 3.9 ft below the sediment surface. Aroclor-1254, americium-241, and plutonium-239/240 were detected at concentrations or activities less than WRW soil ALs. SVOCs were detected at concentrations greater than RLs but much less than WRW soil ALs in surface and subsurface sediment.

IHSS 142.9 – Pond B-5

In accordance with OU 6 Phase I RFI/RI Work Plan (DOE 1992b), seven sediment samples were collected from Pond B-5 from the top of the sediment to top of bedrock and analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs. Three additional surface sediment samples were collected 2 years later and analyzed for PCBs. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Surface and subsurface sediment and subsurface soil samples were collected from five sampling locations at Pond B-5 in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a). Five surface sediment and two subsurface sediment samples were collected and analyzed for radionuclides and metals. All analytes had concentrations or activities less than RFCA WRW soil ALs.

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005d). Aroclor-1254 was not detected. Americium-241 was detected at activities ranging from 0.321 to 0.337 pCi/g in surface sediments, and was not detected in subsurface sediment. Plutonium-239/240 was not detected in surface or subsurface sediment.

No Further Accelerated Action Recommendation

Based on analytical results and the SSRS, an NFAA determination was justified for IHSSs 142.5, 142.6, 142.7, 142.8, and 142.9 because of the following:

- Contaminated sediment was removed from Ponds B-1, B-2, and B-3. Confirmation sampling indicated all residual concentrations and activities were less than WRW soil ALs.
- Activities and concentrations of COCs at Ponds B-4 and B-5 were uniformly below RFCA WRW soil ALs with the exception of the detection of plutonium-239/240 in a one subsurface sediment sample collected at Pond B-4 at a depth of 3.0 to 3.9 ft. In accordance with RFCA sediment removal is not required for radionuclide contamination less than 1 nCi/g at depths greater than 3 ft.
- Migration of soil or sediment contaminants to surface water is unlikely to impact water quality because little contamination is present. Routine surface water monitoring results indicate surface water standards are met and that pond sediments are not impacting surface water. The ponds are also configured to protect off-site water sources. Stormwater runoff is

retained in the Terminal Ponds, sampled, and if the surface water results meet applicable standards, the water is released. Erosion of the pond sediments because of a large influx of water (from a storm) is not likely because the ponds are currently and expected to remain as low-energy ponds and less water will be available after Site closure. Additionally, predictions of contaminant migration based on the integration of the WEPP (USDA 1995) and HEC-6T (Thomas 1999) models are conservative. Site empirical data indicate contaminant migration is less than model predictions.

- Contaminants originating in IHSSs 141.5, 141.6, 141.7, 141.8, and 141.9 soil and sediment are not likely to impact surface water through transport in groundwater because soil contamination levels in these IHSSs are very low. Groundwater contamination present beneath the B-Series Ponds was evaluated as part of the Groundwater IM/IRA (DOE 2005e).

The NFAA recommendation for Ponds B-1 (IHSS 142.5), B-2 (IHSS 142.6), and B-3 (IHSS 142.7) presented in the Closeout Report for IHSS Group NE-1 (DOE 2005b) was approved by EPA May 12, 2005 (EPA 2005a).

The NFAA recommendation for Ponds B-4 (IHSS 142.8) and B-5 (IHSS 142.9) presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005d) was approved by EPA (the LRA) on October 18, 2005 (EPA 2005b).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Walnut Creek Priority Drainage (Operable Unit No. 6) Rocky Flats Plant, Golden, Colorado, May.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-11 IHSS Group NE-1 (Ponds B-1, B-2, and B-3), Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005a, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-06, Rocky Flats Environmental Technology Site Golden, Colorado, July.

DOE, 2005b, Closeout Report for IHSS Group NE-1 (Ponds B-1 [IHSS NE-142.5], B-2 [IHSS NE-142.6], and B-3 [IHSS 142.7], Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005c, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005d, Data Summary Report for IHSS Group NE-1, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005e, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005a, Correspondence to J. Legare, DOE RFPO, from C. Mark Aquilar, EPA Region 8, RE: Closeout Report for IHSS Group NE-1, B-Ponds (B-1, B-2, and B-3), May.

EPA, 2005b, Correspondence to J. Rampe, DOE, from C. M. Aguilar, EPA Region 8, RE: Data Summary Report (DSR) for IHSS Group NE-1; Ponds A-1, A-2, A-3, A-4, A-5, B-4, B-5, C-1, and C-2; September 2005, October 18.

Thomas, W.A., 1999, Sedimentation in Stream Networks (HEC-6T), Mobile Boundary Hydraulics, Clinton, Mississippi.

USDA, 1995, Water Erosion Prediction Project Hillslope Profile and Watershed Model Documentation, NERSL Report No. 10. D.C. Flanigan, M.A. Nearing, and J.M. Laflin, eds. USDA-ARA National Soil Erosion Research Laboratory, West Lafayette, Indiana.

PAC REFERENCE NUMBER: NE-142.12

IHSS Number:	142.12
Current Operable Unit:	BZ
Former Operable Unit:	6
IHSS Group:	NE-1
Unit Name:	Flume Pond (Walnut Creek Gauging Station)(IAG Name-Retention Pond A-5; RFI/RI Name – Walnut and Indiana Pond)

This Final Update to the HRR for PAC NE-142.12 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 142.12 is summarized in this update. The following HRR volumes contain IHSS 142.12 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996a).

Date(s) of Operation or Occurrence

Fall 1978 to present

Historical Summary

IHSS 141.12 (Pond A-5), the flume pond is located on the Walnut Creek drainage immediately west of and upstream from Indiana Street. The location of Pond A-5 is shown on Figure 8. The flume pond was built in 1978. The Walnut Creek Drainage received discharges from Rocky Flats throughout the history of the Plant.

Pond A-5 is a flow-through pond that generally retains several thousand gallons of water. Pond A-5 cannot be used to retain a storm surge and regulate discharge. This pond was cleaned out occasionally to reduce buildup of sediment on the bottom or to reconstruct the flumes. The removed sediment was placed on the southern side of Walnut Creek upstream of the pond and within the IHSS boundary. A primary source of these sediments is the McKay Ditch Bypass, which was originally constructed as an unlined ditch, and therefore carried considerable amounts of entrained sediments (DOE 1992a).

IHSS Investigations

In accordance with Phase I RFI/RI Work Plan (DOE 1992b), sediment samples were collected at five different locations within Pond A-5. One sample was collected within 5 ft of the pond inlet, one from the deepest part of the pond, and the remaining three samples were collected at random locations. Composite samples were collected from 2-ft intervals. Sediment samples were analyzed for radionuclides, VOCs, SVOCs, pesticides, PCBs, and metals. Eight soil samples were collected from the soil outside of the pond. Two of these samples were analyzed for radionuclides, metals, and VOCs and five were analyzed for metals and VOCs.

Recently, additional surface and subsurface sediment and subsurface soil samples were collected from three sampling locations at Pond A-5 in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a). At Pond A-5, two surface sediment and one surface and subsurface

sediment samples were collected and analyzed for radionuclides and metals. Results indicated all concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003).

Based on analytical data from both sampling events, several metals were detected in surface and subsurface sediment at concentrations only slightly greater than background mean plus two standard deviations. All were well below WRW soil ALs. Neither americium-241 nor plutonium-239/240 were detected in surface or subsurface sediment. Americium-241 was detected once, at an activity of 0.122 pCi/g in soil and plutonium-239/240 was detected twice in surface soil at activities of 0.262 and 0.285 pCi/g (DOE 2005b).

Five surface water samples were collected from the pond: one from the deepest part, one within 5 ft of the inlet, one within 5 ft of the spillway, and two were randomly collected. Surface water samples were analyzed for VOCs, SVOCs, pesticides/PCBs, metals (total and dissolved), radionuclides (total and dissolved), and water quality parameters. Two stream sediment samples were also collected: one sample was collected from McKay Ditch, just upstream from its confluence with Walnut Creek, and another was collected from Walnut Creek, just downstream from the pond spillway. These stream sediment samples were analyzed for VOCs, SVOCs, pesticides/PCBs, metals, radionuclides, and water quality parameters. Sodium was the only analyte detected at a range of concentrations from 23.6 mg/L to 26.7 mg/L in surface water.

Groundwater samples were collected from two downgradient alluvial monitoring wells (0486 and 41691) and analyzed for radionuclides, metals, VOCs, SVOC, pesticides/PCBs and nitrate/nitrite. Analytical results indicated methylene chloride at 10 μg/L and toluene at 0.12 μg/L, bis(2-ethylhexyl)phthalate at 3.0 μg/L, plutonium-239/240 (dissolved) at 0.0035 pCi/L, chromium (dissolved) at 16.8 μg/L, zinc at 314 μg/L, manganese at 1,010 μg/L, and potassium at 5720 μg/L were detected in groundwater. Pesticides/PCBs were not detected and nitrates/nitrites were not found at concentrations greater than baseline screening values.

A CDPHE risk-based conservative screen (CDPHE 1993) was conducted on surface water, pond sediment, and stream sediment for IHSS 142.12 (DOE 1994). Passing the conservative screen requires a carcinogenic and noncarcinogenic risk ratio sum of below 1. The carcinogenic ratio sum for Pond A-5 sediment is 2.84×10^{-3} and the noncarcinogenic ratio sum is 3.34×10^{-5}. Both of these values are below 1. These ratios differ somewhat from those presented in the OU 6 Letter Report (DOE 1994) because methylene chloride was subsequently determined to be a laboratory contaminant and was omitted from the data set (DOE 1995). Results of the screen on stream sediment samples show a carcinogenic risk ratio sum of 3.73×10^{-3} and a noncarcinogenic risk ratio sum of 3.36×10^{-5}; both sums are below 1. Additionally, the carcinogenic and noncarcinogenic risk ratio sums for dermal exposure for both pond and stream sediment are below 1 and the risk to human health from exposure to pond and stream sediment at IHSS 142.12 is very low based residential scenario. Potential ecological threats from exposure to sediment constituents at IHSS 142.12 were also evaluated. There is little risk to the environment based on chemical concentrations detected in this IHSS (DOE 1995).

No Further Action Recommendation

Based on analytical results and the SSRS, accelerated action was not required and an NFAA determination was justified for IHSS 142.12 because of the following:

- Activities and concentrations of COCs were uniformly below RFCA WRW soil ALs at Pond A-5.

- Migration of soil or sediment contaminants to surface water is unlikely to impact water quality because little contamination is present. Routine surface water monitoring results indicate surface water standards are met and that pond sediments are not impacting surface water. The upstream ponds are also configured to protect off-site water sources. Stormwater runoff is retained in the Terminal Ponds, sampled, and if the surface water results meet applicable standards, the water is released. Erosion of the pond sediments because of a large influx of water (from a storm) is not likely because the ponds are currently and expected to remain as low-energy ponds and less water will be available after Site closure. Additionally, predictions of contaminant migration based on the integration of the WEPP (USDA 1995) and HEC-6T (Thomas 1999) models are conservative. Site empirical data indicate contaminant migration is less than model predictions.
- Contaminants originating in IHSS 142.12 soil and sediment are not likely to impact surface water by transport in groundwater because soil contamination levels in IHSS 142.12 are very low. Groundwater was evaluated as part of the Groundwater IM/IRA (DOE 2005c).

The NFAA recommendation for Pond A-5 (IHSS 142.12) presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005b) was approved by EPA on October 18, 2005 (EPA 2005).

Comments

None

References

CDPHE, 1993, Interim Final Policy and Guidance on Risk Assessments for Corrective Action at RCRA Facilities, November.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Walnut Creek Priority Drainage (Operable Unit No. 6) Rocky Flats Plant, Golden, Colorado, May.

DOE, 1994, Letter Report on the Colorado Department of Public Health and Environment Source Area Delineation and Risk-based Conservative Screen and the Environmental Protection Agency Areas of Concern Delineation for the Human Health Risk Assessment, Walnut Creek Priority Drainage, Operable Unit No. 6, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Phase I RFI/RI Report on the Walnut Creek Priority Drainage, Operable Unit No. 6 (Draft), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-06, Rocky Flats Environmental Technology Site Golden, Colorado, July.

DOE, 2005b, Data Summary Report for IHSS Group NE-1, Rocky Flats Environmental Technology Site Golden, Colorado, October.

DOE, 2005c, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site Golden, Colorado, June

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

EPA, 2005, Correspondence to J. Rampe, DOE, from C. M. Aguilar, EPA Region 8, RE: Data Summary Report (DSR) for IHSS Group NE-1; Ponds A-1, A-2, A-3, A-4, A-5, B-4, B-5, C-1, and C-2; September 2005, October 18.

Thomas, W.A., 1999, Sedimentation in Stream Networks (HEC-6T). Mobile Boundary Hydraulics, Clinton, Mississippi.

USDA, 1995, Water Erosion Prediction Project Hillslope Profile and Watershed Model Documentation, NERSL Report No. 10. D.C. Flanigan, M.A. Nearing, and J.M. Laflin, eds, USDA-ARS National Soil Erosion Research Laboratory, West Lafayette, Indiana.

PAC REFERENCE NUMBER: NE-156.2

IHSS Number: 156.2

Current Operable Unit: BZ

Former Operable Unit: 6

IHSS Group: Not Applicable

Unit Name: Soil Dump Area between the A-Series and B-Series Drainages

This Final Update to the HRR for PAC NE-156.2 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 156.2 is summarized in this update. The following HRR volumes contain IHSS 156.2 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1968 to 1973

Historical Summary

IHSS 156.2, located in an area immediately north of Pond B-1 (PAC NE-142.5) and between the A-Series Drainage and B-Series Drainage, was used for the dumping of soil. The location of IHSS 156.2 is shown on Figures 8 and 9. The possible sources of the soil disposed of in this area were:

- Soil excavated for building construction projects may have been placed in this area in the late 1960s.
- Sediments removed from the Pond B-5 (PAC NE-142.9) discharge outlet modification activities may also have been placed in this general area.
- The RCRA 3004(u) Report (DOE 1987) identified this area as a soil disposal location from construction activities at Building 774. However, this is unlikely as Building 774 was constructed before 1968.

No documentation was found that contained analyses of the soil from construction projects or from the Pond B-5 modification work (DOE 1992a).

IHSS Investigations

OU 6 RFI/RI Activities

In accordance with the Phase I RFI/RI Work Plan (DOE 1992b) for OU 6, activities at IHSS 156.2 included the collection of surface soil and subsurface soil samples from 22 gridded locations. These results are described in the RFI/RI Report (DOE 1996). The COCs for soil were metals, radionuclides, and VOCs. Surface soil samples were collected in the uppermost 2 inches. Boreholes were drilled to a depth of 3 ft into undisturbed soil beneath fill. Within the overlying fill material, composite samples were collected in 6-ft increments. Prior to the collection of

surface and subsurface soil samples, a 17-pt Field Instrument Detection of Low Energy Radiation (FIDLER) survey was conducted around each sampling location (DOE 1996).

Eleven metals and two radionuclides were detected at concentrations above their respective background levels in one or more of the surface soil samples collected in IHSS 156.2. These were antimony (43.6 mg/kg), calcium, chromium, copper, iron, magnesium, mercury, nickel, strontium, vanadium, zinc, americium-241, and plutonium-239/240. Strontium was detected above background in 18 of the 22 samples. Americium-241(maximum activity of 0.301 pCi/g) and plutonium-239/240 (maximum activity of 1.85 pCi/g) were detected above background in 13 of 21 and 8 of 21 samples, respectively. For both metals and radionuclides, concentrations exceeding background were randomly distributed throughout the IHSS (1996).

Subsurface soil samples from IHSS 156.2 were analyzed for VOCs, metals, and radionuclides. Seven VOCs were detected in subsurface soil at IHSS 156.2, of which four (2-butanone, acetone, methylene chloride, and toluene) were suspected laboratory contaminants. The remaining VOC detections were of 4-methyl-2-pentanone, chlorobenzene, and total xylenes, which were each detected once at low concentrations (less than 5 μg/kg). Five metals and three radionuclides were detected in subsurface soil at concentration exceeding background, including barium, calcium, strontium, lead (maximum concentration of 84.9 mg/kg), zinc, americium-241, plutonium-239/240, and uranium 235. The maximum activities of americium-241, plutonium-239/240, and uranium-235 were 0.31 pCi/g, 0.88 pCi/g, and 0.16 pCi/g, respectively. Occurrences of all analytes present above background appeared to be random throughout the IHSS (1996).

No Further Action Recommendation

As part of the OU 6 RFI/RI, risk was evaluated in a Human Health Risk Assessment (HHRA) for current and future receptors exposed to IHSS 156.2 and two adjacent IHSSs. The results showed that for all current and future on-site residential receptors the cumulative hazard indices (HIs) for noncarcinogenic health effects were 0.01 or less; therefore no adverse noncancer health effects were expected under the exposure conditions evaluated. The excess lifetime cancer risk was estimated at 4×10^{-7}, indicating negligible risk. Results of the Ecological Risk Assessment (ERA) for the Walnut Creek Watershed indicated no adverse ecological effects to ecological receptors (DOE 1996).

IHSS 156.2 (PAC NE-156.2) was proposed for NFA in the 1997 HRR (DOE 1997), consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996). DOE received EPA (the LRA) and CDPHE approval of the NFA status of IHSS 156.2 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1987, Appendix 1, Resource Conservation and Recovery Act 3004 (u) Waste Management Units, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan, Walnut Creek Priority Drainage (Operable Unit No. 6, Rocky Flats Plant, Golden, Colorado, September.

DOE, 1996, Final Phase I RFI/RI Report Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBERS: NE-166.1, NE-166.2, AND NE-166.3

IHSS Numbers:	166.1, 166.2, and 166.3
Current Operable Unit:	BZ
Former Operable Unit:	6
IHSS Group:	Not Applicable
Unit Name:	Trenches South of the Present Landfill (IHSS Name: Trenches A, B, and C; Trench C consists of two smaller trenches)

This Final Update to the HRR for PACs NE-166.1, NE-166.2, and NE-166.3 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 166.1, 166.2, and 166.3 is summarized in this update. The following HRR volumes contain information regarding IHSSs 166.1, 166.2, and 166.3:

Original Report – 1992 (DOE 1992a);
Update Report – 1996 Annual (DOE 1996a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

Prior to 1964 and also 1970

Historical Summary

Trenches A, B, and C (IHSSs 166.1, 166.2, and 166.3) were located north of the IA and immediately south of the Present Landfill (PAC NW-114). The location of these IHSSs is shown on Figure 8.

Conflicting information has been found regarding the description of Trenches A, B, and C (IHSSs 166.1, 166.2, and 166.3). Listed below are four explanations for the existence of these trenches.

- According to one reference, these trenches received a few hundred gallons of liquid from the Rocky Flats sanitary wastewater treatment plant (Building 995) in 1970 (DOE 1992a). A map with that reference indicates only one trench in the area.
- The RCRA 3004(u) Report (DOE 1987) stated that sludge from Building 995 was disposed of in two trenches and possibly in a third trench near the landfill. This sludge was generated during a period of high sewage sludge output from Building 995, but no other time frame for these activities is given.
- One document included a brief discussion of possible sludge disposal "out north of the plant." This document also discusses sanitary wastewater treatment plant sludge from the No. 1 digester at Building 995 being disposed by Austin (a construction firm) to the north of the plant (DOE 1992a).
- Another reference stated that the sanitary sewage sludge that was disposed of in this area was simply pumped on the ground and the area was never actually trenched (DOE 1992a).

Aerial photographs of Rocky Flats do not indicate any disturbances in the location of these trenches in 1955, but in a 1964 photo, disturbed areas corresponding to the locations of these three trenches are visible. The disturbed areas do not show significant change in any photographs taken after 1964.

Older sanitary wastewater treatment plant sludge (prior to 1957) would reportedly have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination beginning in 1957. Total long-lived alpha activity present in the sludge has been reported between a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960 (DOE 1992a).

IHSS Investigations

OU 6 RFI/RI Activities

IHSSs 166.1, 166.2, and 166.3 were investigated as part of the OU 6 RFI/RI in accordance with the OU 6 Phase I RFI/RI Work Plan (DOE 1992b). During the OU 6 field investigation (1992-1993) 26 soil borings were drilled to a depth of 5 ft below the bottom of the disturbed area of each trench. Eight borings were drilled in Trench A, seven in Trench B, six in Trench C west, and five in Trench C east. Soil samples were analyzed for VOCs, metals, and radionuclides (DOE 1996b).

VOCs detected in subsurface soil samples collected at Trenches A, B, and C include four compounds labeled as “suspect” (2-butanone, acetone, methylene chloride, toluene), and five additional compounds believed to be representative of actual environmental conditions (benzene, chloroform, trichloroethene, 4-methyl-2-pentanone, styrene). The highest VOC concentration was tetrachloroethene at 21 μg/kg. The suspect VOCs are likely laboratory contaminants (DOE 1996b).

Metals detected at concentrations slightly greater than background in subsurface soil in Trenches A, B, and C included chromium, barium, calcium, and strontium. Detections of calcium in excess of background concentrations were limited to depths less than 6 ft bgs in intervals where caliche was observed (DOE 1996b).

Radionuclides detected in excess of background activities included americium-241, plutonium-239/240, and uranium-235 with maximum activities of 0.0229 pCi/g, 0.0855 pCi/g, and 0.13 pCi/g, respectively. Activities of these were at or slightly above background levels in composite samples up to 6 ft bgs (DOE 1996b).

No Further Action Recommendation

IHSSs 166.1, 166.2, and 166.3 were proposed for NFA based on the results of the HHRA and ERA, as presented in the 1996 HRR Annual Update and the RFI/RI Report (DOE 1996a, 1996b). Carcinogenic and noncarcinogenic ratio sums were 8.81×10^{-1} and 1.57×10^{-1}, respectively. The results of a dermal assessment indicated that risk to a resident from dermal exposure was also low, with risk ratio sums of 3.46×10^{-5} and 1.19×10^{-3}. The ERA for the Walnut and Woman Creek Watersheds (presented as an Appendix in the OU 5 RFI/RI Report) indicated no risk to the environment due to contamination detected in IHSSs 166.1, 166.2, and 166.3 (DOE 1996c).

Based on the above findings, NFA was proposed for IHSSs 166.1, 166.2, and 166.3, (Trenches A, B, and C) in the HRR 1996 Annual Update (DOE 1996a). DOE received approval

of the NFA status of IHSSs 166.1, 166.2, and 166.3 from EPA (the LRA) and CDPHE on February 14, 2002 (EPA and CDPHE 2002).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1987, Appendix 1, Resource Conservation and Recovery Act 3004 (u) Waste Management Units, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase II RFI/RI Work Plan, Walnut Creek Priority Drainage, (Operable Unit No. 6), Rocky Flats Plant, Golden, Colorado, September.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Phase I RFI/RI Report on the Walnut Creek Priority Drainage, Operable Unit No. 6, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996c, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-167.1

IHSS Number:	167.1
Current Operable Unit:	BZ
Former Operable Unit:	6
IHSS Group:	Not Applicable
Unit Name:	Landfill Spray Field (North Area)

This Final Update to the HRR for PAC NE-167.1, consolidates the information in initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 167.1 is summarized in this update. The following HRR volumes contain information concerning IHSS 167.1:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

Approximately October 1974 to May 1981

Historical Summary

The location of IHSS 167.1 is shown on Figure 8. Originally there were two landfill ponds, the East and West Landfill Ponds. These ponds were intended to protect surface water and groundwater in the vicinity of the Present Landfill (PAC NW-114). The West Pond was used to collect leachate and surface water runoff from the Present Landfill (DOE 2004). The West Pond was also referred to as Landfill Pond 1 or the Leachate Collection Pond. It originated with the conversion of temporary berms to permanent ones between October 1974 and January 1975 and was in use through May 1981 when the West Landfill Pond was buried as the Present Landfill expanded (DOE 2004).

Spray-evaporation was conducted near the Present Landfill to prevent the release of water from the landfill ponds. Spray fields associated with the Present Landfill included the North Area (IHSS 167.1) and the Central and South Areas (PACs NE-167.2 and NE-167.3). The North Spray Field covered an area of approximately three acres with dimensions of approximately 280 ft by 480 ft (DOE 1992a). There were two sources for spray-evaporation water in the North Spray Field. The principal one was the West Landfill Pond. Water from footing drains at Buildings 771 and 774 was also applied to IHSS 167.1 north of the Landfill. The water was collected at the Building 771 and Building 774 outfall pond, trucked out to the Landfill area, and then sprinkled from the truck onto the North Spray Field area. After March 1975, the footing drain water was no longer sprayed or spread at the Landfill area because of “damage to the landscape” (DOE 1992a).

IHSS Investigations

The water sprayed onto the North Spray Field (IHSS 167.1) may have been contaminated with varying amounts of low-level radioactivity derived from tritium, strontium-90, plutonium, and americium (DOE 1992). Low concentrations of phenol and nitrate were also detected in the spray water. Table NE-5 of the HRR (DOE 1992a) lists the activity and concentrations limits for spraying as follows: tritium - 100,000 picocuries per liter (pCi/L); strontium-90 - 25 pCi/L, plutonium – 20 pCi/L, americium – 200 pCi/L above background, and total long-lived alpha – 400 pCi/L. As shown in Table NE-6 of the 1992 HRR (DOE 1992a), tritium activity in water ranged from 950 pCi/L to 56,000 pCi/L. The source of spray evaporation water discussed above was either from the landfill pond, collected from the footing drain pond at Buildings 771 and 774, or a combination of both.

IHSS 167.1 was investigated in accordance with the OU 6 RFI/RI Work Plan (DOE 1992b). The only VOC detected was toluene at a maximum concentration of 3 µg/kg. The maximum radionuclide activities were 0.024 pCi/g of americium-241, 0.0716 pCi/g of plutonium-239/240, 3.05 pCi/g of uranium-233/234, 0.137 pCi/g of uranium-235, and 141 pCi/g of uranium-238. Additional data are available in the OU 6 RFI/RI report (DOE 1996a) and OU 7 IM/IRA Decision Document (DOE 1996b). These data were developed from analysis of East Landfill Pond water regardless of whether spraying operations were being conducted.

As documented in the OU 6 RFI/RI Report, IHSS 167.1 was identified as an Area of Concern (AOC) based on the results of the CDPHE conservative screen, in accordance with RFCA (DOE et al.1996), for purposes of the HHRA. The results of the HHRA for the AOC showed that for all current and future on-site receptors, the cumulative HIs for noncarcinogenic health effects were 0.01 or less and therefore no adverse noncarcinogenic health effects were expected under the exposure conditions evaluated. For all current and future on-site residential receptors the excess lifetime cancer risk was estimated at 5×10^{-8}, also indicating negligible risk (DOE 1996a). Additionally, results of the ERA for the Walnut Creek Watershed indicated barium concentrations detected within IHSS 167.1 would pose negligible risks to the small mammal receptor group (DOE 1996a).

No Further Action Recommendation

IHSS 167.1 was proposed for NFA in the 1997 HRR Update (DOE 1997). As proposed this recommendation was consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996).

NFA status for IHSS 167.1 was approved in a letter from EPA (the LRA) and CDPHE (CDPHE and EPA 1999) to DOE dated July 9, 1999 that was published in the 1999 HRR Update (DOE 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997), July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase II RFI/RI Work Plan, Walnut Creek Priority Drainage, (Operable Unit No. 6), Rocky Flats Plant, Golden, Colorado, September.

DOE, 1996a, Final Phase I RFI/RI Report Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996b, Operable Unit 7 Revised Draft IM/IRA Decision Document and Closure Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1997, Annual Update, August 1, 1996 Through August 1, 1997, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Final Interim Measure/Remedial Action for IHSS 114 and RCRA Closure of the RFETS Present Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBERS: NE-167.2 AND NE-167.3

IHSS Number:	167.2 and 167.3
Current Operable Unit:	BZ
Former Operable Unit:	7
IHSS Group:	Not Applicable
Unit Name:	Center Area Spray Field (IHSS 167.2) South Area Spray Field (IHSS 167.3)

This Final Update to the HRR for PACs NE-167.2 and NE-167.3 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSSs 167.2 and 167.3 are summarized in this update. The following HRR volumes contain information concerning IHSSs 167.2 and 167.3:

Original Report – 1992 (DOE 1992a);
Update Report – 1996 Annual (DOE 1996a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1975 to 1994

Historical Summary

The locations of IHSSs 167.2 and 167.3 are shown on Figure 8. Spray evaporation of water from the East Landfill Pond began in September 1975 and was discontinued in 1994 (DOE 1992a). During that time, approximately 5,500,000 gallons of water was stored to maintain a 75 percent capacity in the pond. Two discrete spray areas were identified adjacent to the Landfill Pond; IHSS 167.2 on the northern bank and IHSS 167.3 on the southern bank. These IHSSs were originally part of OU 6 but were transferred to OU 7 in 1994 (DOE 1994). Dimensions of the spray fields were approximately 100 by 460 ft. for IHSS 167.2 and 120 by 440 ft for IHSS 167.3 (DOE 1992a). Surface soil in spray-evaporation areas was potentially contaminated by the landfill pond water. Surface soil downgradient of the East Landfill Pond dam was considered downwind and also potentially contaminated by spray activities (DOE 1992a).

The water sprayed onto the spray fields may have been contaminated with varying amounts of low-level radioactivity derived from tritium, strontium, plutonium, and americium (DOE 1996b). Small concentrations of phenol and nitrate were also detected in the spray water.

The original location of the South Area Spray Field as described in the OU 6 Work Plan (DOE 1992b), was south of the Present Landfill (PAC NW-114) on the plateau between an unnamed tributary and North Walnut Creek. During OU 6 characterization activities, it was determined that the South Area Spray Field was actually located further north, adjacent to the south bank of the Present Landfill Pond. The location of IHSS 167.3 was reported in the HRR (DOE 1992a) and based on reevaluation of aerial photographs and other historical records of waste disposal practices was revised in the Final OU 6 Phase I RFI/RI (DOE 1996c).

IHSS Investigations

In accordance with the OU 7 Phase I RFI/RI Work Plan (DOE 1991), five surface soil samples were collected in IHSS 167.2 and three in IHSS 167.3 from the 0-2 inch soil horizon during the OU 7 Phase I RFI/RI. All samples were analyzed for metals, radionuclides, and indicator parameters (DOE 1996b). Maximum concentrations of metals included 16 mg/kg of arsenic and the maximum activity of americium-241 was 1 pCi/g.

At IHSS 167.2, barium, beryllium, manganese, nitrite, americium-241, and plutonium-239/240 were detected at concentrations or activities slightly greater than background. Analytes that were detected at concentrations or activities slightly greater than background at IHSS 167.3 included barium, manganese, lead, zinc, and nitrite (DOE 1996b).

Carcinogenic risk is below the EPA acceptable risk range for incidental ingestion of nonradionuclides, incidental ingestion of radionuclides, particulate inhalation, and external irradiation. Noncarcinogenic risk (HI) is below 1 for incidental ingestion by a child (HI=0.004) and incidental ingestion by an adult (HI=0.0005). These results indicate there is negligible risk to human health from exposure to surface soils downgradient of the Landfill for an open space receptor and that the requirements to support a No Action or NFA have been met.

No Further Action Recommendation

Based on the OU 7 IM/IRA document and a review of available data by CDPHE and EPA using the consultative process in an NFA Working Group meeting, approval was granted for NFA status for IHSSs 167.2 and 167.3 on November 14, 2001. Approval of the NFA status for IHSSs 167.2 and 167.3 was approved in a letter from CDPHE and EPA (the LRA) to DOE dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1991, Final Phase II RFI/RI Work Plan, Present Landfill IHSS 114 and Inactive Hazardous Waste Storage Area IHSS 203 (Operable Unit No. 7), Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 6-Walnut Creek Priority Drainage, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Work Plan Technical Memorandum for Operable Unit No. 7 – Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996a, Annual Update August 1, 1995 through August 1, 1996, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Operable Unit 7 Revised Draft IM/IRA Decision Document and Closure Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1996c, Phase I RFI/RI Report Walnut Creek Priority Drainage, Operable Unit No. 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-216.1

IHSS Number: 216.1

Current Operable Unit: BZ

Former Operable Unit: 6

IHSS Group: Not Applicable

Unit Name: East Spray Field, North Area

This Final Update to the HRR for PAC NE-216.1 consolidates the information in initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 216.1 is summarized in this update. The following HRR volumes contain information concerning IHSS 216.1:

Original Report – 1992 (DOE 1992a);
Update Report – 1996 Annual (DOE 1996a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

Spring 1989

Historical Summary

The location of IHSS 216.1 is shown on Figures 8 and 9. The north area of the East Spray Field was located on the top of a hill between the A-Series and B-Series Ponds, east of the Protected Area (PA) fence, and was opened in 1989 because of excessive runoff from the existing spray fields. Surface runoff from this area was collected in the ponds. During its short operational period, the north area of the East Spray Field received water from Pond B-3 (PAC NE-142.7), which received treated sanitary effluent from the on-site sewage treatment facility.

During the time the north area was in operation a chromic acid spill occurred in Building 444 on February 22, 1989. This chromic acid was inadvertently pumped to the sanitary sewer system (PAC 000-500). It was estimated that 4.7 pounds of chromium were discharged to Pond B-3. The water from this pond was then sprayed on the north (and south [PAC NE-216.3]) areas of the East Spray Field. This incident required the submittal of a RCRA CPIR (Number 89-001) (DOE 1992) .

Analyses of treated sanitary effluent discharged to Pond B-3 were used to characterize water applied to the East Spray Fields. The chemical analytes included: pH, five-day biochemical oxygen demand, total suspended solids (TSS), nitrate as nitrogen, total chromium, total phosphorus, total residual chlorine, and fecal coliform.

In response to the application of water potentially contaminated with chromium to the East Spray Field, soil samples were collected from the spray fields and analyzed for total chromium using the EPA EP Toxicity test in order to measure the amount of chromium that was leachable from the soil. The EP Toxicity chromium analyses of these soil samples indicated background soil concentrations of leachable chromium varied from less than 0.010 to 0.023 mg/L, and the spray field soil had leachable chromium concentrations of less than 0.010 to 0.082 mg/L. The data are

summarized in the Original HRR (DOE 1992a) and again in the 1996 Annual HRR Update (DOE 1996a).

In accordance with the OU 6 RFI/RI Work Plan (DOE 1992b), six surface soil samples were collected and analyzed for metals, radionuclides, and total organic carbon (TOC). Americium-241 and plutonium-239/240 were detected at activities of 0.192 pCi/g and 0.758 pCi/g, respectively. In addition, six soil borings were drilled to a depth of 4 ft and sampled in 2-ft intervals. Samples were analyzed for VOCs, metals, radionuclides, and TOC. Three metals and two radionuclides were detected at concentrations or activities greater than background including strontium with a maximum concentration of 506 mg/kg, americium-241 at a maximum activity of 0.349 pCi/g and plutonium-239/240 at a maximum activity of 0.206 pCi/g. IHSS 216.1 lies in an unsaturated zone between the two drainages; therefore, no groundwater was available for sampling (DOE 1996a).

IHSS Investigations

The results of the CDPHE conservative screen for IHSS 216.1, as reported in the final OU 6 Letter Report (DOE 1994), indicated that constituents released to the environment presented negligible risk to the onsite residential receptor. The background comparison conducted as part of the conservative screen resulted in the definition of the inorganic and radionuclide potential contaminants of concern (PCOCs) shown in Table 1 of the 1996 Annual Update to the HRR (DOE 1996a). All organic chemicals detected in the soil samples were considered PCOCs and were also listed in Table 1 of the 1996 Annual Update to the HRR (DOE 1996a).

No Further Action Recommendation

In accordance with RFCA NFA decision criteria (DOE et al. 1996), any area that passed the CDPHE conservative screen was a candidate for NFA. As shown in Table 1 in the 1996 Annual Update (DOE 1996a) the carcinogenic ratio sum was 4.0×10^{-1} and the noncarcinogenic ratio sum was 4.4×10^{-2}. Both of these values were below 1. IHSSs were also assessed for risk due to dermal exposure as indicated in Table 2 of the 1996 Annual Update (DOE 1996a). The noncarcinogenic risk ratio sum for barium and strontium was 3.4×10^{-4}. Again these values were less than 1. Evaluation of data presented in Tables 1 and 2 indicated the risk to human health from exposure to soil at IHSS 216.1 was low (DOE 1996a).

An ERA was also conducted. The results of the ERA for Walnut Creek and Woman Creek watersheds at RFETS, which appeared as Appendix N in the OU 5 RFI/RI Report (DOE 1996b), indicated there was no adverse affect to ecological receptors.

Based on the above evidence, IHSS 216.1 was proposed for NFA status in the 1996 Annual Update (DOE 1996a). IHSS 216.1 was discussed at the NFA Status Meeting of November 14, 2001, where decision criteria were reviewed and NFA status was granted to IHSS 216.1, the north area of the East Spray Field. Approval of NFA status for IHSS 216.1 was confirmed in a letter from CDPHE and EPA (the LRA) to DOE dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase II RFI/RI Work Plan, Walnut Creek Priority Drainage, (Operable Unit No. 6), Rocky Flats Plant, Golden, Colorado, September.

DOE, 1994, Letter Report on the Colorado Department of Public Health and Environment Source Area Delineation and Risk-Based Conservative Screen and the Environmental Protection Agency Areas of Concern Delineation for the Human Health Risk Assessment, Walnut Creek Priority Drainage, Operable Unit No. 6, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1996a, Annual Update August 1, 1995 through August 1, 1996, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Phase I RFI/RI Report on the Walnut Creek Priority Drainage, Operable Unit No. 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996c, Final Phase I RFI/RI Report on the Woman Creek Priority Drainage, Operable Unit No. 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April. See Appendix N: Ecological Risk Assessment for Walnut Creek and Woman Creek Watersheds at Rocky Flats Environmental Technology Site.

DOE, 2002, Annual Update August 1, 2001, through August 1, 2002, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: NE-216.2 AND NE-216.3

IHSS Number:	216.2 and 216.3
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	NE/NW
Unit Name:	East Spray Fields (Center and South Areas)

This Final Update to the HRR for PACs NE-216.2 and NE-216.3 consolidates the information in initial 1992 HRR and subsequent HRR updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 216.2 and 216.3 is summarized in this update. The following HRR volumes contain IHSSs 216.2 and 216.3 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

PAC NE-216.2 – Center Area: 1979 to the early 1980s

PAC NE-216.3 – South Area: early 1980s to 1990.

Historical Summary

IHSS 216.2 was located immediately north of the East Access Road and was only operated for a few years until it was closed because of erosion and soil slumping problems on hillsides near the spray field. IHSS 216.3 was a considerably larger spray field located immediately south of the East Access Road and was operated for a period of approximately 10 years (DOE 1992). The location of IHSSs 216.2 and 216.3 are shown on Figures 8 and 9.

Spray irrigation of Pond B-3 (PAC NE-142.7) water was initiated in 1979 as an action to achieve zero off-site discharge of sanitary effluent from Rocky Flats. Water from Pond B-3, which received treated sanitary wastewater flows, was applied to these spray fields. Water was pumped from Pond B-3 and spray irrigated on the nearby soil. Gasoline-driven pumps and a series of laterals and sprinkler nozzles distributed the water to the ground surface for evaporation and infiltration into the subsurface. It is estimated that during spray irrigation activities, up to 20 million gallons per year of water was disposed in this manner. When used, the spray system often saturated the soils near the spray fields, leading to overland flow of the sprayed effluent into the retention ponds (DOE 1992).

Direct runoff of spray-irrigated water from the southern portion of the East Spray Field into Woman Creek was observed on March 2, 1987. The direct runoff constituted a technical NPDES violation because the point of discharge to Woman Creek was not an NPDES permitted discharge point. In response to this NPDES technical violation, a ditch was constructed to divert runoff water from the southern portion of the East Spray Field into Pond C-2 (PAC SE-142.11) (DOE 1992).

A second incident occurred following a spill of chromic acid in Building 444 on February 22, 1989. The chromic acid was inadvertently pumped to the sanitary sewer system (PAC 000-500) and it was estimated that 4.7 lbs of chromium was discharged to Pond B-3. The water from this pond was then spray irrigated on the southern (and northern) portions of the East Spray Fields.

The analyses of treated sanitary effluent discharged to Pond B-3 and of the pond water is representative of the water applied to the East Spray Fields. Chemical analytes included: pH, five-day biochemical oxygen demand, TSS, nitrate as nitrogen, total chromium, total phosphorus, total residual chlorine, and fecal coliform.

In response to the application of water potentially contaminated with chromium to the northern and southern portions of the East Spray Fields, 34 soil samples were collected. Two of the samples were duplicates. The samples were collected from the ground surface, 0- to 1-inch deep, and from 6- to 7-inch deep. Samples were analyzed for total chromium using the EPA EP Toxicity test in order to measure the amount of chromium that was leachable from the soil. Sampling locations were representative of the application, surface runoff, and background areas. The EP Toxicity chromium analyses of these soil samples indicated background soil concentrations of leachable chromium varied from less than 0.010 to 0.023 mg/L, and the spray field soils had leachable chromium concentrations of less than 0.010 to 0.082 mg/l (DOE 1992).

IHSS Investigations

IHSSs 216.2 and 216.3 were investigated as part of the OU 2 RFI/RI in accordance with the OU 2 RFI/RI Work Plans (DOE 1991a, 1991b). Results are reported in the Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2 (DOE 1995). Metals and radionuclides were reported at concentrations and activities greater than background but less than RFCA Tier II soil ALs (DOE et al. 1996) in surface soil. IHSSs 216.2 and 216.3 were also characterized in accordance with the BZSAP Addendum #BZ-02-01 (DOE 2002). This characterization included five surface and one subsurface soil sampling locations in IHSS 216.2. Metals and radionuclides were detected at concentrations or activities greater than background but less than RFCA WRW soil ALs (DOE et al. 2003) in surface soil and toluene was detected, at a maximum concentration of 100 μg/kg in subsurface soil.

Fourteen surface and subsurface soil samples were collected at IHSS 216.3. All surface and subsurface soil results were less than RFCA WRW soil ALs. Metals and radionuclides were detected at concentrations or activities greater than background in surface soil. The maximum radionuclide activities detected included 0.068 pCi/g of americium-214, 0.538 pCi/g of plutonium-239/240, 0.24 pCi/g of uranium-235, and 1.66 pCi/g or uranium-238. Methylene chloride, acetone, ethylbenzene, and total xylenes were detected, at very small concentrations, in subsurface soil.

No Further Action Recommendation

After review of the Data Summary Report for IHSS Group NE/NW (DOE 2003b) by regulatory agencies, DOE received approval from EPA (the LRA) of NFAA status for IHSSs 216.2 and 216.3, on October 7, 2003 (EPA 2003).

Comments

None

References

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Phase II RFI/RI Report 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Characterization Data Summary IHSS Group NE/NW, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, G. Kleeman, letter to J. Legare, RE: Characterization Data Summary IHSS Group NE/NW, October 7.

PAC REFERENCE NUMBER: NE-1400

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Tear Gas Powder Release

This Final Update to the HRR for PAC NE-1400 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1400 is summarized in this update. The following HRR volumes contain PAC NE-1400 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 5, 1987

Historical Summary

A member of Plant Protection dumped approximately 5 lbs of CS tear gas powder on the roadway in the BZ on the evening of August 5, 1987. The location of PAC NE-1400 is shown on Figure 8. The powder became airborne the next day when other members of Plant Protection drove through the tear gas powder. Three individuals were affected by the powder and were taken to Medical and received attention. The area where the tear gas was located was hosed down by the Plant Fire Department.

PAC Investigations

No other investigation required because of the nature of the release.

No Further Action Recommendation

PAC NE-1400 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. An NFA for PAC NE-1400 was formally approved by CDPHE and EPA (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1401

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: NE Buffer Zone Gas Line Break

This Final Update to the HRR for PAC NE-1401 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1401 is summarized in this update. The following HRR volumes contain PAC NE-1401 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

April 28, 1987

Historical Summary

A 12-inch high-pressure natural gas line was ruptured by a bulldozer during construction of a spray irrigation runoff control ditch in the southeastern BZ. The location of PAC NE-1401 is shown on Figures 8 and 9. The line was reported to be 36 to 42 inches deep. No explosion, fire, or injuries occurred as a result of the rupture; however, overhead electrical lines were damaged by debris blown into the air by the escaping gas. Approximately 5 million cubic feet (ft^3) of gas were released to the environment. The flow of gas to the line was shut off. The line was repaired and returned to service on April 30, 1987. Because of the rapid diffusion characteristics of natural gas, it was concluded at the time that the release never presented a hazard to off-site populations.

PAC Investigations

No investigation required because there was no release to soil or water.

No Further Action Recommendation

PAC NE-1401 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. An NFA for PAC NE-1401 was formally approved by CDPHE and EPA (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1402

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: East Inner Gate PCB Spill

This Final Update to the HRR for PAC NE-1402 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1402 is summarized in this update. The following HRR volumes contain PAC NE-1402 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 8, 1983

Historical Summary

PCB-contaminated transformer oil leaked onto the asphalt at the east gate. The oil came from a commercial truck which was to pick up a shipment of PCB wastes from the Plant. The truck already contained wastes from elsewhere, which apparently were leaking. When the truck was opened for inspection before entering, the leak was noticed. While attempts were being made to clean up the spill, the oil leaked out of the truck and onto the asphalt. The truck left without entering Rocky Flats. The following day, approximately 1 ft^2 of contaminated asphalt was removed and stored with other Rocky Flats PCB-contaminated waste. The location of PAC NE-1402 is shown on Figures 8 and 9.

PAC Investigations

No investigation was required because the PCB-contaminated waste was contained by the asphalt.

No Further Action Recommendation

PAC NE-1402 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. An NFA for PAC NE-1402 was formally approved by CDPHE and EPA (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1403

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Gasoline Spill - Building 920 Guard Post

This Final Update to the HRR for PAC NE-1403 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1403 is summarized in this update. The following HRR volumes contain PAC NE-1403 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 5, 1991

Historical Summary

Approximately 1 quart of gasoline spilled from the portable generator on the parking lot asphalt just east of the Building 920 Guard Post. The location of PAC NE-1403 is shown on Figures 8 and 9. The spill was a result of a defective fuel level gauge. The spill was contained by the use of Oil-Dri®, an absorbent, and removed from the area. RCRA CPIR No. 91-006 was submitted to CDH as required per 6 Code of Colorado Regulations (CCR) 1007-3, 265.56(j). The report states that the material was released to the asphalt, but was contained and removed immediately. There did not appear to be any threat to the environment. The packaged material was transferred to the Building 331 storage area.

PAC Investigations

No investigation was required because the spill was contained and removed.

No Further Action Recommendation

PAC NE-1403 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. An NFA for PAC NE-1403 was formally approved by CDPHE and EPA (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1404

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	6
IHSS Group:	NE/NW
Unit Name:	Diesel Spill at Pond B-2 Spillway

This Final Update to the HRR for PAC NE-1404 consolidates the information in the Second Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1404 is summarized in this update. The following HRR volumes contain PAC NE-1404 information:

Original Report – Second Quarterly (DOE 1993a);
Update Report – Third Quarterly (DOE 1993b);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 27, 1992

Historical Summary

A diesel spill was reported on October 27, 1992 within the spillway (northeast corner) of Pond B-2 (PAC NE-142.6) (DOE 1993a). PAC NE-1404 is shown on Figures 8 and 9. Approximately 18 gallons of diesel fuel leaked to the ground from the tank of a portable pump used to transfer water from Pond B-2 to Pond A-2 (PAC NE-142.2).

The diesel fuel released to the environment was greater than the reportable quantity (RQ) for RCRA-regulated hazardous waste. The EPA waste code for this diesel fuel was D018. The pump was taken out of service for repair (DOE 1993a). The spill was stabilized and contained on the ground by construction of a dike and the surface of Pond B-2 was cleaned from west to east using absorbent booms and pads (DOE 1998). An estimated 200 pounds of contaminated material (soil and absorbents) were recovered from the spill area and containerized in drums (absorbent booms and pads) and one half-crate plywood box (soil) (DOE 1993a). The area was declared a RCRA 90-day accumulation area until analytical data were received on October 29, 1992. The spill and spill area were cleaned up until no visual evidence of contamination was present. The pond area was monitored for a week for evidence of sheen; none was found (DOE 1998).

There was no release to water downstream of RFETS because of the isolation of Pond B-2 water from the normal B-Series Drainage (DOE 1998).

PAC Investigations

Cleanup materials from this diesel spill were managed as RCRA-regulated waste because the material could contain levels of benzene that exceeded the toxicity characteristic leaching

procedure (TCLP) limit (DOE 1993a). Samples collected from the contaminated soil were analyzed for TCLP volatiles and gross alpha/beta. Results of the TCLP analysis indicated the contaminated soil contained no RCRA-regulated hazardous constituents associated with the release and radiological screens were below background (DOE 1993a).

Soil removed from the spill area was analyzed for TCLP volatiles for waste disposition purposes, VOCs were not detected in the extract (DOE 1993a).

No Further Action Recommendation

Based on the nature of the release and response to the occurrence, a residual source of contamination associated with PAC NE-1404 was not considered likely. PAC NE-1404 was proposed for NFA status in the HRR 1998 Annual Update (DOE 1998), additional information was requested by the agencies in 1999, and NFA approval for PAC NE-1404 was given in a letter from CDPHE and EPA (the LRA) to DOE dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1993a, Second Quarterly Update, October 1, 1992 to January 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1993b, Third Quarterly Update, January 1, 1993 to April 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1998, Annual Update for August 1, 1997 through August 1, 1998 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1405

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	OU 2, Phase 2, Field Treatability Unit

This Final Update to the HRR for PAC NE-1405 consolidates the information in the Third Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1404 is summarized in this update. The following HRR volumes contain PAC NE-1404 information:

Original Report – Third Quarterly (DOE 1993a);
Update Report – Fourth Quarterly (DOE 1993b);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

January 14, 1993

Historical Summary

A release of approximately 20 gallons of diesel fuel to the ground due to overfilling of a fuel tank occurred at the OU 2 Treatment Facility. The location of PAC NE-1405 is shown on Figures 8 and 9. The release to the environment was greater than the RQ of RCRA hazardous waste. Cleanup materials from diesel spills were managed as RCRA-regulated waste pending analytical results because the contaminated material potentially contained benzene in excess of the TCLP limit. The EPA waste code for diesel fuel is D018.

The release was cleaned up with absorbent material and later contaminated soil was excavated until all indication of fuel presence was gone (DOE 1993a). Seventeen gray drums were filled the day following the spill with soil contaminated by diesel fuel. Clean road gravel was placed in the excavation as backfill.

PAC Investigations

Prior to excavation of soil in the spill area, sampling was conducted to determine if potential RCRA contaminants were present (DOE 1993a). Six samples were collected from the spill area. Two samples were collected from soil mixed with diesel fuel, two samples were collected from a pool of fuel, and another two samples were collected from a nearby snow bank which absorbed some of the diesel. Analytical data indicated the spilled diesel fuel did not create a RCRA hazard waste. The analysis consisted of target analyte list (TAL) volatile organic analytes (VOAs) and TCLP volatiles.

No Further Action Recommendation

Based on the nature of the release and response to the occurrence, a residual source of contamination associated with PAC NE-1405 was not considered likely. PAC NE-1405 was proposed for NFA status in the 1998 HRR Annual Update (DOE 1998) and approval was given through a letter from the CDPHE and EPA (the LRA) to DOE dated July 9, 1999 (CDPHE and EPA 1999).

Comments

Originally this spill was identified as PAC NE-1404 in the Third Quarterly HRR Update (DOE 1993a). It was reassigned as PAC NE-1405 in the Fourth Quarterly HRR Update (DOE 1993b).

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997), July 9.

DOE, 1993a, Third Quarterly Update, January 1, 1993 to April 1, 1993, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1993b, Fourth Quarterly Update, for April 1, 1993 to July 1, 1993, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1994, Seventh Quarterly Update, for January 1, 1994 to March 1, 1994, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1406

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: 771 Hillside Sludge

This Final Update to the HRR for PAC NE-1406 consolidates the information in the Fourth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1406 is summarized in this update. The following HRR volumes contain PAC NE-1406 information:

Original Report – Fourth Quarterly (DOE 1993);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

Prior to June 1992

Historical Summary

During excavation activities for construction of piping and tanks to store groundwater collected in the SEP area (Modular Storage Tanks [MSTs], OU 4 area), an 80 by 80 ft area of odoriferous and dark-colored soil was identified (DOE 1993). The location of PAC NE-1406 is shown on Figure 8. The area in which this material was located was cordoned off to restrict access (DOE 1993). This soil appeared to be highly organic in nature and was thought to be similar to sanitary wastewater treatment plant sludge disposed in other locations onsite. Review of available aerial photographs for the area did not indicate any soil disturbances in this location.

PAC Investigations

The location was surveyed for VOCs and radioactivity (DOE 1998). Samples for laboratory analysis were collected from the area in July 1992 (DOE 1993). Sample analytes included VOCs, SVOCs, gross alpha/beta, metals, nitrate, ammonia, pH, and fecal coliform bacteria. Analytical results indicated only chromium (22.9 mg/kg) and selenium (3.4 mg/kg) were above background levels (DOE 1998). These results were well below the RFCA Tier II (DOE et al. 1996) surface soil ALs of 36,740 mg/kg for chromium VI (the more conservative value) and 38,400 mg/kg for selenium.

No Further Action Recommendation

Based on the lack of evidence for contamination, PAC NE-1406 was proposed for NFA status in the 1998 HRR Annual Update (DOE 1998). NFA status was approved for PAC NE-1406 in a letter from CDPHE and EPA (the LRA) to DOE dated July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997), July 9.

DOE, 1993, Fourth Quarterly Update, for April 1 1993 through July 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

EPA and CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Regions VIII, S. Gunderson, CDPHE, RE: 1998 Annual HRR Review, Rocky Flats Environmental Technology Site, Golden, Colorado, July 9.

PAC REFERENCE NUMBER: NE-1407

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	NE/NW
Unit Name:	OU 2 Treatment Facility

This Final Update to the HRR for PAC NE-1407 consolidates the information in the Fourth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1407 is summarized in this update. The following HRR volumes contain PAC NE-1407 information:

Original Report – Fourth Quarterly (DOE 1993);
Update Report – 2002 Annual (DOE 2002a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

March 9, 1993

Historical Summary

The OU 2 Treatment Facility was located in the 900 Area on the hillside north of Woman Creek and was in operation from May 1991 until August 1995. The location of PAC NE-1407 is shown on Figures 8 and 9. The facility was used primarily to treat contaminated groundwater using a chemical precipitation/micro-filtration/granular activated carbon system. On March 9, 1993 at 3:10 P.M., approximately 50 gallons of untreated seepage/spring water leaked from a ruptured elbow in a secondary containment line near the facility.

Routine sampling of the influent water indicated concentrations of carbon tetrachloride, trichloroethene, tetrachloroethene, chromium, and 1,2-dichchloroethene were slightly above the Safe Drinking Water Act (SDWA) drinking water standards (DOE 1993).

In response to the leak, the pump was turned off, and a berm was constructed to contain the spill area within a radius of 150 ft^2. Analytical data for the influent water suggested that the release did not pose an unacceptable risk to human health and the environment and therefore, immediate removal of the affected soil was not performed.

PAC Investigations

In accordance with BZSAP Addendum #BZ-02-01 for the NE/NW Group (DOE 2002b), characterization samples were collected on June 25, 2002 from five locations. Analytical results from surface and subsurface soil (DOE 2003b) indicated potential contaminant concentrations were less than RFCA Tier II soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

PAC NE-1407 was proposed for, and received, NFAA status through the IHSS Group NE/NW Data Summary Report (DOE 2003b) that received EPA (the LRA) approval in a letter to DOE on October 7, 2003 (EPA 2003).

Comments

None

References

DOE, 1993, Fourth Quarterly Update, for April 1 1993 through July 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, July.

DOE, 2002a Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Buffer Zone Sampling and Analysis Plan Addendum #BZ-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group NE/NW, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modification Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to J. Legare, DOE RFFO from G. Kleeman, EPA RE: Characterization Data Summary IHSS Group NE/NW, October, 7.

PAC REFERENCE NUMBER: NE-1408

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	OU 2 Test Well Number 219-93

This Final Update to the HRR for PAC NE-1408 consolidates the information in the Fourth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1408 is summarized in this update. The following HRR volumes contain PAC NE-1408 information:

Original Report – Fourth Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000).

Date(s) of Operation or Occurrence

April 26, 1993

Historical Summary

Approximately 10 gallons of groundwater was spilled when casing being inserted into a new bedrock monitoring well forced water out of the hole and onto the ground (DOE 1993). An area approximately 2 ft by 8 ft was wetted in the incident. The location of PAC NE-1408 is shown on Figures 8 and 9.

At the time of the incident analytical testing of a well 27 ft upgradient identified the following contaminants in the groundwater: carbon tetrachloride, trichloroethene, tetrachloroethene, chloroform, and 1,1-dichloroethene (DOE 1993).

A desiccant was immediately applied to the area to absorb the water and prevent it from spreading (DOE 1993). The wet desiccant, wet dirt from below the desiccant, and a layer of dry dirt were removed from the area and containerized. The wetted material was placed into barrels with “Aqua-Set” absorbent. Approximately 11 ft^3, 1-1/2 barrels, of material was removed. The area was cleaned up until dry soil was encountered. Therefore, no additional threat to human health and the environment occurred as a result of this release.

PAC Investigations

In 1999, two confirmation samples were collected under the approved SAP for the Characterization of Potential No Further Action Sites (DOE 1999b). The samples were collected between 0 and 6 inches bgs and no VOCs were detected (DOE 1999a).

No Further Action Recommendation

Based on the two confirmation samples and the lack of evidence for a contaminant source, PAC NE-1408 was proposed for NFA status in the 1999 HRR Annual Update (DOE 1999a). NFA status was approved for PAC NE-1408 in a letter from CDPHE and EPA (the LRA) to DOE dated June 23, 2000 (CDPHE and EPA 2000).

Comments

PAC NE-1408 was erroneously referred to as PAC NE-1406 in the Fourth Quarterly HRR Update. However, this was corrected in the Seventh Quarterly HRR Update.

References

CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: Annual Update for the Historical Release Report (September 1999), Colorado, June 23.

DOE, 1993, Fourth Quarterly Update, for April 1 1993 through July 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1994, Seventh Quarterly Update, for January 1, 1994 to March 1, 1994, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Sampling and Analysis Plan for Characterization of Potential No Further Action Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1409

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: NE/NW

Unit Name: Modular Tanks and Building 910 Treatment System

This Final Update to the HRR for PAC NE-1409 consolidates the information in the Fifth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1409 is summarized in these updates. The following HRR volumes contain information concerning PAC NE-1409:

Original Report – Fifth Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 1999 Annual (DOE 1999);
Update Report – 2000 Interim (DOE 2000a);
Update Report – 2000 Annual (DOE 2000b);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 20, 1993 to 2003

Historical Summary

Temporary MSTs, stored liquid collected by the SEP ITS which was pumped to Building 910 (RCRA Unit 38 which was approved as a non-RCRA unit in 2002) for treatment. During transfer, approximately 4,700 gallons of hazardous waste in the primary containment, located between the MSTs and the ITS sump, leaked into the secondary containment. This waste overflowed back into the MST pumphouse. The waste was fully contained in the pumphouse secondary containment. When the liquid levels in the pumphouse secondary containment rose, the local alarm was activated and the pumps automatically shut down. This alerted the Building 910 operators to the spill. When the building operators found that liquid was still siphoning out through the pump, they closed the manual valves. The location of PAC NE-1409 is shown on Figure 8.

Some of the hazardous waste gravity-drained through a failed hose connection on the secondary containment piping located within the ITS sump. The ITS sump was equipped with automatic level controls which caused this spilled material to be pumped back into the MSTs.

The released material was considered RCRA F-listed hazardous waste because it passed through the ITS sump (which was considered a waste generation point). EPA waste codes for the released material included F001, F002, F003, F005, F006, F007, and F009. RCRA constituents generally existing in the ITS system include cadmium, chromium, lead, nickel, silver, methylene chloride, carbon tetrachloride, chloroform, tetrachloroethene, toluene, trichloromethene, and cyanide.

No release to the environment is known to have occurred from this incident; however, because the concrete sump that received the waste was unlined, the RCRA Contingency Plan was implemented as a precautionary measure (DOE 1994). The MSTs were RCRA closed and demolished in 2002.

PAC Investigation

PAC NE-1409 had not been subject to immediate investigation until construction activities related to the MST Freeze Protection project were initiated in November 1998. Four soil samples were collected at the corner of the ITS sump in December 1998 and January 1999 in support of the Site Survey Determination for Environmental and Worker Exposure, the supporting Soil Disturbance Evaluation, and hazardous waste determination requirements. The soil samples were analyzed for metals, radionuclides, SVOCs, and VOCs. Analysis for cyanide was not performed because the waste concentrations were below background concentrations.

Results indicated all analyte concentrations were less than RFCA Tier II soil ALs (DOE et al. 1996). Analytical results are presented in the No Further Action Justification Document for incorporation into the HRR for PACs NW-1501, NE-1408, NE-1409, 900-1309, 900-1311, 900-1312, 900-1313 (DOE 1999). Based on the results of the soil samples collected, no current or potential contaminant source was identified. The incident occurred in 1993 and was not a continuing release. PCOCs for PAC NE-1409 were not detected and therefore PAC NE-1409 was proposed for NFA consistent with criteria set forth in the RFCA (DOE et al. 1996).

No Further Action Recommendation

PAC NE-1409 was proposed for NFA status in the 1999 and 2000 Annual HRR Updates (DOE 1999, 2000b). In response to comments received from the regulatory agencies on June 23, 2000, this PAC narrative update was submitted as part of an Interim Update to the HRR in August, 2000 (DOE 2000a). The Interim Update included detailed attachments consisting of CPIR No. 93-007 (with amendments), critique meeting notes, analytical data, and maps (36 pages total). The 36-page attachment was not provided in this Annual Update to the HRR, but is available in the AR.

PAC NE-1409 information was evaluated using the consultative process in an NFA Work Group meeting on January 31, 2002 and NFA status was agreed to. The NFA for PAC NE-1409 was formally approved by EPA (the LRA) and CDPHE on February 14, 2002 (CDPHE and EPA 2000) as reported in the 2002 HRR Annual Update (DOE 2002).

Comments

This PAC was formerly identified as PAC 000-503. It was renumbered to better reflect the area of its mapped location.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1993, Fifth Quarterly Update - July 1, 1993 to October 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado.

DOE, 1994, Seventh Quarterly Update - January 1, 1994 to March 31, 1994, Historical Release Report, Rocky Flats Plant, Golden, Colorado.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Interim Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2000b, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: NE-1410

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Diesel Fuel Spills at Field Treatability Unit

This Final Update to the HRR for PAC NE-1410 consolidates the information in the Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1410 is summarized in this update. The following HRR volumes contain PAC NE-1410 information:

Original Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 10 and 11, 1993

Historical Summary

On October 10, 1993, Rocky Flats personnel were refueling an emergency generator unit with diesel fuel at OU 2. The operator turned his back on the operation to shield himself from the wind, and when he turned back around, the automatic nozzle valve had not turned off as expected, resulting in approximately 0.5 to 1 gallon of fuel spilling inside the generator unit (DOE 1994). The spill was absorbed with Oil-Dri®. The location of PAC NE-1410 is shown on Figures 8 and 9.

On October 11, 1993 at 9:30 A.M., the generator was being filled again. The OU 2 project manager was conducting a shift inspection at this time and noticed a shiny pool of 2 to 3 gallons of a substance on the ground on the northern side of the generator (DOE 1994). The Hazardous Materials (HAZMAT) team responded by applying Oil-Dri® to the standing liquid. Because the soil around the area was very compacted, a backhoe was used to loosen the soil. The affected soil was removed and placed in six 55-gallon gray drums and held by the garage prior to being moved to the Property Utilization and Disposal (PU&D) Yard 90-day RCRA accumulation storage area (DOE 1994).

PAC Investigations

The soil affected by the 2 to 3 gallon diesel spill was removed. The area affected was approximately 200 ft^2. Soil samples were collected from the soil and the bermed area. The samples were determined to be nonhazardous based on sample results because the results were less than regulatory limits for benzene (DOE 1994).

No Further Action Recommendation

Based on the removal of the affected soil and the relatively small quantity of diesel fuel spilled (less than 5 gallons) (DOE 1994), NFA was recommended at the site.

Information on PAC NE-1410 was evaluated through the consultative process at the January 31, 2002 Working Group meeting and NFA status was agreed to. The NFA for PAC NE-1410 was formally approved by CDPHE and EPA (the LRA) on February 14, 2002 (CDPHE and EPA 2002).

Comments

A similar diesel spill occurred on January 14, 1993, and is documented in PAC NE-1405.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1994, Seventh Quarterly Update, January 1, 1994 to March 31, 1994, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NE-1411

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Diesel Fuel Spill at Field Treatability Unit

This Final Update to the HRR for PAC NE-1411 consolidates the information in the Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NE-1410 is summarized in this update. The following HRR volumes contain PAC NE-1410 information:

Original Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

January 29, 1994

Historical Summary

As garage employees were refueling a diesel generator located near OU 2, approximately 20 gallons of diesel fuel were released to the ground. The incident occurred during the transfer of fuel from the generator (Tank B to Tank A). The location of PAC NE-1411 is shown on Figures 8 and 9.

The generator was initially refueled from Tank A, which in turn was refueled through a hose from Tank B. Because of extreme cold, the employees attending the refueling operation were sitting in the truck cab and were not able to hear a problem over the generator noise. When they smelled diesel fumes, they immediately cut the master switch from inside the cab and notified the Shift Supervisor of the spill. It was determined that the back-feed preventer tube on the pump nozzle froze, causing the automatic shut-off to malfunction, releasing approximately 20 gallons of diesel fuel to the ground. Although the generator itself was located within secondary containment, the spill area was not within the containment and diesel was released to the soil (DOE 1994).

The HAZMAT team responded and contained the leak. It was determined that the spill was nonhazardous based on soil characterization. Rocky Flats personnel removed the soil and placed it in barrels (DOE 1994).

PAC Investigations

No additional investigation was required because soil was removed and the spill was determined to be nonhazardous.

No Further Action Recommendation

PAC NE-1411 was proposed for NFA status in the Seventh Quarterly Update (DOE 1994). Information on PAC NE-1411 was evaluated through the consultative process at the January 31, 2002 Working Group meeting. CDPHE and EPA requested further confirmation that contaminated soil had been removed from the spill site. This information was provided at the next NFA Status Meeting in February in the form of copies of operations logbooks which indicated the contaminated soil had been removed. Based on the logbooks PAC NE-1411 was accepted as an NFA site. The NFA for PAC NE-1411was formally approved by CDPHE and EPA (the LRA) on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Seventh Quarterly Update, January 1, 1994 to March 31, 1994, Historical Release Report HRR, Rocky Flats Plant, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBERS: NE-1412 AND NE-1413

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	NE/NW
Unit Name:	Trenches T-12 and T-13, Located in OU 2, East Trenches

This Final Update to the HRR for PACs NE-1412 and NE-1413 consolidates the information in the Tenth Quarterly HRR Update and subsequent updates with information gained through the disposition of these PACs in accordance with the RFCA accelerated action process. The disposition of PACs NE-1412 and NE-1413 is summarized in this update. The following HRR volumes contain information concerning PACs NE-1412 and NE-1413:

Original Report – Tenth Quarterly (DOE 1995a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

July 1954 to August 1968

Historical Summary

The term "East Trenches" refers to a group of disposal trenches that are located east of the IA and within approximately 400 ft north and south of the East Access Road. All of the East Trenches have similar operational histories, but some have been written up separately for purposes of the Final Update to the HRR. This writeup pertains only to Trenches T-12, and T-13 (PACs NE-1412 and NE-1413). Other trenches in the East Trenches are considered separately in this HRR Update because of having been remediated or proposed for NFAA as separate entities. These other trenches include T-3, T-4, T-5, T-6, T-7, T-8, T-9a, T-9b,T-10, and T-11 (PACs NE-110, and NE-111.1, through 111.8). Figures 8 and 9 indicate the locations of the trenches.

Trenches T-12 and T-13 were identified and incorporated into the RFI/RI for OU 2 (East Trenches) in June 1993 (DOE 1993) when a Plant employee completed further research of aerial photographs in the East Trench area. Historical documentation indicated that the East Trenches were primarily used to dispose of sanitary wastewater and sludge from the STP drying beds (Building 995 [PAC 900-1300]) until August of 1968. From 1968 to 1970, sanitary wastewater and sludge was taken to the Present Landfill (APC NW-114). The total amount of sludge disposed of in the East Trenches has been estimated to be 125,000 kg (275,577 lb).

Trench T-12 was approximately 125 ft long, 10 ft wide, and 5 ft deep (DOE 1996). Trench T-13 was estimated to be nearly 250 ft in length and filled with dark gray material. An employee was contacted who remembers that this trench may also have contained laboratory wastes (DOE 1996).

The East Trenches (T-3 through T-13) were used primarily for the disposal of sanitary wastewater treatment plant sludge, which consists primarily of concentrated organic matter

(DOE 1995a). Sludge removed from the wastewater treatment plant was placed on sludge drying beds (PAC 900-1300) and the dried material removed from the sludge drying beds was placed in disposal trenches. An estimated 125,000 kg of sludge is buried in trenches T-2 through T-13 (DOE 1995a).

Some uranium and plutonium contamination is present in the sludge disposed in the trenches. It is reported that the older sludge would have primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination (DOE 1995a). Total reported long-lived alpha activity present in the sludge ranged from a minimum of 382 pCi/g in August 1964 to a maximum of 3591 pCi/g in June 1960 (DOE 1995a).

On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. This waste had an average activity of 150,000 dpm/L. It is believed that this is total alpha activity. The activity of this material was reported as 1.35×10^8 dpm with approximately 1.3 kg of depleted uranium present in the waste (DOE 1995a). It is unknown whether this material was in drums.

PAC Investigations

Upon discovery of the two trenches, their characterization was incorporated into the RFI/RI for OU 2 in 1993 (DOE 1993). PACs NE-1412 and NE-1413 were investigated in accordance with the OU 2 RFI/RI Work Plans (DOE 1991b) and the results were documented in the Phase II RFI/RI Report (DOE 1995b). In 1995, the PACs were again investigated in accordance with the Trenches and Mound Site Characterization Work Plan (DOE 1995c). Results of this investigation are in the Draft Trenches and Mound Site Characterization Report (DOE 1996). The investigation included electromagnetic (EM-31 and EM-61) surveys, GPR surveys, and borehole sampling.

The results from the RFI/RI indicate only low concentrations of toluene (maximum concentration of 120 μg/kg) at Trench T-12. Four metals and five radionuclides were detected at concentrations or activities greater than background. Maximum activities of key radionuclides were 4.85 pCi/g of americium-241, 31.31 pCi/g of plutonium-239/240, and 0.15 pCi/g of uranium-235 (DOE 1995b). No organic compounds were detected at Trench T-12 during the Trenches and Mound Site characterization. Radionuclides were detected at activities greater than background including americium-241 at 0.16 pCi/g, plutonium-239/240 at 0.13 pCi/g, uranium-235 at 2.95 pCi/g, and uranium-238 at 0.8 pCi/g (DOE 1996).

No boreholes were drilled in Trench T-13 during the OU 2 RFI/RI because it was not identified until after the OU 2 field investigation was finished (DOE 1995b). VOCs detected in subsurface soil during the Trenches and Mound Site characterization were near or less than detection limits. Maximum radionuclide activities include 4.23 pCi/g americium-241, 0.46 pCi/g plutonium-239/240, 3.55 pCi/g uranium-233/234, 0.20 pCi/g uranium-235, and 2.43 pCi/g uranium-238 (DOE 1996).

Trenches T-12 and T-13 were sampled in the summer of 2003 as part of the NE/NW Group characterization in accordance with the BZSAP Addendum #BZ-02-01 (DOE 2002). Based on the characterization sampling results presented in the Data Summary Report for IHSS Group NE/NW (DOE 2003b) there were no analytical results greater than the RFCA WRW soil ALs except for two surface locations identified with plutonium-239/240 activities greater than RFCA WRW soil ALs. Both locations are adjacent to the southern side of Trench T-12 and the

measured activities were 133 pCi/g and 88 pCi/g. These detections of surface plutonium were attributed to the 903 Pad Lip Area (PAC 900-155) and remediated as part of the 903 Lip Area IHSS 155 project (DOE 2005). There were no other PCOCs detected at concentrations greater than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

Based on the results of the soil samples collected in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002), NFAA status was proposed for Trenches T-12 (PAC NE-1412) and T-13 (PAC NE-1413) in the IHSS Group NE/NW Data Summary Report (DOE 2003b). NFAA status for PACs NE-1412 and NE-1413 was approved by EPA (the LRA) on October 7, 2003 (EPA 2003).

Comments

The exact dates of operation for the East Trenches are not well documented with exception of the overall period of use from July 29, 1954, through August 14, 1968 (DOE 1995a). Trench T-12 (PAC NE-1412) was clearly open in a July 2, 1955 photograph but in 1964 was covered by asphalt due to roadwork as part of the East Access road south bypass (DOE 2003a). Aerial photographs show that Trench T-13 (PAC NE-1413) was open between 1966 and 1967 but entirely covered by asphalt in 1968 when the East Access road north bypass was constructed (DOE 1995a).

The 1995 PAC map (DOE 1995a) shows Trench T-12 (PAC NE-1412) under the East Access Road North Bypass and Trench T-13 (PAC NE-1413) under the South bypass. The opposite is true and in subsequent HRR the maps have been corrected.

References

DOE, 1991a, Technical Memorandum 1, Final Phase II RCRA Facility Investigation/Remedial Investigation Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Phase II Remedial Investigation OU 2 (East Trenches), Rocky Flats Plant, Golden, Colorado, December.

DOE, 1995a, Tenth Quarterly Update for September 30, 1994 Through December 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1995b, Phase II RFI/RI Report 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995c, Trenches and Mound Site Characterization Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996, Draft Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan Fiscal Year 2002, Addendum #BZ-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group NE/NW, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Closeout Report, IHSS Group 900-11; for IHSS 900-155 - 903 Lip Area, IHSS 900-140 - Hazardous Disposal Area, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to J.A. Legare, DOE, from G. Kleeman, EPA, RE: Characterization Data Summary IHSS Group NE/NW, October 7.

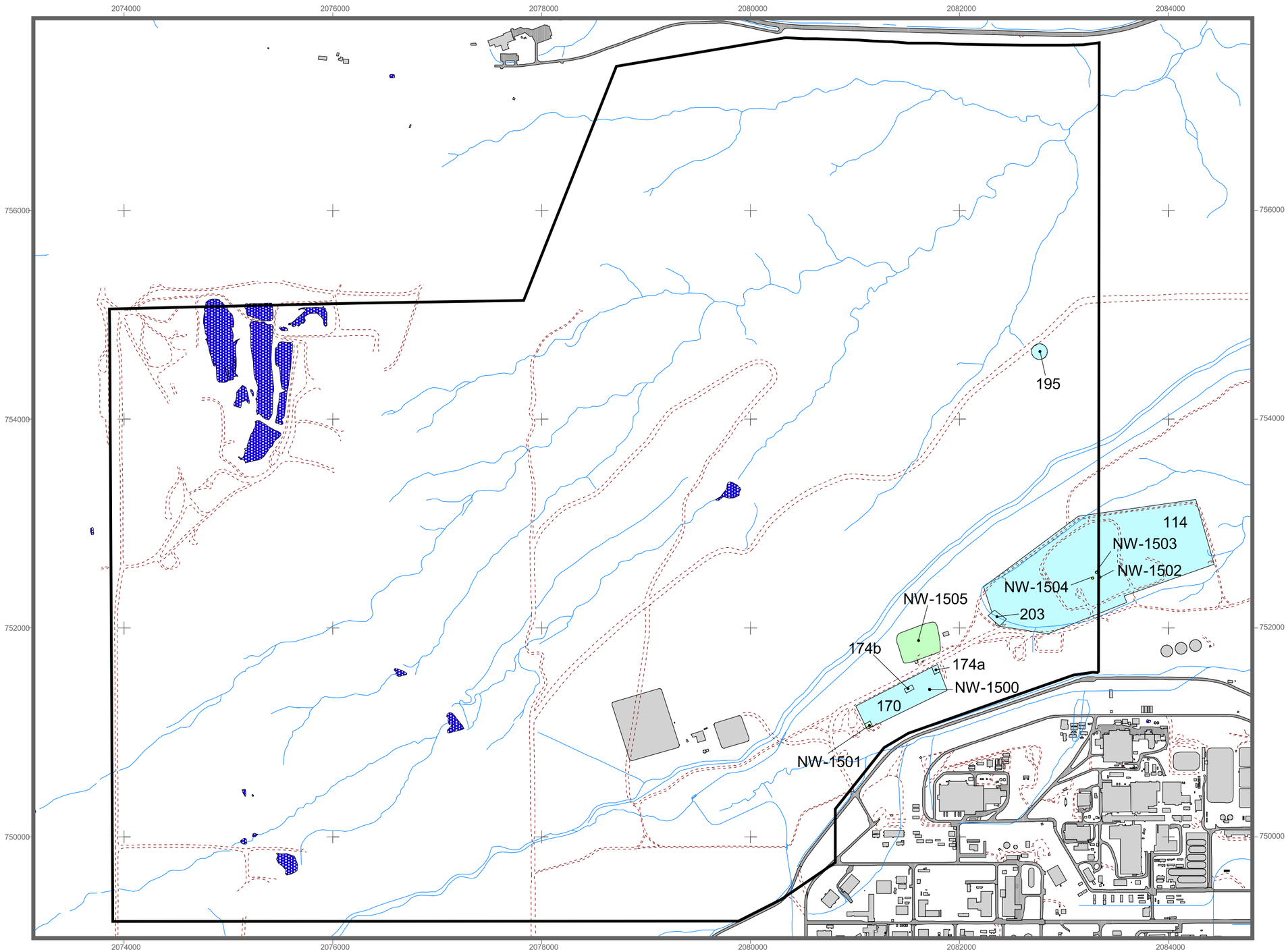

Figure 10
Northwest Buffer Zone Area
IHSSs and PACs

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

750 0 750 Feet

Scale = 1: 15150

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_NW_BZ.apr

PAC REFERENCE NUMBER: NW-114

IHSS Number:	114
Current Operable Unit:	BZ
Former Operable Unit:	7
IHSS Group:	000-5
Unit Name:	Present Landfill

The Final Update to the HRR for PAC NW-114 consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 114 is summarized in this update. The following HRR volume contains IHSS 114 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

August 1968 to March 1998

Historical Summary

The landfill was constructed in August 1968 for the disposal of the Plant's uncontaminated solid wastes. The location of the Present Landfill is shown on Figure 10. The development and use of this Landfill replaced the incinerator (PAC SW-133.5) and Original Landfill (PAC SW-115) as the method of sanitary solid waste disposal. For the purpose of this historical summary, much of the background history has been summarized. The complete operational history of the Present Landfill is detailed in the original HRR (DOE 1992). Detailed drawings and figures showing the location of wells, leachate collection systems, ponds, and other IHSSs within the IHSS 114 boundary can be found in the OU 7 Phase 1 RFI/RI Work Plan (DOE 1991) and the OU 7 Final Work Plan, Technical Memorandum (DOE 1994).

The Landfill was used for the disposal of general Rocky Flats refuse collected from various locations throughout the Plant. Refuse from production areas was monitored and approved by appropriate on-site supervisors prior to placement in dumpsters. Liquids, sludge, or noncontaminated potentially hazardous solid materials were reviewed and required to meet Plant specifications to be accepted for disposal. Waste types included paper, rags, floor sweepings, cartons, demolition material, sanitary wastewater treatment plant sludge, asbestos, PCBs, and other miscellaneous items (DOE 1992).

In October 1972, Rocky Flats policies on waste disposal at the Landfill were reviewed and judged to be in accordance with applicable regulations. Regulatory guidelines were issued in 1973 to control burial of solid and liquid wastes in the Present Landfill prompting Site staff to initiate a program of radioactive monitoring and scanning of the wastes. In 1977, a Solid Waste Management Plan was prepared in compliance with 40 Code of Federal Regulations (CFR) 241 that included both radiation and groundwater monitoring programs. CDH inspected the Landfill in 1978 and 1979 at which time the Landfill was reported to comply with minimum state and federal standards. Because hazardous waste was disposed of at the Landfill, it was designated as an interim status RCRA regulated unit and was included in the 1986 Part B Permit Application.

Radioactively-contaminated sludge from the sanitary wastewater treatment plant (Building 995) was routinely disposed of in the Present Landfill from August 1968 through May 1970. The contamination consisted of uranium and plutonium, which had entered the sanitary sewage system with laundry water. This practice was discontinued in May 1970 when off-site shipment of sludge as low-level waste (LLW) began (DOE 1992).

Tritium was discovered in the Landfill drainage in 1973. Tritium activity in surface water was greatest downgradient of the Landfill, with the highest activity of 91,800 pCi/L in September 1973. Groundwater samples from monitoring wells placed in the Landfill had the greatest tritium activity (301,609 pCi/L). The tritium activity steadily decreased with time and was within measured background values by 1987 at which time, no migration of tritium had been identified downgradient or laterally from the Landfill (DOE 1992).

Hazardous waste that routinely went to the Landfill included four categories: 1) containers partially filled with paint, solvents, and foam polymers; 2) wipes and rags contaminated with listed hazardous wastes; 3) filters, typically including silicone oil filters, paint filters, and other miscellaneous filters that may have contained hazardous constituents; and 4) metal cuttings and shavings, including mineral and asbestos dust and metal chips coated with hydraulic oil and organic solvents. This disposal of wastes with hazardous constituents ceased in the fall of 1986 (DOE 1992).

In 1985, asbestos generated onsite was disposed of in a designated area, which consisted of a 10-ft deep pit in the Present Landfill. This operation was evaluated in 1985 and considered in compliance with the appropriate Federal regulations. By December 1988, asbestos was disposed of in several pits in specified areas near the center of the Landfill.

Small quantities of PCBs were contained in materials that were routinely disposed of in the Landfill. In 1976, it was determined that used fluorescent light ballasts could no longer be sent to the Landfill because they contained small quantities of PCBs.

IHSS Investigations

In response to the elevated tritium levels mentioned above, 52 monitoring wells were drilled into the Landfill itself to identify the source of the elevated tritium activity. Initially, 21 test wells were drilled about 25 ft deep and cased with plastic pipe. The pattern of these was a grid of 100-ft spacing down the centerline of the Landfill. Samples collected from the wells contained tritium at background activities except for the area of the Landfill used in 1970, that measured up to 36,000 pCi/L.

When RCRA regulations were implemented at Rocky Flats, the Landfill was designated as a regulated unit because hazardous waste had been disposed of in it. Because it was a land disposal unit, groundwater monitoring was required. Four wells were installed in the immediate vicinity in 1986; 16 wells in 1987, and 13 wells in 1989 for a total of 33 monitoring wells to monitor the groundwater near and in the Landfill. These wells monitored water in both the alluvium and bedrock. Results of groundwater quality analyses are presented in the Annual RCRA Groundwater Monitoring Reports for Regulated Units.

A Final Phase I RFI/RI Work Plan (DOE 1991) was completed in December of 1991, and analytical data collected underwent review and data quality evaluation as part of the OU 7 Final Work Plan, Technical Memorandum (DOE 1994).

Surface soil samples were collected from the western end of the Landfill, across IHSS 114 – Present Landfill, and in the vicinity of the East Landfill Pond, including the spray areas (within the former OU 7 area). Surface soil samples from the western end of the Landfill were analyzed for PCBs, metals, radionuclides, and nitrate as nitrogen. Surface soil samples from IHSS 114 – Present Landfill were analyzed for SVOCs, metals, inorganics, radionuclides, and asbestos. Surface soil samples from the vicinity of the East Landfill Pond were analyzed for radionuclides, metals, and nitrate as nitrogen (DOE 1994). The surface soil data indicated some metals, radionuclides, and SVOCs were present at concentrations greater than background means plus two standard deviations for metals and radionuclides or the method detection limits (MDLs) for SVOCs. All potential contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).

Subsurface soil samples were collected from IHSS 114 – Present Landfill, including the spray areas. Samples were collected from 2-ft intervals in alluvium and 4-ft intervals in bedrock. The deepest samples collected ranged from a depth of 22 to 60 ft. Subsurface soil samples were analyzed for metals, PCBs, radionuclides, SVOCs, VOCs, and nitrate as nitrogen. The subsurface soil data indicated some metals, radionuclides, SVOCs, and VOCs were present at concentrations greater than background (for metals and radionuclides) or MDLs (for SVOCs and VOCs). All potential contaminant concentrations were less than RFCA WRW soil ALs.

Prior to closure, groundwater was monitored at four RCRA wells upgradient of the landfill and four RCRA wells downgradient of the East Landfill Pond dam. At the upgradient RCRA wells, there were very few detections of VOCs, only a few of which were at concentrations greater than RFCA Tier II groundwater ALs (DOE et al. 1996). Tetrachloroethene, trichloroethene and 1,1-dichloroethane were detected in two wells at concentrations greater than RFCA Tier II groundwater ALs. Only trichloroethene was found at a concentration greater than the RFCA Tier II groundwater AL for every sampling event, ranging from 10 to 22.6 µg/L. These constituents likely originated from the PU&D Yard (PAC NW-174a).

At the downgradient RCRA wells, selenium (ranging from 196 to 410 µg/L), lithium (ranging from 1,100 to 2,140 µg/L), and thallium (ranging from 2.4 to 4.6 µg/L) were the only metals with concentrations greater than RFCA Tier II groundwater ALs. The only metal detected at concentrations greater than RFCA Tier II groundwater ALs at the upgradient wells was thallium with concentrations ranging from 2.2 to 6.2 µg/L.

All of the downgradient RCRA wells have historically had RFCA Tier II groundwater uranium-233/234 and uranium-238 AL exceedances. The upgradient RCRA wells had very few Tier II uranium exceedances, and the magnitude of the exceedances are lower by more than an order of magnitude when compared to downgradient wells. All but one of the uranium-233/234 and uranium-238 RFCA Tier II groundwater AL exceedances in the upgradient wells were from weathered bedrock. Based on High-Resolution Inductively Coupled Plasma Mass Spectrometry (HRICP/MS) and Thermal Ionization Mass (TIMS) Analyses conducted at the downgradient wells, 4087 and B206989, the observed uranium is from natural uranium sources not from anthropogenic sources (DOE 2005a).

Data from wells in the Present Landfill vicinity indicated that the highest activity of tritium occurred at closely spaced wells located near the center of the Landfill. Activities were as high as 3,500 pCi/L but were considerably lower at the northern edge of the Landfill and farther downgradient, indicating the high activities of tritium were localized. All of the reported

activities were well below the RFCA Tier II groundwater AL of 20,000 pCi/L. Only one well had a reported strontium-89/90 activity that exceeded the RFCA Tier II groundwater AL of 0.852 pCi/L. This exceedance was a single occurrence in 1991.

RFCA Actions

A RFCA action (DOE et al. 1996) at IHSS 114 was conducted in accordance with the Final IM/IRA for IHSS 114 and RCRA Closure of the RFETS Present Landfill (DOE 2004), which was approved by the regulatory agencies in August 2004. The presumptive remedy described in the IM/IRA was containment and the remedial action objectives (RAOs) were:

- Prevent direct human and ecological exposure to contaminated soil or fill material;
- Provide containment with a RCRA Subtitle C interim status equivalent cover; and
- Protect surface water quality.

The IM/IRA also describes the newly constructed seep treatment system and the regulatory authorities supporting it. A passive seep interception and treatment system was first constructed in 1996 to modify an existing collection system and to collect and treat seep water flowing from the eastern end of the Present Landfill (DOE 1995, DOE 1996).

The effectiveness of the passive seep interception and treatment system was evaluated in 1998, and it was determined that the primary contaminants detected above the established performance standards were limited to benzene and vinyl chloride. As a result of this evaluation, the system was modified in October 1998 to treat the seep water by passive aeration, and sampling and analysis for SVOCs, metals, and radionuclides was discontinued (DOE 1998). This seep treatment system operated until closure of the Landfill.

The major remedial actions conducted to meet the RAOs included constructing a RCRA Subtitle C-compliant cover and a new passive aeration seep treatment system, and installing three new downgradient groundwater monitoring wells (DOE 2005b). Asbestos was removed and shipped to an off-site disposal facility before the cover was constructed. Additionally, as a conservative environmental and regulatory measure, pond sediments were removed from the East Landfill Pond and placed in an area on the Landfill that would be under the RCRA cover.

The RFCA activities were documented in the Accelerated Action for the Present Landfill RFETS Construction Completion Certification Report, (Attachment A of the Closeout Report for IHSS Group 000-5 [DOE 2005b]), which was accepted by the regulatory agencies on November 22, 2005 (CDPHE and EPA 2005). The IM/IRA was modified in 2006 to include the Monitoring and Maintenance Plan as the Post-Closure Plan for the Present Landfill (DOE 2006a). The Modification was approved by the regulatory agencies on March 15, 2006 (CDPHE and EPA 2006a). The Monitoring and Maintenance Plan (DOE 2006b) and the Closeout Report were approved by the regulatory agencies on May 15, 2006 (CDPHE and EPA 2006b).

<u>No Further Action Recommendation</u>

Based on the completion of the Present Landfill accelerated action and review of the subsequent Closeout Report and Construction Completion and Certification Report (DOE 2005b), CDPHE and EPA approved the Construction Completion and Certification Report for the Present Landfill on November 22, 2005 (CDPHE and EPA 2005), which also constituted agreement on the NFAA status of IHSS 114. Approval of the Closeout Report (DOE 2005b) was made contingent

upon approval of the Monitoring and Maintenance Plan required by the minor modification to the IM/IRA Appendix B. The Closeout Report was approved by CDPHE and EPA (the LRA) for IHSS 114 on May 15, 2006 (CDPHE and EPA 2006b).

Comments

None

References

CDPHE and EPA, 2005, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Approval of the Construction Completion and Certification Report for the Present Landfill, November 22.

CDPHE and EPA, 2006a, Correspondence to R. Schassburger, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Modifications to the IM/IRA and RCRA Closure of the Present Landfill (February 2006), March 15.

CDPHE and EPA, 2006b, Correspondence to R. Schassburger, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Final Closeout Report for IHSS Group 000-5, Present Landfill (IHSS-114) (September 2005), Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan (May 2006), May 15.

DOE, 1991, Final Phase I Resource Conservation and Recovery Act Facility Investigation Remedial Investigation Work Plan; Rocky Flats Plant Present Landfill IHSS 114 and Inactive/ Hazardous Waste Storage Area IHSS 203 (Operable Unit No. 7), Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Work Plan, Operable Unit 7, Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203), Technical Memorandum, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1995, Final Modified IM/IRA for the Passive Seep Interception and Treatment System at OU7, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Operable Unit 7 Revised Draft IM/IRA Decision Document and Closure Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1998, Notification of Minor Modification to the Modified IM/IRA for the Passive Seep Interception and Treatment System at OU 7, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004, Final Interim Measure/Interim Remedial Action for IHSS 114 and RCRA Closure of the RFETS Present Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Draft RCRA Facility Investigation – Remedial Investigation/Corrective Measures Study-Feasibility Study Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Closeout Report for IHSS Group 000-5, Present Landfill (IHSS 114), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2006a, Minor Modification to the Final Interim Measure/Interim Remedial Action for IHSS 114 and RCRA Closure of the RFETS Present Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2006b, Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: NW-170

IHSS Number: 170

Current Operable Unit: BZ

Former Operable Unit: 10

IHSS Group: Not Applicable

Unit Name: PU&D Storage Yard

The Final Update to the HRR for PAC NW-170 consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 170 is summarized in this update. The following HRR volumes contain IHSS 170 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997a);
Update Report – 1998 Annual (DOE 1998);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1974 to 1994

Historical Summary

The location of IHSS 170 is shown on Figure 10. Historically, the PU&D Storage Yard was used for storing empty drums and dumpsters, cargo boxes, cable spools, and similar materials. The yard was divided in thirds with wire fences. The eastern third was used for storage of scrap metal and encompassed the drum (PAC NW-174a) and dumpster (PAC NW-174b) storage areas. The center third was used for the storage of equipment such as stainless steel tanks. The western third was used for the storage of excess property. The greatest potential for contamination was considered the eastern third because scrap metal may have been stored without prior decontamination and hazardous materials in drums and dumpsters were transferred in this area of the yard (DOE 1992a). Storage in these areas stopped in 1994 and all containers and debris were removed (DOE 1997b).

IHSS Investigations

Assessment of environmental contamination attributable to PU&D Yard operations was initiated as part of the OU 10 Phase I RFI/RI (DOE 1995). In 1993, 37 surface soil samples were collected from IHSS 170 and analyzed for total metals, SVOCs, pesticides, and PCBs in accordance with the OU 10 RFI/RI Workplan (DOE 1992b). No results were greater than RFCA Tier I surface soil ALs (DOE et al. 1996). Arsenic was present at a maximum concentration of 9 mg/kg (IHSS 174a). Aroclor-1254 was detected twice; the maximum value was 330 μg/kg. Several PAHs were detected a number of times, and the maximum benzo(a)pyrene concentration was 270 μg/kg, less than Tier II surface soil ALs. Forty-six locations within and adjacent to IHSSs 170, 174a, and 174b also were surveyed with a high purity germanium (HPGe) detector, and no anomalous radionuclide activities were observed. In 1994, approximately 235 soil gas

locations were sampled within and adjacent to IHSSs 170, 174a, and 174b for VOC analysis. Soil gas results at IHSS 170 were low. The highest detection was methane at 220 ppm. The data are presented in the Draft Technical Memorandum 1, OU 10, Other Outside Closures (DOE 1995), and show VOCs were potentially present in subsurface soils along the eastern third of the PU&D Yard.

Based upon these results, a pre-remedial investigation of IHSSs 170, 174a, and 174b was performed in August 1997 (DOE 1997b) to investigate the potential presence of a VOC contaminant source. The investigation consisted of 20 soil borings and 38 subsurface soil samples over IHSSs 170, 174a, and 174b. Borehole locations corresponded with areas where VOC detections in soil gas samples were observed in the 1994 survey and were biased to the eastern third of the IHSS. Two boreholes were also placed in areas of visibly stained soil. No VOC COCs (tetrachloroethene, trichloroethene, and 1,1,1-tetrachloroethane) were detected in subsurface soil samples from IHSS 170 (DOE 1997c). Methylene chloride was detected in several of the subsurface soil samples; however, the contaminant was also detected in the method blank associated with the analyses and is most likely attributable to laboratory contamination. Naphthalene was estimated in one sample from borehole 17897 at 390 µg/kg, substantially below the RFCA Tier II subsurface soil AL of 101,000 µg/kg (DOE et al. 1996). Isotopic results were below background levels where measured. Detailed figures for IHSSs 170, 174a, and 174b can be found in the Pre-Remedial Investigation document for IHSSs 170, 174a, and 174b (DOE 1997b).

Six groundwater samples were collected during the pre-remedial investigation of IHSSs 170, 174a, and 174b. Three of the six samples were within the IHSS 170 boundary. The tetrachloroethene concentration of 15 µg/L detected in groundwater, from borehole 18197, is greater than the RFCA Tier II groundwater AL of 5 µg/L (DOE et al. 1996). Trichlorotrifluoroethane was also detected in groundwater from IHSS 170, which also may indicate impact from past practices (that is, Freon-based lathe coolant). The 1,1,1-trichloroethane concentration of 6.3 µg/L was less than the RFCA Tier II groundwater AL of 200 µg/L (DOE et al. 1996).

In September of 2001, it was determined a source of VOCs was present in the northeastern corner of the PU&D Yard (IHSS 174a) as stated in the Final PU&D Yard Plume Enhanced Natural Attenuation Treatability Study Report (DOE 2001). The primary contaminant identified was tetrachloroethene (5,700 µg/kg) at a depth of 11 ft; the RFCA Tier I AL was 3,150 µg/kg (DOE et al. 1996). Hydrogen Release Compound® (HRC®) was introduced (injected) into the area under investigation to enhance natural attenuation of VOCs.

In 2005, soil at two locations near IHSS 170 with vanadium concentrations greater than RFCA WRW soil ALs was excavated.

No Further Action Recommendation

No surface or subsurface soil analyses demonstrated the presence of contaminants above RFCA Tier II surface soil ALs in IHSS 170 (with exception to IHSS 174a). IHSS 170 was addressed using the consultative process at an NFA Working Group meeting on February 27, 2002. Based upon these discussions, NFAA was verbally approved and formally approved in a letter from CDPHE (the LRA) and EPA dated September 26, 2002 (CDPHE and EPA 2002).

Comments

IHSS 170 overlaps with IHSS 174a, IHSS 174b, PAC-NW-1500, and PAC-NW-1501. IHSS 170 may be the location of PIC 51.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFPO; from S. Gunderson, CDPHE; and R. Rehder, EPA RE: Approval of NFA designations for IHSSs, PACs, and PICs, September 26.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase 1, RFI/RI Workplan, Rocky Flats Plant, Other Outside Closures, Operable Unit 10, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Draft Technical Memorandum 1, OU 10, Other Outside Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Final Sampling and Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174a and 174b, Property Utilization & Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1997c, Data Summary Report for IHSSs 170, 174a, and 174b, Property Utilization and Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Final PU&D Yard Plume Enhanced Natural Attenuation Treatability Study, Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: NW-174a

IHSS Number:	174a
Current Operable Unit:	BZ
Former Operable Unit:	10
IHSS Group:	NE/NW
Unit Name:	Property Utilization & Disposal Drum Storage Facility

The Final Update to the HRR for PAC NW-174a consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 174a is summarized in this update. The following HRR volumes contain IHSS 174a information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997a);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1974 to 1994

Historical Summary

The location of IHSS 174a is shown on Figure 10. IHSS 174a was one of two areas within the PU&D Storage Yard (PAC NW-170) designated for container storage. One area stored drums (IHSS 174a) and the other was designated for a dumpster (PAC NW-174b). Until August 1985, the drum storage area was used for the storage of RCRA-regulated waste. After 1985 it was used for the storage of empty drums. Storage in these areas stopped in 1994 and all containers and debris were removed (DOE 1997b).

Drums were routinely monitored for radiation prior to shipment to the PU&D Yard. In addition, the contents of drums originating from areas that handled radioactive materials were sampled and analyzed prior to shipment to the PU&D Yard. At times, the level of radioactivity set for acceptance in the Yard was exceeded, and drums were returned to their building of origin (DOE 1992a, 2003a).

Most of the drums associated with IHSS 174a held waste oils that contained hazardous constituents, waste paints, and spent paint thinner. Waste oils were typically derived from equipment and vehicle maintenance activities. Visual monitoring of the drum storage area was conducted periodically, and visible staining on the ground surface was documented. However, no documentation of leaks or spills could be identified (DOE 2003a).

An incident in May 1982 identified two drums of liquid stored in the PU&D drum storage area (IHSS 174a) as being pressurized with bulging drum heads. A third drum was noted to have the bottom blown out. The drums were moved to the hazardous waste storage area (PAC NW-203) west of the Present Landfill and the contents identified. No documentation was found that indicated a release to the environment as a result of these damaged drums. No other documentation was found describing other releases to the environment (DOE 2003a).

IHSS Investigations

As described in the writeup for IHSS 170, assessment of contamination attributable to PU&D Yard operations was initiated in accordance with the OU 10 RFI/RI Workplan (DOE 1992b). In 1994, approximately 235 soil gas locations were sampled for VOC analysis, and 71 surface soil locations were sampled and analyzed for metals, SVOCs, pesticides, and PCBs. The soil gas data indicated VOCs were potentially present in subsurface soil along the eastern third of the yard (DOE 2003b).

In September 2001, it was determined a source of VOCs was present in the northeastern corner of the PU&D Yard (IHSS 174a) as stated in the Final PU&D Yard Plume Enhanced Natural Attenuation Treatability Study Report (DOE 2001). Based on the subsurface soil sampling data, tetrachloroethene contamination (5,700 µg/kg) was identified at a depth of 11 ft. The RFCA Tier I soil AL was 3,150 µg/kg (DOE et al. 1996); the RFCA WRW soil AL is 615,000 µg/kg (DOE et al. 2003). Analytical results are presented in the Data Summary Report for IHSS Group NE/NW (DOE 2003b). Total metals, radionuclides, SVOCs, VOCs, PCBs, and pesticides were also analyzed from one soil sampling location in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002). Results indicated that all contaminant activities and concentrations were below WRW soil ALs (DOE 2003b).

HRC® was introduced (injected) into the area under investigation to enhance natural attenuation of VOCs (refer to writeup for PAC NW-170 [DOE 2001]).

No Further Action Recommendation

Based upon the analytical data for surficial and subsurface soils, the SSRS, and the introduction of HRC®, IHSS 174a was approved for NFAA as part of the IHSS Group NE/NW Data Summary Report (DOE 2003b) in a letter from the EPA (the LRA) dated October 7, 2003 (EPA 2003).

Comments

None

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I, RFI/RI Workplan, Rocky Flats Plant, Other Outside Closures, Operable Unit 10, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Final Sampling and Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174a and 174b, Property Utilization & Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Final PU&D Yard Plume Enhanced Natural Attenuation Treatability Study, Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan Addendum #BZ-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group NE/NW, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence, to J. Legare, DOE RFFO, from G. Kleeman, EPA, RE: Characterization Data Summary IHSS Group NE/NW, October 7.

PAC REFERENCE NUMBER: NW-174b

IHSS Number:	174b
Current Operable Unit:	BZ
Former Operable Unit:	10
IHSS Group:	Not Applicable
Unit Name:	Property Utilization & Disposal Drum Storage Facility

The Final Update to the HRR for PAC NW-174b consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 174b is summarized in this update. The following HRR volumes contain IHSS 174b information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997a);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999Annual (DOE 1999).

Date(s) of Operation or Occurrence

1974 to 1994

Historical Summary

The location of IHSS 174b is shown on Figure 10. IHSS 174b was a dumpster storage site. Dumpsters were moved to the storage area when filled and were stored directly on the ground surface (resulting in the designation of IHSS 174b) prior to shipment for off-site recycling (DOE 1992a). Storage in these areas stopped in 1994 and all containers and debris were removed (DOE 1997b).

The dumpster storage area was used for the storage of stainless steel chips coated with Freon-based or oil-based lathe coolant (DOE 1992a). Radioactive contamination of the chips was not expected because of the presence of administrative controls to prevent radioactively contaminated material from being shipped to the PU&D Yard. Visible staining was apparent on the soil in the dumpster storage area from spills which occurred during transfer and from rainwater washing residual oil from metal shavings onto the ground within IHSS 174b (DOE 1992a).

IHSS Investigations

Assessment of environmental contamination attributable to PU&D Yard operations was initiated as part of the OU 10 Phase I RFI/RI. In accordance with the OU 10 RFI/RI Work Plan (DOE 1992b), approximately 235 soil gas locations were sampled within and adjacent to IHSSs 170, 174a, and 174b for VOC analysis (DOE 1995). VOCs were potentially present in subsurface soils along the eastern third of the yard; however, there were no VOCs detected at concentrations greater than 1 μg/L in soil gas.

Based on the analytical results from the pre-remedial investigation, a VOC contaminant source equal to or above the RFCA Tier I subsurface soil ALs (DOE 1997b) was not identified in

IHSS 174b (DOE 1999). The tetrachloroethene concentration of 1,700 µg/L detected in groundwater from borehole 17497 is greater than the RFCA Tier I and Tier II groundwater ALs of 500 and 5 µg/L, respectively (DOE et al. 1996). Trichlorotrifluoroethane was also detected in groundwater from IHSS 174b.

Based on the subsurface soil sampling data, no current or potential source of contamination associated with IHSS 174b could be identified. Trichlorotrifluoroethane, detected in groundwater, was not detected in the subsurface soil. As a result, IHSS 174b was proposed for NFA in 1999 (DOE 1999).

No Further Action Recommendation

Based upon the analytical data submitted to the regulatory agencies in the 1998 HRR Annual Update to the HRR (DOE 1998), IHSS NW-174b was approved for NFA in a letter from CDPHE and EPA (the LRA) dated July 9, 1999 (CDPHE and EPA 1999).

Comments

IHSS 174b is within PAC NW-170.

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan, Other Outside Closures (Operable Unit No. 10, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Draft Technical Memorandum 1, OU 10, Other Outside Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Final Sampling and Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174a and 174b, Property Utilization & Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: NW-195

IHSS Number:	195
Current Operable Unit:	BZ
Former Operable Unit	16
IHSS Group:	Not Applicable
Unit Name:	Nickel Carbonyl Disposal

The Final Update to the HRR for PAC NW-195 consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 195 is summarized in this update. The following HRR volumes contain IHSS 195 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Date(s) of Operation or Occurrence

March 1972 to August 1972

Historical Summary

The location of IHSS 195 is shown on Figure 10. From March through August 1972, cylinders of nickel carbonyl were disposed of in a dry well located in the BZ. The cylinders were opened inside the well and vented with small arms fire (nickel carbonyl vapors are denser than air) (DOE 1992a).

Cylinders were later removed from the hole, and buried in the Present Landfill (PAC NW-114). Two cylinders could not be removed and were buried in place. Samples from the lip of the well were collected after the initial disposal indicated nickel carbonyl concentrations of approximately 10 ppm being released during disposal (DOE 1992a, 1992b).

IHSS Investigations

No other IHSS 195 investigations were deemed necessary.

No Further Action Recommendation

Based on information presented in the Final No Further Action Justification Document for OU 16, Low-Priority Sites (DOE 1992b), the CAD/ROD for OU 16 (DOE 1994) requiring no action for IHSS 195 was approved on October 28, 1994 (DOE 1996).

Comments

CERCLA Five Year Review: The CAD/ROD for OU 16 (DOE 1994) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final No Further Action Justification Document for Operable Unit 16 Low-Priority Sites, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Corrective Action Decision/Record of Decision for OU16: Low Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-203

IHSS Number:	203
Current Operable Unit:	BZ
Former Operable Unit:	7
IHSS Group:	Not Applicable
Unit Name:	Inactive Hazardous Waste Storage Area

The Final Update to the HRR for PAC NW-203 consolidates the information presented in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 203 is summarized in this update. The following HRR volumes contain IHSS 203 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996a;
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1986 to 1988

Historical Summary

An area in the southwestern portion of the Present Landfill (PAC NW-114) was operated as a hazardous waste storage area for both drummed solid and liquid wastes. All containers with free liquids were stored within two 40-ft cargo containers with interior secondary containment. Some drums containing only solid waste were stored outside. At maximum capacity, the area consisted of eight 20-ft-long cargo containers and six 40-ft cargo containers. A total of 384 55-gallon drums could be stored. Two of the containers were used to store PCB-contaminated soil and debris and PCB-contaminated transformer oil (DOE 1992). The location of IHSS 203 is shown on Figure 10.

A small spill (less than 4 fluid ounces) from a leaking drum was discovered in a cargo container on June 21, 1988. The material had traces of PCBs. The drum was placed into an 83-gallon overpack drum and the cleanup material was placed in a waste drum (DOE 1992).

Miscellaneous solid and liquid hazardous, nonradioactive wastes containing organic compounds and PCBs were stored at this site. Controls, which met regulatory standards, were in place to prevent leaks and spills. Spills of less than reportable quantities may have occurred from the drums during transfer of materials into and out of the drums. Because of the distance of the area from Plant operations, this area was considered inconvenient for use as a hazardous waste storage area. The use of this area stopped in 1988.

IHSS Investigations

The area was investigated as described in the OU 7 Phase I RFI/RI Work Plan (DOE 1991). Results were presented in the Final Work Plan Technical Memorandum for OU 7 (DOE 1994).

Concentrations of VOCs in soil gas varied significantly within the sampling area and, as a result, a distinct source area was not identified. Because Present Landfill wastes underlie IHSS 203, it was concluded VOCs in soil gas in this area were probably associated with the Landfill waste rather than potential releases from IHSS 203 (DOE 1996b).

Surface soil samples were collected at 49 locations from 0 to 2 inches and from 18 locations from 0 to 10 inches. Based on the suspected contaminants, the samples were analyzed for PCBs, metals, and radionuclides. The analytical results for all analytes were less than RFCA Tier II soil ALs (DOE et al. 1996) and WRW soil ALs (DOE et al. 2003). Analytical data for IHSS 203 are presented in Table 1 (page 38) of the 1998 Annual Update for the HRR (DOE 1998).

No Further Action Recommendation

Based upon the analytical data for surface soil, no contamination associated with IHSS 203 could be identified. IHSS 203 was approved for NFA in a letter from the CDPHE and EPA (the LRA) dated July 9, 1999 (EPA and CDPHE 1999).

Comments

IHSS 203 is within the Present Landfill (IHSS 114).

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1991, Final Phase I RFI/RI Work Plan Rocky Flats Plant, Present Landfill IHSS 114 and Inactive Hazardous Waste Storage Area IHSS 203 (Operable Unit No. 7), Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Work Plan Technical Memorandum for OU 7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, OU 7 Revised Draft Interim Measures/Interim Remedial Action (IM/IRA) Decision Document and Closure Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: NW-1500

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Diesel Spill at PU&D Yard

The Final Update to the HRR for PAC NW-1500 consolidates the information presented in the Third Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NW-1500 is summarized in this update. The following HRR volumes contain PAC NW-1500 information:

Original Report – Third Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

December 17, 1992

Historical Summary

Approximately 1 ½ gallons of diesel fuel spilled onto the ground within the southeastern corner of the PU&D Storage Yard (PAC NW-170) during a routine, forklift truck fueling operation when a fuel nozzle failed to shut off automatically after the tank reached capacity (DOE 1993). The location of the spill is within the PAC NW-170 boundary as shown on Figure 10.

The soil affected by the spill was excavated and containerized. Samples of the excavated material were collected for waste dispositioning purposes. The area affected by the spill was surveyed using Global Positioning System (GPS) on March 15, 1993 (DOE 1993).

PAC Investigations

Contaminants detected in the groundwater (that is, tetrachloroethene, 1,1,1-trichloroethane, and trichlorotrifluoroethane) are not components of diesel fuel (DOE 1998). Additionally, because the affected soil was removed, additional sampling was not required.

No Further Action Recommendation

Based on the subsurface soil sampling data (DOE 1997a, DOE 1997b), an existing or residual source of contamination associated with PAC NW-1500 could not be identified. PAC NW-1500 was approved for NFA in a letter from CDPHE and EPA (the LRA) dated July 9, 1999 (CDPHE and EPA 1999). The NFA was justified because the spill was cleaned up and did not adversely impact soil or water.

Comments

PAC NW-1500 is within IHSS NW-170.

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1993, Third Quarterly Update from January 1, 1993 to April 1, 1993 Historical Release Report, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994, Seventh Quarterly Update from January 1, 1994 to March 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997a, Final Sampling and Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174a and 174b, Property Utilization & Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1997b, Data Summary Report for IHSSs 170, 174a, and 174b, Property Utilization and Storage Yard, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-1501

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Asbestos Insulated Boiler at the PU&D Yard

The Final Update to the HRR for PAC NW-1501 consolidates the information presented in the Third Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NW-1501 is summarized in this update. The following HRR volumes contain PAC NW-1501 information:

Original Report – Third Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000).

Date(s) of Operation or Occurrence

November 12, 1992

Historical Summary

On November 12, 1992, it was discovered that approximately 1.5 lbs of asbestos was potentially released to the environment from a boiler wrapped with deteriorating asbestos insulation. The boiler was being stored in the southwestern corner of the PU&D Storage Yard (PAC NW-170), shown on Figure 10. Visual observations made on November 12, 1992, indicated approximately 15 ft^2 of asbestos-containing insulation was missing. There was no visible insulation material identified on the ground (DOE 1993).

Upon discovery, the boiler was wet down and the surrounding soil was covered with plastic. The boiler was wrapped with plastic, taped, and removed (DOE 1993).

PAC Investigations

A SAP for characterization sampling was prepared by a State Certified Asbestos Inspector (DOE 1999b). Ten composite surface soil samples (nine real and one duplicate) were collected on January 24, 1999 (DOE 1999b). None of the soil samples contained detectable levels of chrysotile asbestos. A detailed figure of PAC NW-1501 is found in the 1999 Annual Update to the HRR (DOE 1999a)

No Further Action Recommendation

Based on the results of the soil samples collected in 1999 (DOE 1999c), no current or potential contaminant source was identified. The containment and removal of the asbestos-containing boiler in 1992 and the results of the source evaluation provide sufficient justification to determine there was no current or potential threat to public health or the environment. It is

suspected the boiler may have been placed in the storage yard with the asbestos material already missing and a release did not occur at this location.

PAC NW-1501 was approved for NFA in a letter from CDPHE and EPA dated June 23, 2000. The NFA was justified because no source of contamination could be identified and the potential release of asbestos did not adversely impact soil or water.

Comments

PAC NW-1501 is within the PU&D Yard (PAC NW-170).

References

CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1999), June 23.

DOE, 1993, Third Quarterly Report to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994, Seventh Quarterly Update from January 1, 1994 to March 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Asbestos Sampling and Analysis Plan for the Property Utilization and Disposal Yard Boiler Site, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1999c, No Further Action Justification Document for the Property Utilization and Disposal Yard Asbestos Site, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-1502

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Improper Disposal of Diesel Contaminated Material at the Landfill

The Final Update to the HRR for PAC NW-1502 consolidates the information presented in the Second Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NW-1502 is summarized in this update. The following HRR volumes contain PAC NW-1502 information:

Original Report – Second Quarterly (DOE 1993a);
Update Report – Third Quarterly (DOE 1993b);
Update Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 25, 1992

Historical Summary

On September 25, 1992, a report was made of improper disposal of diesel-contaminated soil and absorbent material to the Present Landfill (PAC NW-114). The material was generated from cleanup of approximately 1 gallon of diesel fuel released onto the asphalt while patching the Building 850 Parking Lot. The diesel was absorbed with approximately 50 lbs of soil and Oil-Dri® absorbent and inadvertently taken to the Present Landfill. In accordance with Plant procedure, diesel spills and associated cleanup materials were managed as a potential RCRA waste because of benzene (DOE 1993a). The location of PAC NW-1502 is shown on Figure 10.

CDPHE was notified and a RCRA Contingency Plan (CPIR 92-021) implemented as a precautionary measure. Approximately 100 lbs of potentially contaminated soil was removed from the area (within the Landfill) and dispositioned in accordance with Plant procedure for fuel-contaminated soils (DOE 1993a). No samples were collected as a result of this occurrence (CPIR 92-021).

PAC Investigations

No other PAC NW-1502 investigations were deemed necessary because the soil was removed.

No Further Action Recommendation

PAC NW-1502 was addressed using the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified because the material placed in the landfill was removed and dispositioned properly. Further, the diesel-contaminated soil did not likely adversely impact soil or water.

The NFA was formally approved in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1993a, Second Quarterly Report to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1993b, Third Quarterly Report to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994, Seventh Quarterly Update from January 1, 1994 to March 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-1503

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Improper Disposal of Fuel Contaminated Material at the Landfill

The Final Update to the HRR for PAC NW-1503 consolidates the information presented in the First Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NW-1503 is summarized in this update. The following HRR volumes contain PAC NW-1503 information:

Original Report – First Quarterly (DOE 1992);
Update Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

February 26, 1992

Historical Summary

On February 26, 1992, empty motor oil containers, used oil filters, and oil-stained debris were inadvertently disposed of in a centralized area of the Present Landfill (PAC NW-114), shown on Figure 10. The used oil filters were to be regulated as a RCRA hazardous waste because of the potential for containing lead in excess of the TCLP limit of 5 ppm (DOE 1994). These materials were immediately recovered and drummed by Landfill personnel and a RCRA Contingency Plan (CPIR 92-004) was implemented. As a result of the prompt recovery of the disposed items, it was determined there was no actual or potential threat to the environment or human health (DOE 1994). No samples were collected as a result of this occurrence because a release to the environment did not occur (CPIR 92-021).

PAC Investigations

No other PAC NW-1503 investigations were deemed necessary because the soil was removed.

No Further Action Recommendation

PAC NW-1503 was addressed using the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified because the material placed in the Landfill was sufficiently removed before a release to the environment could take place. This occurrence did not adversely impact soil or water. PAC NW-1503 was approved for NFA in a letter from CDPHE and EPA (the LRA) dated February 14, 2002 (CDPHE and EPA 2002).

Comments

The CPIR dated September 30, 1992 is all that was available for the First Quarterly Report to the HRR, therefore, no formal PAC narrative was written until 1994 for this occurrence.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA designation for IHSSs and PACs, February 14.

DOE, 1992, First Quarterly Report to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, September.

DOE, 1994, Seventh Quarterly Update from January 1, 1994 to March 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-1504

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Improper Disposal of Thorosilane-Contaminated Material at the Landfill

The Final Update to the HRR for PAC NW-1504 consolidates the information presented in the Seventh Quarterly Update to the HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC NW-1504 is summarized in this update. The following HRR volumes contain PAC NW-1504 information:

Original Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

January 28, 1994

Historical Summary

On January 28, 1994, materials potentially contaminated with Thorosilane (Thorosilane consists of mineral spirits, naphtha and diacetone alcohol) were disposed of in a centralized area of the Present Landfill (PAC NW-114), shown on Figure 10. When disposed of in liquid form, Thorosilane is considered a hazardous waste exhibiting the characteristic of ignitibility (D001). The incident occurred as a result of a January 27, 1994 spill in Building 551 when a 5-gallon bucket containing approximately 5 gallons of Thorosilane product leaked into the double bags surrounding the can.

The spilled material and the remainder in the bucket were placed into a 20-gallon poly-pack drum along with 75 lbs of Oil-Dri®. The contents were not agitated. The drum was then sealed and subsequently placed into the Present Landfill. Upon discovery, the RCRA Contingency Plan (CPIR 94-002) was implemented as a precautionary measure.

On February 1, 1994, the poly-pak was located in the landfill; however, the lids and approximately half of the contents were not found. It was presumed the hydraulic compaction system in the trash truck crushed both the overpack and metal bucket and lids from both containers. No free liquids were found. The crushed poly-pack and product bucket containing part of the Oil-Dri® were packaged in a 55-gallon drum and returned to the 551 Warehouse for proper handling and disposition. A determination was made that the drummed material no longer constituted a hazardous waste. The CPIR indicated the incident had not contributed to any measurable deterioration to the Landfill condition.

PAC Investigations

No other PAC NW-1504 investigations were deemed necessary because the spilled material was removed and did not impact soil.

No Further Action Recommendation

PAC NW-1504 was addressed using the consultative process in an NFA Working Group meeting on January 31, 2002. Based on these discussions, agreement was reached that an NFA was justified because the material placed in the Landfill did not likely adversely impact soil or water. NW-1504 was approved for NFA in a letter from CDPHE and EPA (the LRA) dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Seventh Quarterly Update from January 1, 1994 to March 31, 1994 Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: NW-1505

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	NE-1
Unit Name:	North Firing Range

The Final Update to the HRR for PAC NW-1505 consolidates the information presented in the 2001 Annual Update to the HRR with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC-1505 is summarized in this update. The following HRR volume contains PAC NW-1505 information:

Original Report – 2001 Annual (DOE 2001).

Date(s) of Operation or Occurrence

1983 to 2004

Historical Summary

A firing range (Buildings 303 and 308) located in the northwestern BZ was in use for target practice and security officer qualification from 1983 until 2004. The location of PAC NW-1505 is shown on Figure 10. The range consisted of a concrete pad covered by a roof. Until 1993, the target area consisted of a bermed area (approximately 300 ft by 200 ft), however in December 1993, construction began to enhance the range with an improved backstop (bullet trap) and roof (DOE 2001). Potential lead contamination may have resulted from bullets fired into the north berm within the firing range. Several times a year, bullets, bullet casings, and lead fragments (collected in the bullet trap) were containerized in 3-gallon plastic buckets and transferred to PU&D for recycling.

Use of solvents for cleaning firearms did not occur at this location, nor have any explosives been detonated or armor piercing ammunition been used. The concrete pad was washed with approximately 200 to 300 gallons of water several times a year. The rinse water would flow into a culvert on the eastern side of the pad which was blocked with sediment and vegetation for an undetermined length of time (DOE 2001).

PAC Investigations

In accordance with IABZSAP Addendum #IABZ-05-01 (DOE 2004) for characterization of the North Firing Range (IHSS Group NE-1), 61 soil characterization samples were collected and analyzed for total metals. Three sampling locations required a RFCA accelerated action (DOE et al. 1996) because of exceedances of the lead WRW soil AL (DOE et al. 2003) as described in the IHSS Group NE-1 Closeout Report (DOE 2005a). Approximately 32 cy of soil and a culvert (under the berm) were excavated and disposed of in accordance with the ER RSOP FY05 Notification #05-05 (DOE 2005b).

Through the consultative process, it was agreed that remediation for arsenic concentrations greater than the RFCA WRW soil AL (when using on-site, x-ray fluorescence [XRF]) would not

be warranted because the XRF provides results higher than mass spectroscopy methods. After remediation, both lead and arsenic concentrations were less than WRW soil ALs (DOE 2005a).

Through the consultative process (RCR dated August 11, 2005), it was agreed that DOE would push in the North Firing Range berms and regrade the site. The berms were pushed in, and the surface was inspected for bullets and fragments. Soil samples were collected from the surface and analyzed using XRF. The maximum detected concentration of copper was 19.7 mg/kg and the maximum detected concentration of lead was 51.6 mg/kg. This action was completed on August 29, 2005.

No Further Action Recommendation

PAC NW-1505 was remediated in spring of 2005 and approved for NFAA in a letter from EPA (the LRA) dated June 13, 2005 (EPA 2005).

Comments

The North Firing Range is also described as Site No. 11 in the BZ Contamination Review (CDPHE 1999).

References

CDPHE, 1999, Buffer Zone Contamination Review, Hazardous Materials and Waste Management Division, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-01, PAC NW-1505 (North Firing Range), Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005a, Closeout Report for IHSS Group NE-1, North Firing Range, PAC NW-1505, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005b, Environmental Restoration RFCA Standard Operating Protocol, FY05 Notification #05-05, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Rampe, DOE, RFPO from C.M. Aguilar, EPA, RE: Closeout Report for IHSS Group NE-1, North Firing Range, June 13.

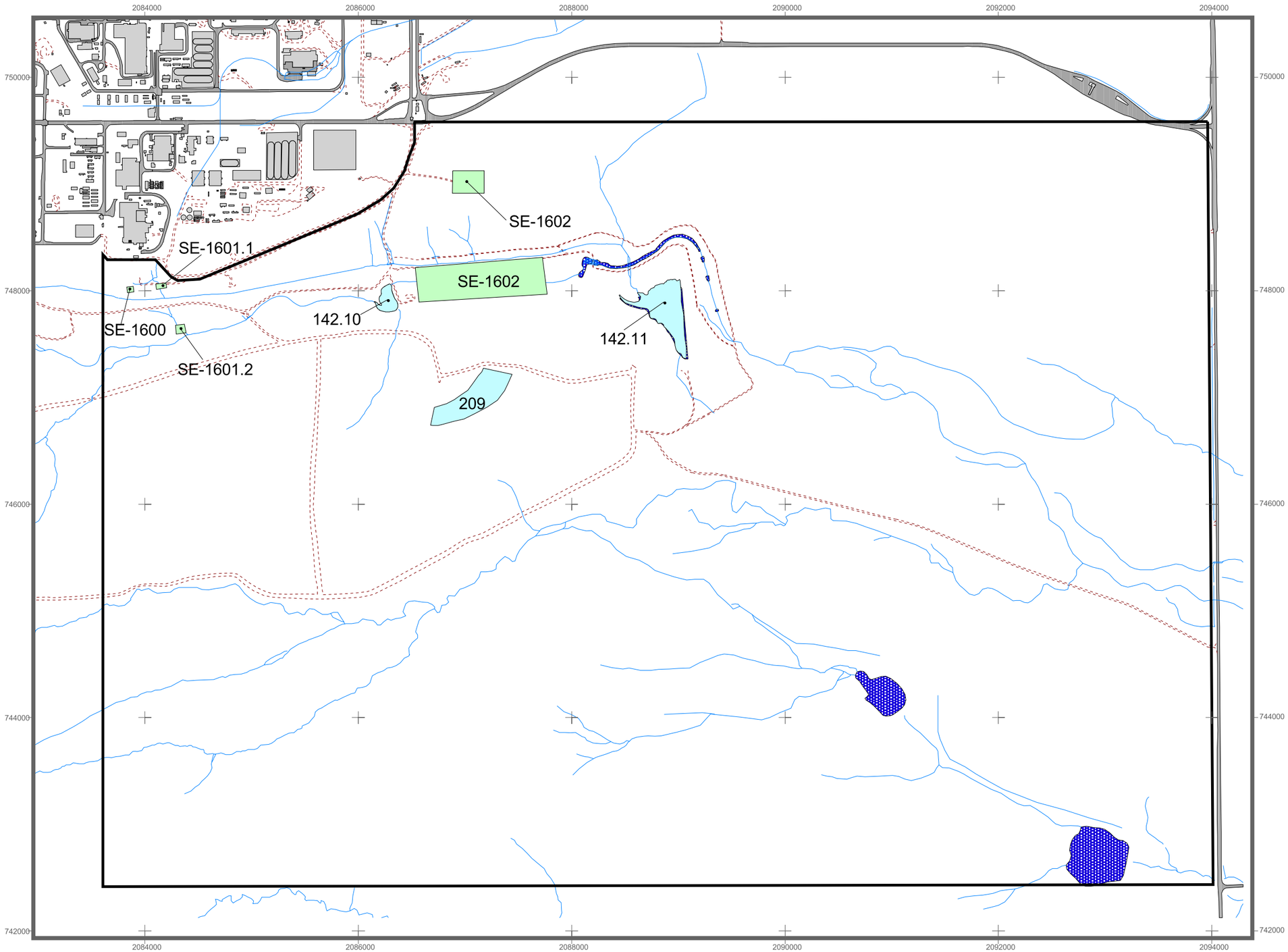

Figure 11
Southeast Buffer Zone Area
IHSSs and PACs

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

750 0 750 Feet

Scale = 1: 13825

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_se_bz.apr

PAC REFERENCE NUMBER: SE-142.10

IHSS Number:	142.10
Current Operable Unit:	BZ
Former Operable Unit:	5
IHSS Group:	NE-1
Unit Name:	Retention Pond C-1

The Final Update to the HRR for PAC SE-142.10 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 142.10 is summarized in this update. The following HRR volumes contain IHSS 142.10 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997a); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1955 to present

Historical Summary

Pond C-1, IHSS 142.10 was constructed in 1955 to provide temporary holding and monitoring of Woman Creek waters. The first discharge from Pond C-1 was observed on March 29, 1955. The location of IHSS 142.10 is shown on Figure 11.

Pond C-1 was also referred to as Pond 9 prior to the early 1970s and received discharge from upstream Ponds 6, 7, and 8. Ponds 7 and 8 (PACs SE-1600 and SE-1601) were approved for NFAA in 2002. Ponds 6, 7, and 8 no longer exist and never received an alphanumeric designation like Pond 9, which became Pond C-1. The numeric pond numbering system at Rocky Flats was replaced by an alphanumeric system in the early 1970s.

Ponds 6, 7, and 8 were located adjacent to Woman Creek, upstream from Pond C-1. Pond 6 (PAC SW-196) received the raw water treatment plant, Building 124, backwash. Pond 7 (PAC SE-1600) received steam condensate from the Building 881 cooling towers and could have received sewage lift station overflows. Pond 8 (PAC SE-1601) probably received Building 881 cooling tower overflow/blowdown. See the descriptions for PACs SW-196, SE-1600, SE-1601.1, and SE-1601.2 for more complete discussions of these ponds.

Woman Creek flow enters Pond C-1, which serves as a flow-through temporary detention pond. The South Interceptor Ditch (SID) was constructed in 1979 to reroute runoff from the southern portions of the RFETS main manufacturing area to Pond C-2 (IHSS 142.11). Discharges from Pond C-1 are routed around Pond C-2 and back into the natural Woman Creek channel. Water from the SID is the only input to Pond C-2, and Pond C-2 serves as a surface water retention and spill control pond (DOE 1992).

Releases or concerns associated with Woman Creek, as summarized in the HRR (DOE 1992), are as follows:

- Sanitary sewer overflow and discharge of untreated sanitary sewage were released to Woman Creek. Discharges ceased on February 21, 1955.
- A release of 2,700 gallons of steam condensate from Building 881 to Pond 7 occurred because of a break in the process waste line leading to Building 774. The break occurred on September 27, 1955.
- Pond C-1, its drainage, and the general area near Pond C-1 (and Pond C-2) may have been impacted by resuspended soil and runoff from the 903 Pad area (PACs 900-112 and 900-155).
- An armored vehicle turned over into Woman Creek upstream of Pond C-1 on October 19, 1975 (PAC SW-1700). An oil slick was observed on the C-Series Drainage west of the clay pits during the week of October 20, 1975. This oil slick was not observed at Pond C-1 or where the C-Series Drainage passed beneath Indiana Street.

Monitoring of effluent discharged offsite from the Woman Creek drainage has routinely taken place since the first discharge from Pond C-1. In 1955, these analyses consisted of daily composite samples for pH, nitrate, and radionuclide activity, with a detailed mineral analysis on a monthly composite. More recently, the analytes that have been routinely used to monitor off-site discharges from the C-Series Drainage have consisted of pH, nitrate as nitrogen, radionuclides, and nonvolatile suspended solids.

IHSS Investigations

As documented in the RFI/RI for the Woman Creek Priority Drainage, OU 5 (DOE 1996), IHSSs 142.10, and 142.11, along with the SID and Woman Creek Source Area, were grouped as AOC 3 for purposes of the HHRA. The results of the HHRA for AOC 3 showed that for all current and future on-site receptors, the cumulative HIs for noncarcinogenic health effects are 0.001 or less. Therefore, no adverse noncancer health effects are expected under the exposure conditions evaluated. For all current and future on-site receptors, the excess lifetime cancer risk was estimated to be 6×10^{-8} or less, thus indicating negligible risk. Land use scenario/receptor assumptions for the assessment included current worker (security worker), future construction worker, future ecological researcher, future office worker, and future open space worker (DOE 1996).

Sediment samples were analyzed for metals, radionuclides, VOCs, SVOCs, pesticides, PCBs, and water quality parameters (DOE 1997b). Surface water samples were analyzed for all analytical suites except PCBs. Although PCBs were not analyzed for in surface water, they are relatively insoluble. Surface water was sampled frequently between 1991 and 1996 for total radionuclides. In 1991, several samples were collected for dissolved radionuclides and total and dissolved metals, as well as organics. Surface water sampling and analysis at Pond C-1 ceased after 1996 in accordance with the Integrated Monitoring Plan (IMP) (DOE 1997b).

In accordance with RFCA (DOE et al. 1996), surface water compliance monitoring is conducted at several locations on Site, including where Woman Creek crosses Indiana Street. Pond C-1 is a flow-through retention basin and, if there is adequate flow, the water ultimately discharges off the Site in Woman Creek at Indiana Street (compliance monitoring station GS01) (Plate 4). Flow in Woman Creek at Indiana Street is likely a mixture of Pond C-1 outflow and runoff from within the Woman Creek drainage downstream of Pond C-1. At GS01, plutonium and americium concentrations have been monitored since October 1996, total uranium concentrations since

February 2003, and tritium concentrations from October 1996 through June 2003. (As of June 2003, tritium is no longer an analyte of interest [AOI]) (DOE 2004). The monitoring data (DOE 2000, 2001, 2002) indicate AOI concentrations were less than the RFCA Attachment 5, Table 1, surface water ALs and standards (DOE et al. 2003, DOE 1997b).

Application of the Subsurface Soil Risk Screen

Current site conditions are evaluated by using the SSRS to determine whether remediation is required. The SSRS follows the steps identified on Figure 3 of Attachment 5 of RFCA (DOE et al. 2003). The SSRS for Pond C-1 was completed as part of the NFAA recommendation process.

Screen 1 – Are COC concentrations below RFCA Attachment 5 Table 3 WRW Soil ALs?

Yes. Subsurface soil concentrations are less than the WRW soil ALs. In accordance with Figure 3 of RFCA Attachment 5, Screen 4 is performed next given a "yes" response to Screen 1 (DOE 2004).

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause exceedance of surface water standards?

No. Pond C-1 is a flow-through pond on Woman Creek and, therefore, erosion is a potentially significant pathway whereby surface water could become contaminated by the sediments. However, concentrations of contaminants above background in the sediment are relatively low. The few organic compounds that were detected at low levels in the sediment have never been detected in Pond C-1 surface water.

Plutonium-239/240, americium-241, and uranium-total concentrations have been greater than background in Pond C-1 surface water samples, and occasionally greater than the surface water ALs. However, concentrations greater than the surface water ALs were very infrequent. The data indicate most of the radionuclide concentrations are less than or only slightly greater than background levels.

Additional Sampling

At Pond C-1, four surface sediment and one subsurface sediment samples were collected and analyzed for radionuclides, metals, PCBs, and SVOCs in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a). All results were less than RFCA WRW soil ALs. These results along with all previous results were summarized in the Data Summary Report for IHSS Group NE-1 (DOE 2005b).

No Further Action Recommendation

Sediment COC concentrations are well below the RFCA Attachment 5 Table 3, WRW soil ALs (DOE et al. 2003) and the monitoring data for GS01 on Woman Creek at Indiana Street indicate there have never been AOIs at concentrations greater than the surface water ALs. Therefore, it was concluded an NFAA was justified at IHSS 142.10.

After review of the NFAA justification by the regulatory agencies, DOE received concurrence from EPA (the LRA) of the NFAA status for Pond C-1 (PAC Reference Number SE-142.10) on June 17, 2004 (EPA 2004).

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Integrated Monitoring Plan Background Document, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, RFETS Automated Surface-Water Monitoring Report: Water Years 1997-2000, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2001, RFETS Automated Surface-Water Monitoring Report: Water Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2002, RFETS Automated Surface-Water Monitoring Report: Water Year 2002, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2004, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996b, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2004, Correspondence to J. Legare, DOE RFFO, from M. Aguilar, EPA, RE: No Further Accelerated Action Justification for Retention Pond C-1 (PAC Reference Number SE-142.10, June 17.

DOE, 2005a, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-06, Rocky Flats Environmental Technology Site Golden, Colorado, July.

DOE, 2005b, Data Summary Report for IHSS Group NE-1, Rocky Flats Environmental Technology Site Golden, Colorado, October.

PAC REFERENCE NUMBER: SE-142.11

IHSS Number:	142.11
Current Operable Unit:	BZ
Former Operable Unit:	5
IHSS Group:	NE-1
Unit Name:	Retention Pond C-2

The Final Update to the HRR for PAC SE-142.11 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 142.11 is summarized in this update. The following HRR volumes contain IHSS 142.11 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1997 Annual (DOE 1997).

Date(s) of Operation or Occurrence

1979 to present

Historical Summary

Pond C-2, IHSS 142.11, was constructed in 1979 and is downgradient of Pond C-1 (PAC SE-142.10) and the SID. The location of IHSS 142.11 is shown on Figure 11.

The SID was constructed in 1979 to reroute runoff from the southern portions of the RFETS IA to Pond C-2. Besides much localized drainage from precipitation, water from the SID is the only input to Pond C-2; Pond C-2 serves as a surface water retention and spill control pond. Woman Creek flow enters Pond C-1 which serves as a flow-through temporary detention pond. Discharges from Pond C-1 are routed around Pond C-2 and back into the natural Woman Creek channel (DOE 1992a, 1997). Releases or concerns that are known to have been associated with the C-Series Drainage are summarized and listed below (DOE 1992a, 1997):

- Pond C-1, the C-Series Drainage, and the general area near Pond C-1 and Pond C-2 are believed to have been impacted by resuspended soil and runoff from the 903 Pad area (PACs 900-112 and 900-155).
- Leaks from the SID to Woman Creek near the outfall of the Building 881 footing drain were observed during the week ending March 12, 1982. Repairs to the SID were requested.
- Direct runoff from the East Spray Field (PACs NE-216.1, NE-216.2, and NE-216.3) to Woman Creek was observed on March 2, 1987.
- A spill of waste acid may have impacted the SID and Pond C-2 on April 10, 1989. Based on the RCRA CPIR generated for the April 10, 1989, waste acid spill, 5 to 7 gallons of a dilute nitric acid and nitrad, a combination of hydrofluoric acid and ammonium salts, waste solution entered a storm drain that eventually drained to Pond C-2 (through the SID). A more complete discussion of the activities surrounding this event can be found in PAC 400-205 (DOE 1992a).
- Measurable quantities of atrazine were identified in Pond C-2 in 1989.

The identification of atrazine in Pond C-2 resulted in the construction of modular activated carbon treatment systems at Pond A-4, Pond B-5, and Pond C-2. These systems were only in operation for a short period of time before being dismantled.

IHSS Investigations

In accordance with the OU5 Phase I RFI/RI Work Plan (DOE 1992b), three surface sediment samples were collected in Pond C-2 as part of the OU 5 RFI/RI. Two samples were analyzed for radionuclides, metals, PCBs, pesticides, SVOCs, and VOCs and one was analyzed for radionuclides, metals, and VOCs. An additional sample, collected as part of a sitewide sampling program, was analyzed for PCBs and pesticides. IHSSs 142.11 along with the SID and Woman Creek Source Area, were grouped as AOC 3 for purposes of the OU 5 HHRA. The results of the HHRA for AOC 3 showed that for all current and future on-site receptors, the cumulative HIs for noncarcinogenic health effects are 0.001 or less. Therefore, no adverse noncancer health effects are expected. For all current and future on-site receptors, the excess lifetime cancer risk was estimated at 6×10^{-8} or less, thus indicating negligible risk (DOE 1996). Land use scenario/receptor assumptions for the assessment included current worker (security worker), future construction worker, future ecological researcher, future office worker, and future open space worker (DOE 1996). The human health estimates supported the recommendation for NFA and are consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996). The results of the ERA did not indicate a substantial and definitive risk to ecologic receptors.

At Pond C-2, six surface sediment and two subsurface sediment samples were collected and analyzed for radionuclides and metals in accordance with IABZSAP Addendum #IABZ-05-06 (DOE 2005a).

Results from all investigations were evaluated and presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005b). PCBs were not detected in either surface or subsurface sediment. Americium-241 was detected at activities ranging from 0.394 to 0.727 pCi/g in surface sediment, and at an activity of 0.305 pCi/g in subsurface sediment. Plutonium-239/240 was detected in surface soil at activities ranging from 2.09 to 2.96 pCi/g. In subsurface sediment, plutonium-239/240 was detected once at an activity of 1.64 pCi/g. Several metals were detected in surface sediment at concentrations only slightly greater than background mean plus two standard deviations. All concentrations and activities were less than WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

Based on analytical results and the SSRS, accelerated action was not required and an NFAA determination was justified for IHSS Group NE-1 given the following:

- Activities and concentrations of COCs were uniformly below RFCA WRW soil ALs.
- Migration of soil or sediment contaminants to surface water is unlikely to impact water quality because little contamination is present. Routine surface water monitoring results indicate surface water standards are met and that pond sediments are not impacting surface water. The ponds are also configured to protect off-site water sources. Stormwater runoff is retained in the Terminal Ponds, sampled, and if the surface water results meet applicable standards, the water is released. Erosion of the pond sediments because of a large influx of

water (from a storm) is not likely because the ponds are currently and expected to remain as low-energy ponds and less water will be available after Site closure. Additionally, predictions of contaminant migration based on the integration of the WEPP (USDA 1995) and HEC-6T (Thomas 1999) models are conservative. Site empirical data indicate contaminant migration is less than model predictions.

- Contaminants originating in IHSS Group NE-1 soil and sediment are not likely to impact surface water by transport in groundwater because soil contamination levels in IHSS Group NE-1 are very low. Groundwater contamination present beneath IHSS Group NE-1 was evaluated as part of the Groundwater IM/IRA (DOE 2005c).

The NFAA recommendation for Pond C-2 (IHSS 142.11), presented in the Data Summary Report for IHSS Group NE-1 (DOE 2005b), was approved by EPA (the LRA) on October 18, 2005.

Comments

None

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 5 Woman Creek Priority Drainage, Rocky Flats Plant, Golden, Colorado, February.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #IABZ-05-06, Rocky Flats Environmental Technology Site Golden, Colorado, July.

DOE, 2005b, Data Summary Report for IHSS Group NE-1, Rocky Flats Environmental Technology Site Golden, Colorado, October.

DOE, 2005c, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA Correspondence to J. Rampe, DOE, from C. M. Aguilar, EPA Region 8, RE: Data Summary Report (DSR) for IHSS Group NE-1; Ponds A-1, A-2, A-3, A-4, A-5, B-4, B-5, C-1, and C-2; September 2005, October 18.

Thomas, W.A., 1999, Sedimentation in Stream Networks (HEC-6T). Mobile Boundary Hydraulics, Clinton, Mississippi.

USDA, 1995, Water Erosion Prediction Project Hillslope Profile and Watershed Model Documentation, NERSL Report No. 10. D.C. Flanigan, M.A. Nearing, and J.M. Laflin, eds, USDA-ARS National Soil Erosion Research Laboratory, West Lafayette, Indiana.

PAC REFERENCE NUMBER: SE-209

IHSS Number:	209
Current Operable Unit:	BZ
Former Operable Unit:	5
IHSS Group:	Not Applicable
Unit Name:	Surface Disturbance Southeast of Building 881

The Final Update to the HRR for PAC SE-209 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 209 is summarized in this update. The following HRR volumes contain IHSS 209 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1955

Historical Summary

This area consisted of a surface disturbance at the site of a former borrow pit. Gravel taken from the pit was used for Plant construction activities. Although waste disposal is not believed to have taken place at this location, DOE agreed to investigate the site as a possible waste disposal area (DOE 1992). The location of IHSS 209 is shown on Figure 11.

IHSS Investigations

As documented in the Phase I RFI/RI Report for OU 5 (DOE 1996), IHSS 209 and the source area west of the IHSS were removed from further evaluation in the HHRA because concentrations did not exceed the mean plus two standard deviations criterion established in the CDPHE screen. FIDLER surveys and surface water and soil samples were collected as part of the IHSS 209 portion of the OU 5 RFI/RI field investigation. The data suggested COCs exceeding background were not present within IHSS 209, with the possible exception of mercury in one surface soil sample. Additionally, results of the Phase I RFI/RI ERA for the Woman Creek Watershed did not indicate IHSS 209 was a source area (DOE 1996).

No Further Action Recommendation

Based upon the conclusions in the Phase I RFI/RI Report for OU 5, IHSS 209 was proposed for NFA in the 1997 Annual Update for the HRR (DOE 1997). This recommendation was consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996). The results of the HHRA and ERA supported the conclusions that any environmental contamination within OU 5, including IHSS 209, did not pose a significant threat to public health or the environment (DOE 1996).

After review of the NFA justification, DOE received approval from EPA (the LRA) and CDPHE of the NFA status for IHSS 209 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: SE-1600

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Pond 7 - Steam Condensate Releases

The Final Update to the HRR for PAC SE-1600 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC SE-1600 is summarized in this update. The following HRR volumes contain PAC SE-1600 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

March 1955 to before October 1964

Historical Summary

Pond 7, PAC SE-1600, was constructed in March 1955. Two other small ponds, Pond 6 and Pond 8-North (part of PAC SE-1601), and one large, unnamed pond were constructed in this area at approximately the same time. The location of PAC SE-1600 is shown on Figure 11.

Pond 7 was constructed to serve as a retention pond and was located adjacent to the Woman Creek drainage, south of the Building 881 sewage lift station, which was also known as Building 887. There is no indication Pond 7 was hydraulically connected to or located in series with Pond 6 or Pond 8-North. On approximately September 27, 1955, steam condensate from Building 881 was released to Pond 7. The release was necessary because the condensate could not be sent to Building 774 because of a break in the process waste line leading to Building 774. Building 881 steam condensate was released to Pond 7 again on November 16, 1955, because of a frozen process waste line leading to Building 774. Each steam condensate release consisted of 2,700 gallons, and no documentation was found detailing the fate of the released steam condensate. However, it is suspected to have flowed out of Pond 7 and into the Woman Creek drainage (DOE 1992).

It is unclear when Pond 7 was abandoned; however, based on examination of aerial photographs, it appears that it was no longer active in October 1964. Additionally, a new pond (Pond 8-South) was constructed by October 1964 approximately 350 ft southeast of what is believed to have been the original Pond 8-North location. Based on aerial photograph reviews, Pond 8-South collected both flows that went to the old Ponds 7 and 8-North. Although there is no definitive information, Ponds 7 and 8-North were probably abandoned because of hillside instability (DOE 1992).

PAC Investigations

According to the original HRR (DOE 1992), it is believed that in 1971 some soil samples were collected in the immediate vicinity of Pond 7. However, no analytical results were found and it could not be determined whether the samples were collected. Additionally, pond samples collected during the 1987 RI activities were probably also collected at the Pond 7 location. Borehole locations in the vicinity of PAC SE-1600 were sampled and analyzed for radionuclides, metals, VOCs, SVOCs, PCBs, and pesticides in accordance with the Phase III RFI/RI Work Plan for OU1 (DOE 1991). Results indicated that radionuclides were either not detected or detected at activities very close to background. Americium-241 ranged from 0.0026 to 0.86 pCi/g, plutonium-239/240 was detected at a maximum of 0.0054 pCi/g, uranium-234 ranged from 0.02 to 0.87 pCi/g, uranium-235 was detected at 0.05 pCi/g, and uranium-238 was detected at a maximum of 1.24 pCi/g in surface soil. In subsurface soil, americium-241 ranged from 0.63 to 1.4 pCi/g, plutonium-239/240 ranged from 0.001 to 0.01 pCi/g, uranium-234 ranged from 0.01 to 0.96 pCi/g, uranium-235 was detected at a maximum of 0.04 pCi/g, and uranium-238 ranged from 0.01 to 1.02 pCi/g. Toluene was the only VOC that was detected and had a maximum concentration of 270 μg/kg in subsurface soil (DOE 1994).

No Further Action Recommendation

PAC SE-1600 was part of a large group of IHSSs, PACs, and PICs that were given NFA status in 2002 by the FY2002 HRR Working Group (CDPHE and EPA 2002). The FY2002 HRR Working Group developed and implemented a systematic approach for reviewing NFA proposals in accordance with RFCA Attachment 6 and the Implementation Guidance Document (IGD) (DOE et al. 1996). After providing the exact location, existing sampling data, and information regarding whether the location was disturbed as part of OU 1, the NFA was granted (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPE Region VIII, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1991, Final Phase III RFI/RI Work Plan, 881 Hillside Area (Operable Unit No. 1) Department of Energy, Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE 1994, Final Phase III RFI/RI, Rocky Flats Plant, 881 Hillside Area (Operable Unit 1) Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report for the 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBERS: SE-1601.1 AND SE-1601.2

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Pond 8 – Cooling Tower Discharge Releases PAC SE-1601.1 Pond 8-North – Original Pond 8 PAC SE-1601.1 Pond 8-South PAC SE-1601.2

The Final Update to the HRR for PAC SE-1601 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC SE-1601 is summarized in this update. The following HRR volumes contain PAC SE-1601 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

Pond 8 – North: March 1955 to before October 1964

Pond 8 – South: Before October 1964 to the mid-1970s

Historical Summary

Pond 8-North, PAC SE-1601 at RFETS, was constructed in March 1955. It was designed to serve as a retention pond for cooling tower water discharges, and was located south of the Building 881 dock area in the vicinity of the cooling tower condensate discharge pipe on the Woman Creek drainage (DOE 2002). Two other small ponds, Pond 6 and Pond 7 (PAC SE-1600), and one large, unnamed pond were constructed in this area at approximately the same time. The location of PAC SE-1601 is shown on Figure 11.

Based on aerial photographs, Pond 8-South replaced Pond 7 and Pond 8-North, which were no longer in use in October 1964. Pond 8-South collected flows that had previously gone to Pond 7, and Pond 8-North. Ponds 7 and 8-North were probably abandoned because of hillside instability. Pond 8-South was located on a gentler slope than Ponds 7 and 8-North (DOE 1992).

No documentation was found that identified Pond 8-North as the recipient of a release. However, its construction relative to the location of the cooling tower condensate discharge pipe makes a release probable. Interviewees indicated there was a constant, but small amount of overflow/blowdown from the Building 881 cooling towers in the past (DOE 1992). It is possible the Pond may also have received cooling tower discharges. Prior to the late 1970s, some Site cooling tower effluent contained chromium-based biocides. It appears that the pond also collected water from the Building 881 footing drain (DOE 2002).

PAC Investigations

No formal investigations into this area were documented (DOE 1992). Surface and subsurface samples were collected from two borehole sampling locations in the vicinity of PAC SE-1601.1

and analyzed for radionuclides, metals, VOCs, SVOCs, PCBs, and pesticides in accordance with the Phase III RFI/RI Work Plan for OU1 (DOE 1991). Results indicated that radionuclides were either not detected or detected at activities very close to background. Americium-241 ranged from 0.0026 to 0.86 pCi/g, plutonium-239/240 was detected at a maximum of 0.0054 pCi/g, uranium-234 ranged from 0.02 to 0.87 pCi/g, uranium-235 was detected at 0.05 pCi/g, and uranium-238 was detected at a maximum of 1.24 pCi/g in surface soil. In subsurface soil, americium-241 ranged from 0.63 to 1.4 pCi/g, plutonium-239/240 ranged from 0.001 to 0.01 pCi/g, uranium-234 ranged from 0.01 to 0.96 pCi/g, uranium-235 was detected at a maximum of 0.04 pCi/g, and uranium-238 ranged from 0.01 to 1.02 pCi/g. Toluene was the only VOC that was detected and had a maximum concentration of 270 µg/kg in subsurface soil (DOE 1994).

Five borehole locations were sampled in the vicinity of PAC SE-1601.2 in accordance with the Phase III RFI/RI Work Plan for OU 1 (DOE 1991). Results indicated that americium-241, plutonium-239/240, and uranium-235 were not detected at activities greater than background, but uranium-234 was detected at 1.15 pCi/g and uranium-238 was detected at 1.88 pCi/g in surface soil. In subsurface soil, plutonium-239/240 was detected at 0.033 pCi/g, uranium-234 was detected at 2.92 pCi/g, and uranium-238 was detected at 14.13 pCi/g. Americium-241 and uranium-235 were not detected at activities greater than background (DOE 1994).

No Further Action Recommendation

PACs SE-1601.1 and SE-1601.2 were part of a large group of IHSSs, PACs, and PICs that were given NFA status in 2002 by the FY 2002 HRR Working Group. After providing the exact location, existing sampling data, and whether the location was disturbed as part of OU 1, the NFA was approved by CDPHE and EPA (the LRA) on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPE Region VIII, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1991, Final Phase III RFI/RI Work Plan, 881 Hillside Area (Operable Unit No. 1) Department of Energy, Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI, Rocky Flats Plant, 881 Hillside Area (Operable Unit 1) Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: SE-1602

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	900-11
Unit Name:	East Firing Range

The Final Update to the HRR for PAC SE-1602 consolidates the information in the 1999 HRR Annual Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC SE-1602 is summarized in this update. The following HRR volume contains PAC SE-1602 information:

Annual Update – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1951 to 1986

Historical Summary

A firing range, located in the southeastern BZ, was used for target practice and security officer firearm use qualification from 1951 through 1986. From 1951 through 1981, the hillside east of the range was used, and after 1981, the hillside south of Woman Creek was used as a target area. The location of PAC SE-1602 within the southeastern BZ is shown on Figure 11.

North Target Area

The north target area consisted of a firing range and berm (approximately 300 by 200 ft). Rounds were fired from the firing range east toward the berm. Bullets were found in the berm. Handgun and shotgun bullets of various calibers were used in this area (DOE 2005).

South Target Area

The south target area is located south of the Firing Range and on the hillside south of Woman Creek. Rounds were fired from the firing range south toward targets and into the hillside. Bullets have been found from the range to the road above the hillside and may also be present in the drainage. Handgun, shotgun, and rifle bullets of various calibers (up to 50 caliber), as well as depleted uranium (armor-piercing) bullets, were used in this area. Brass bullet casings were collected, containerized, and sent to PU&D Yard for disposition. Depleted uranium armor-piercing bullets were not routinely used at the Firing Range (DOE 2005).

Lead from spent bullets was found in and near the Firing Range, north berm, and southern hillside. Depleted uranium may be present in the south hillside.

PAC SE-1602 was identified in the CDPHE BZ Contamination Report and officially designated a PAC in the 1999 Annual Update for the HRR (DOE 1999).

PAC Investigations

The East Firing Range and Target Area were investigated in accordance with BZSAP Addendum #BZ-04-11 (DOE 2004a). WRW soil ALs (DOE et al. 2003) were exceed in several locations. Characterization results indicated maximum metal concentrations in the berm area surface soil included antimony at 433 mg/kg, arsenic at 1,080 mg/kg, and lead at 143,000 mg/kg. Analytical results for the North Target Area indicated that WRW soil ALs were not exceeded. The maximum concentration of lead in this area was 120 mg/kg and arsenic was not detected.

WRW soil ALs were exceeded at two locations in the trench area, south of the North Target Area: lead at a maximum concentration in surface soil of 4,500 mg/kg and 10,000 mg/kg in subsurface soil and lead and copper at a maximum concentrations of 100,000 mg/kg and 130,000 mg/kg, respectively, in surface soil. Lead exceeded WRW soil ALs in the South Target Area with concentrations of 5,300 mg/kg.

Accelerated action activities were conducted in accordance with the IM/IRA for IHSS Group 900-11 (DOE 2004b) and included removal of contaminated soil and an asphalt parking lot. The COCs consisted of lead, arsenic, and antimony in the soil. Based on the consultative process, arsenic cleanup levels were set at 35 mg/kg while lead and antimony cleanup levels were set at their respective WRW soil ALs (RCR dated November 2, 2004). Soil with arsenic and lead concentrations greater than the established cleanup levels or WRW soil ALs was remediated. After soil removal, maximum concentrations in the berm area included arsenic at 33.3 mg/kg, lead at 280 mg/kg, and antimony at 2.1 mg/kg in subsurface soil. Results indicated that the maximum chromium concentration in the trench area was 49 mg/kg and lead was 460 mg/kg. Residual maximum lead concentrations in subsurface soil in the South Target Area were 240 mg/kg. Based on consultation, no additional soil removal was required for these residual arsenic concentrations as described in the ER RCRs dated November 2, 2004 and November 11, 2004. Actions and analytical data are presented in the Closeout Report for IHSS Group 900-11, PAC SE-1602, East Firing Range and Target Area (DOE 2005).

No Further Action Recommendation

Soil with antimony, arsenic, copper, and lead concentrations greater than the WRW soil ALs, or in consultation with the regulatory agencies, was removed. The SSRS did not indicate further soil removal was necessary.

After regulatory agency review of the Closeout Report (DOE 2005), DOE received approval from EPA (the LRA) of the NFAA status for the East Firing Range and Target Area (PAC SE-1602) on February 8, 2005 (EPA 2005).

Comments

PAC SE-1602 includes BZ Contamination Report Site 1.

References

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Draft FY03 Notification #03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Buffer Zone Sampling and Analysis Plan FY04 Addendum #BZ-04-11, IHSS Group 900-11, PAC SE-1602 (East Firing Range), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004b, Interim Measure/Interim Remedial Action (IM/IRA) for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in Operable Unit 1 (881 Hillside), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS 900-11, PAC SE-1602, East Firing Range and Target Area, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE RFPO; from M. Aguilar; EPA, RE: Closeout Report for IHSS Group 900-11, PAC SE-1602 East Firing Range and Target Area, February 8.

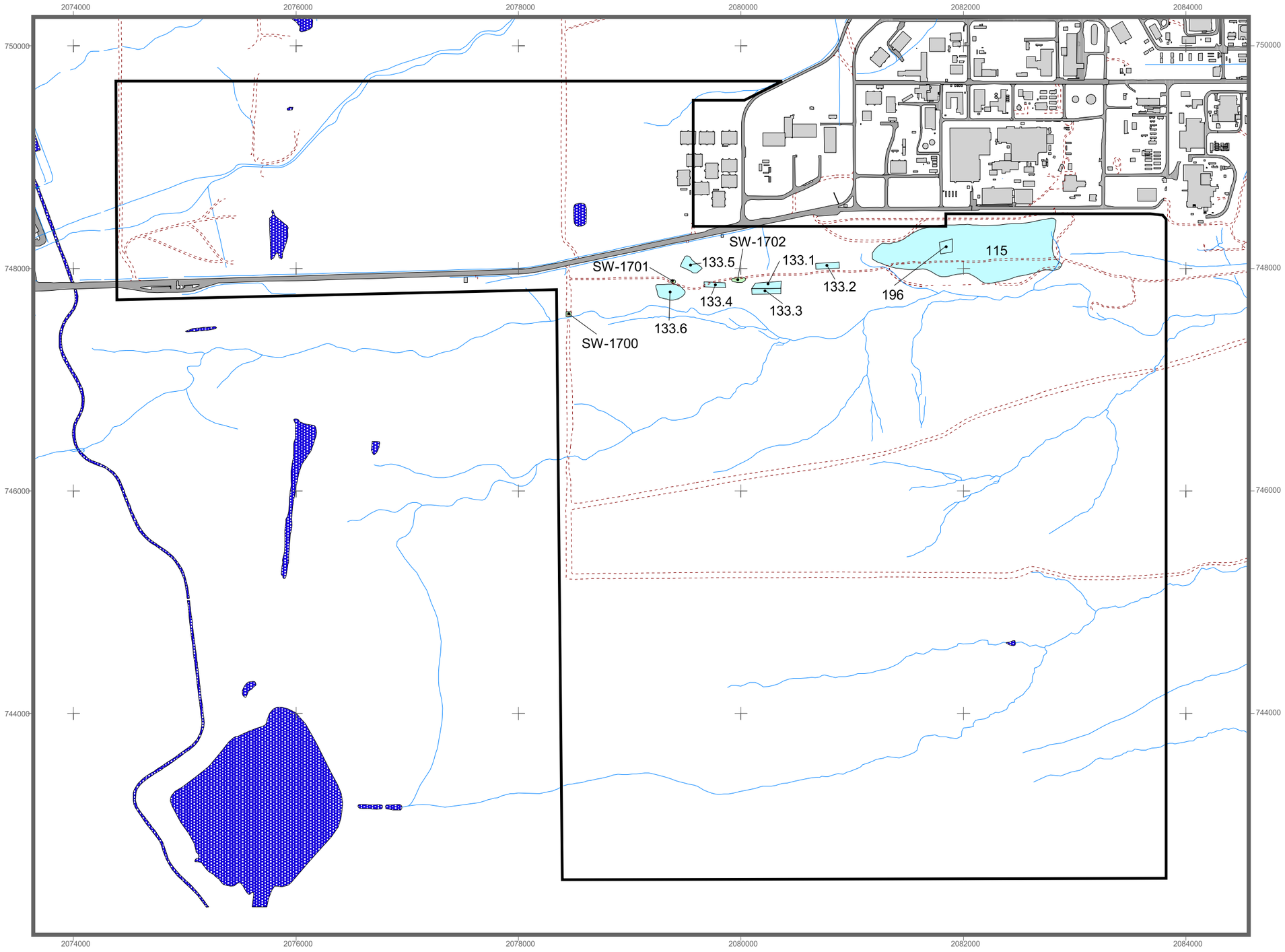

Figure 12
Southwest Buffer Zone Area
IHSSs and PACs

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

750 0 750 Feet

Scale = 1: 12850

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.27.05

File: W:\Projects\FY2005\HRR Update\Figures\hrr_sw_bz.apr

PAC REFERENCE NUMBER: SW-115

IHSS Number: 115

Current Operable Unit: IA

Former Operable Unit: 5

IHSS Group: SW-2

Unit Name: Original Landfill

The Final Update to the HRR for PAC SW-115 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 115 is summarized in this update. The following HRR volume contains IHSS 115 information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

1952 to 1968

Historical Summary

The Original Landfill (IHSS 115) was used to dispose of solid sanitary and construction debris wastes generated at Rocky Flats from 1952 to 1968. The Original Landfill was located south of the IA and north of Woman Creek. The Landfill was not designed or operated as an engineered landfill. No liner or other collection barrier was installed between the waste and the existing surfaces (DOE 2005a). The location of IHSS 115 is shown on Figure 12.

Waste material was mixed with soil material during the waste placement process. The volume of disposed waste and commingled soil was estimated at 160,000 cy. Disposal operations at the Original Landfill ended by fall 1968 because of the Present Landfill (PAC NW-114, located north of the IA), which began operations on August 17, 1968 (DOE 1992a). After disposal operations ceased, the waste material was covered with a layer of soil. However, details on the placement of the soil layer, including exactly when it was constructed, are not available (DOE 2005a). Because of the slope angle, and colluvial and weathered bedrock material making up the hillside, this area was identified as susceptible to sliding even before the slope was covered with waste fill (DOE 2005a).

Accurate and verifiable records of the waste placed in the Landfill are not available. However, approximately 74,000 cy of sanitary waste and construction debris were disposed in the Landfill (DOE 1996). These types of wastes likely included relatively small quantities of organics, paint and paint thinner, oil, pesticides, and cleaners (DOE 2005a). Commonly used organics from 1952 to 1968 may have included trichloroethene, carbon tetrachloride, tetrachloroethene, petroleum distillates, 1,1,1-trichloroethane, dichloromethane, and benzene (DOE 1996). In the 1960s, the Landfill may have received PCB wastes (DOE 1992a), such as carbonless copy paper, transformer and vacuum pump cleanup paper and rags, and small capacitors and fluorescent light bulbs. Metals such as beryllium and chromium, may also have been placed in the Landfill (DOE 2005a).

The Original Landfill was used as a burn pit for the Plant. Ash from the Incinerator (PAC SW-133.5), graphite, used caustic drums, and general trash may have been dumped in the burn pit; however, no records of waste types have been found for at least the first decade of Plant operation.

There is no information indicating that the Original Landfill was used for routine disposal of radioactive material or other hazardous substance waste streams. The majority of radioactive solid waste generated onsite was disposed offsite. Although the Original Landfill was not operated for management or disposal of radioactive waste, information in the HRR and characterization results indicate that some waste contaminated with radioactive material, most notably wastes from buildings where depleted uranium (DU) operations were conducted, were disposed of in the Original Landfill. In addition, in 1965, 60 kg of DU were placed in the Landfill. Efforts were later made to retrieve the DU, however, only 40 kg were recovered (DOE 1992a).

Seepage emerging from the Original Landfill after a major rainstorm in July 1986 was traced to an outfall pipe from the Building 460 footing drains. Sloughing of material in the area of the outfall occurred as a result and hillside material may have washed into the SID. To prevent migration of materials, a containment embankment was constructed to prevent flow into Woman Creek. The outfall piping was also extended to the east to discharge beyond the Landfill boundary (DOE 1992a, 2005a).

IHSS Investigations

IHSS 115 and PAC SW-196 were part of OU 5, the Woman Creek Priority Drainage, which was consolidated into the IA OU when RFCA became effective in July 1996 (DOE et al. 1996). Prior to this consolidation, a Phase I RFI/RI for OU 5 was conducted in accordance with the RFI/RI Work Plan (DOE 1992b, 1994). IHSSs 115 and 196 were addressed in the OU 5 Phase I RFI/RI, and for purposes of the investigation work, the OU 5 IHSSs (and PACs) were separated into specific AOCs. IHSSs 115 and 196 were designated as AOC 1 (DOE 1996).

Geotechnical investigations at the Original Landfill as part of the OU 5 Phase I RFI/RI indicated that the fill material encountered during the investigation consisted of waste mixed with varying amounts of sandy-clayey gravel, and cobbles derived from colluvium and Rocky Flats Alluvium. The waste materials in the fill included sheet metal, wood, broken glass, plastic, rubber, metal shavings, graphite sand, solid blocks of graphite, concrete, asphalt, and portions of 55-gallon steel drums. The waste fill ranged in thickness from 2 ft to more than 11 ft (DOE 2005a).

Soil samples were analyzed for metals, radionuclides, VOCs, SVOCs, pesticides, and PCBs. More than 7,500 validated analyses from 70 surface soil sample locations were collected in the IHSS 115 area. Radionuclide results indicated uranium-234, uranium-235, and uranium-238 were present in surface soil above the RFCA WRW soil ALs (DOE et al. 2003), at four locations: SS505093, SS505293, SS505493, and SS515593. SS505093 had uranium-235 and uranium-238 WRW soil AL exceedances of 46 and 2,000 pCi/g, respectively; SS505293 had uranium-235 and uranium-238 WRW soil AL exceedances of 23 and 1,000 pCi/g, respectively; SS505493 had uranium-234, uranium-235, and uranium-238 WRW soil AL exceedances of 2,800, 670, and 38,000 pCi/g, respectively; and SS515593 had uranium-235 and uranium-238 WRW soil AL exceedances of 19 and 780 pCi/g, respectively. These four locations were removed during the “hot spot” removal portion of the accelerated action (DOE 2005a).

Organic results indicated that benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were present in surface soil above the RFCA WRW soil ALs, at 45,000, 43,000, and 49,000 μg/kg, respectively (DOE 2005a).

RFCA Actions

The IHSS Group SW-2 (IHSSs 115 [Original Landfill] and 196 [Water Treatment Plant Backwash Pond]) RAOs (DOE 2005a) were developed to:

- Prevent direct contact with Landfill soil and commingled waste; and
- Control erosion caused by stormwater run-on and runoff.

The remedial action plan for IHSS Group SW-2 consisted of the following major activities to meet RAOs:

- Removal of surface soil "hot spots";
- Grading of the Landfill to a maximum slope of 18 percent;
- Construction of a soil buttress;
- Placement of a minimum 2-ft-thick soil cover over the entire waste area;
- Construction of surface water diversion berms and perimeter channels;
- Site monitoring (groundwater and surface water); and
- Institutional controls.

The remedial objectives of this action were principally met through placement of the buttress, grading the waste, placement of the cover, and installation of surface water controls. Prior to these major actions, the removal of small areas of surface soil, contaminated above the WRW soil ALs, was accomplished. To achieve the remaining objectives, an engineered soil cover was designed to prevent direct contact with Landfill soil and commingled waste, and to control erosion caused by stormwater run-on and runoff (DOE 2005a). ER accelerated action activities at the Original Landfill were conducted between February 2005 and August 2005 (DOE 2005b).

Closure of IHSS Group SW-2, including IHSS 115, was conducted in accordance with the Final IM/IRA for the Original Landfill (including IHSS Group SW-2; IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond) (DOE 2005a) and with the Final Design Report and Design Calculation Documentation for the Accelerated Action for the Original Landfill at the Rocky Flats Environmental Technology Site (DOE 2005a) approved by CDPHE on May 13, 2005 (CDPHE 2005).

The RFCA activities were documented in the Construction Completion and Certification Report, Accelerated Action for the Original Landfill, Rocky Flats Environmental Technology Site (DOE 2005c) (Attachment A of the Closeout Report for IHSS Group SW-2 [DOE 2005b]). The Construction Completion and Certification Report was approved by CDPHE (the LRA) and EPA on November 22, 2005 (CDPHE and EPA 2005), which also constituted agreement on the NFAA status of IHSS 115.

Post-accelerated action monitoring and long-term surveillance and maintenance considerations were addressed in a minor modification to Appendix B of the Final IM/IRA for the Original Landfill (DOE 2006a) and incorporated into the Monitoring and Maintenance Plan for the

Original Landfill (DOE 2006b). The Monitoring and Maintenance Plan was approved by the regulatory agencies on February 28, 2006 (CDPHE and EPA 2006a) and the modifications to the IM/IRA were approved on March 6, 2006 (CDPHE and EPA 2006b). Three new monitoring wells were installed during the accelerated action (DOE 2005b).

Approval of the Closeout Report (DOE 2005b) was made contingent upon approval of the Monitoring and Maintenance Plan required by the minor modification to the IM/IRA Appendix B. The Closeout Report was approved by CDPHE (the LRA) and EPA for IHSS 115 on May 15, 2006 (CDPHE and EPA 2006c).

No Further Accelerated Action Recommendation

Based on the completion of the Original Landfill accelerated action and review of the subsequent Closeout Report and Construction Completion and Certification Report (DOE 2005c), CDPHE and EPA approved the Construction Completion and Certification Report for the Original Landfill on November 22, 2005 (CDPHE and EPA 2005). The Closeout Report (DOE 2005c) was approved by CDPHE (the LRA) and EPA for IHSS 115 on May 15, 2006 (CDPHE and EPA 2006c).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE, RFFO from S. Gunderson, CDPHE, RE: Original Landfill Design, May 13.

CDPHE and EPA, 2005, Correspondence to J. Rampe, DOE, RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Approval of Construction Certification Report for the Original Landfill (November 2005), November 22.

CDPHE and EPA, 2006a, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Landfill Monitoring and Maintenance Plan – Original Landfill, February 28.

CDPHE and EPA, 2006b, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Final Interim Measure/Interim Remedial Action for the Original Landfill (March 10, 2005), March 6.

CDPHE and EPA, 2006c, Correspondence to R. Schassburger, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Closeout Report for IHSS Group SW-2 Original Landfill (IHSSs 115 and 196) (November 2005), May 15.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 5 Woman Creek Priority Drainage, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1994, Draft Final Technical Memorandum No. 15, Addendum to Final Phase I RFI/RI Work Plan, Amended Filed Sampling Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Volume 1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2005a, Final Interim Measure/Interim Remedial Action for the Original Landfill (Including IHSSs Group SW-2; IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005b, Final Closeout Report for IHSS Group SW-2 Original Landfill (IHSS-115 & 196) Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005c, Construction Completion and Certification Report for the Original Landfill at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2006a, Minor Modification to the Final Interim Measure/Interim Remedial Action for the Original Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2006b, Final Landfill Monitoring and Maintenance Plan, Rocky Flats Environmental Technology Site, Original Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBERS: SW-133.1, SW-133.2, SW-133.3, SW-133.4, SW-1701, AND SW-1702

IHSS Number:	133.1. 133.2, 133.3, 133.4, and PACs SW-1701 and SW-1702
Current Operable Unit:	5
Former Operable Unit:	5
IHSS Group:	SW-1
Unit Name:	Ash Pits

This Final Update to the HRR for PACs SW-133.1, SW-133.2, SW-133.3, SW-133.4, SW-1701 and SW-1702 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of these IHSSs and PACs in accordance with the RFCA accelerated action process. The dispositions of IHSSs 133.1, 133.2, 133.3, and 133.4, and PACs SW-1701 and SW-1702 are summarized in this update. The following HRR volumes contain IHSSs 133.1, 133.2, 133.3, and 133.4 and PACs SW-1701 and SW-1702 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2001 Annual (DOE 2001);
Update Report – 2002 Annual(DOE 2002); and
Update Report – 2003 Annual (DOE 2003).

Dates(s) of Operation or Occurrence

1950s to 1968

Historical Summary

The locations of IHSSs 133.1, 133.2, 133.3, and 133.4, and PACs SW-1701 and SW-1702 are shown on Figure 12. Trenches were used for disposal of ash (and noncombustible trash) from the Incinerator (PAC SW-133.5) that operated from approximately 1952 until 1968. Ash from the Incinerator and "dump area" was first monitored in 1959 (DOE 1992a). Activities of 4,000 counts per minute (cpm) alpha and 30 millirems per hour (mrem/hr) beta were observed. Subsequently, the ash was buried in the trenches, known as Ash Pits.

In 1970, four Ash Pits (IHSSs 133.1, 133.2, 133.3, and 133.4) were identified as being south of the Incinerator area. Noncombustible trash, such as counting discs, broken glassware, and metal was collected in a nearby dumpster and also disposed of in the Ash Pits. The trenches were approximately 150 to 200 ft long, 12 ft wide and 10 ft deep, and were staked with steel fence posts and surveyed. When a trench was considered full, approximately 3 ft of soil covered each trench location. It was estimated that approximately 30,000 ft^3 of ash commingled with soil, and undocumented but relatively small volumes of noncombustible trash were buried in the Ash Pits.

Two additional burial trenches (PAC SW-1701 and PAC SW-1702) were identified in 1994 (DOE 1996) based on anomalies found during a time-domain electromagnetic (TDEM) conductivity survey. These two additional areas were confirmed through review of aerial photographs and samples collected from boreholes in the immediate area as shown on Figure 2.2 of the 2003 Annual Update for the HRR (DOE 2003). In addition, two anomalies adjacent to Ash

Pits 2 and 4 (IHSSs 133.2 and 133.4, respectively) were identified based on the TDEM conductivity survey. In each case, the southern most anomaly at each location was referred to as a twin investigation area as documented in the OU 5 Final Phase I RFI/RI Report (DOE 1996). The areas are shown on Figure 2.2 of the 2003 Annual Update for the HRR (DOE 2003) and are referred to as the "Ghost Ash Pits."

Small quantities of depleted uranium-contaminated combustibles were burned along with the general combustible Plant refuse. One estimate indicates less than 100 g of depleted uranium were in the combustibles. A monthly ash sampling program was initiated in January 1962 and indicated there was 1 to 8 kg of depleted uranium per ton of ash (DOE 1992a).

In September 1954, five ash samples from the burning of Building 991 wastes were collected. The average activity of the ash was 4.5×10^7 disintegrations per minute per kilogram (dpm/kg) of dry ash. The alpha activity of the ash was approximately 100 times higher than the usual ash samples from the Incinerator.

In 1956, special monitoring was performed during and after contaminated waste was burned in the Plant Incinerator. Ash samples indicated 1.9 g of radioactive material (depleted uranium) per kg of ash. Smear surveys of the Incinerator before and after burning showed no increase in contamination.

IHSS/PAC Investigations

Sampling events were conducted from November 24, 1953 through December 9, 1954. In 1970, the locations of Ash Pits 1-1 through 1-4 were marked in the field. The ash in these trenches was evaluated and considered to present no problems unless disturbed and inhaled.

The Ash Pit sites and surrounding area were extensively sampled as part of the OU 5 RFI/RI (DOE 1992b, 1996) and through groundwater and surface water monitoring. The locations of boreholes, wells, surface soil samples, sediment samples, and surface water samples used in the evaluation of IHSSs 133.1, 133.2, 133.3, and 133.4, and PACs SW-1701 and SW-1702 are shown on Figure 2.2 of the 2001 Annual Update for the HRR (DOE 2001). Summaries of subsurface soil sampling results for the Ash Pits are presented in Tables 2.1 through 2.7 of the 2001 Annual Update. Table 2.8 of the 2001 Annual Update summarizes the results of 18 surface soil and sediment samples from across the Ash Pit area. Historical (1986-1995) groundwater sampling results from 16 well locations proximate to the Ash Pit area are summarized in Table 2.9 of the 2001 Annual Update. Additional results from supplementary groundwater samples taken in August 2001 are presented in Tables 2.10 and 2.11 of the 2001 Annual Update. Table 2.12 of the 2001 Annual Update presents results for surface water samples taken near the Ash Pits.

In addition to laboratory analysis for radionuclides, an HPGe survey of the entire Ash Pit area was conducted in 1993. Figures 2.3, 2.4, and 2.5 of the 2001 Annual Update show the survey results for americium-241, uranium-235, and uranium-238.

As a result of a regulatory agency request, two tables (Tables 2.5 and 2.6) were included in the 2002 Annual Update for the HRR (DOE 2002) to summarize surface and subsurface soil sample results from boreholes located within each "Ghost Ash Pit." These data were assembled from pre-existing historical sampling results.

Results from the analysis of 18 surface soil and sediment samples at IHSSs 133.1, 133.2, and 133.4, and PAC SW-1702 indicated, with the exception of arsenic and beryllium, the metals were not at concentrations exceeding the 1996 Tier II soil ALs (DOE et al. 1996). Beryllium and arsenic were found in subsurface soil at concentrations greater than RFCA Tier II soil ALs but below background values at IHSS 133.3 at maximum concentrations of 23 mg/kg and 21 mg/kg respectively. Arsenic (21 mg/kg), uranium-234 (350 pCi/g), and uranium-235 (68 pCi/g) were found at maximum concentrations or activities greater than RFCA Tier II subsurface soil ALs and uranium-238 (1,130 pCi/g) was found at maximum activities greater than RFCA Tier I subsurface soil ALs at PAC SW-1701. Of the arsenic and beryllium results, the one sample that had a concentration (arsenic) exceeding background, was below the WRW soil AL (DOE et al. 2003). No radionuclide exceedances were found. Consequently, no excavation of surface soil was required.

The 2003 Annual Update for the HRR (DOE 2003) presented a reassessment of the remaining Ash Pit sites not yet determined as NFA (IHSSs 133.1, 133.2, and 133.4, and PAC SW-1702) using existing data (that is, no additional data were included in the reassessment relative to that included in the 2001 Annual Update for the HRR). The reassessment used revised soil ALs and the SSRS (DOE et al. 2003). Applicable data tables and figures from the 2001 Annual Update for the HRR were reiterated and additional figures and tables comparing sampling results to RFCA WRW soil ALs were incorporated.

Subsurface soil concentrations of uranium isotopes and a few metals (chromium and lead) were found to exceed RFCA WRW soil ALs at IHSSs 133.1, 133.2, and 133.4, and PAC SW-1702. The SSRS showed that there was no significant potential for these soils to become exposed at the surface or to contaminate nearby ground or surface water.

No Further Action Recommendation

The Ash Pit sites were addressed through the consultative process in an NFA Working Group meeting on December 5, 2001. Based on the data and NFA justification provided for the Ash Pit sites in the 2001 Annual Update for the HRR (DOE 2001), agreement was reached that an NFA was justified for IHSS 133.3 and PAC SW-1701. NFAs were verbally agreed to in the December 5, 2001 meeting, and formally approved by EPA and CDPHE (the LRA) for IHSS 133.3 and PAC SW-1701 in a letter dated February 14, 2002 (CDPHE and EPA 2002).

In the course of the December 5, 2001 meeting with regulatory agencies, it was agreed that the "Ghost" sites could be eliminated as PACs and removed from existing maps contingent on the requirement that analytical data specific to the Ghost sites be presented in the 2002 Annual Update for the HRR (DOE 2002). This requirement was met by assembling Tables 2.5 and 2.6 in the 2002 Annual Update. The tables showed that all of the data from locations within the Ghost sites were below RFCA Tier II soil ALs (DOE et al. 1996) with the exception of one beryllium detection and one arsenic detection, which were slightly above background (that is, Tier II soil ALs applicable at the time of writing were below background).

The consensus in the December 5, 2001 meeting regarding the remaining Ash Pit sites (IHSSs 133.1, 133.2, and 133.4, and PAC SW-1702) was that their status would be put on hold pending anticipated revisions to the subsurface soil ALs. These remaining Ash Pit sites were reassessed in the 2003 Annual Update for the HRR (DOE 2003). The reassessment used the RFCA WRW soil ALs (DOE et al. 2003) and incorporated an SSRS.

NFAA status for IHSSs 133.1, 133.2, and 133.4, and PAC SW-1702 was proposed in the 2003 Annual Update for the HRR based upon the following:

- The SSRS indicated erosion of subsurface soil from the ash pits was unlikely.
- The Ash Pits area is in a stable configuration with regard to slope stability and erosion.
- There is little potential for contaminated runoff to impact surface water quality, because the wastes are buried and covered and are located outside of the 100-year floodplain of the nearest drainage (Woman Creek).
- Possible groundwater impacts from the Ash Pits are limited to low-level uranium contamination; however, the levels do not exceed surface water ALs in Woman Creek and therefore are unlikely to impact surface water quality.

In accordance with stewardship recommendations at the Ash Pits, a marker was placed near the southwestern corner of the westernmost Ash Pit to monitor bank erosion, if any. DOE conducted an assessment of the groundwater monitoring network in the vicinity of the Ash Pits. In consultation with the regulatory agencies, it was determined that two additional wells were needed to complete the monitoring network. These wells were installed in 2003 (DOE 2005). The Summary Report indicates that there are no significant impacts to groundwater and surface water from the Ash Pits. The IMP Water Working Group decided that there was no need for further monitoring of this area (RCR dated September 26, 2005).

DOE received approval of NFAA status for IHSS 133.3 and PAC SW-1701 from EPA (LRA) and CDPHE in a letter dated February 14, 2002. DOE received approval of NFAA status for IHSSs 133.1, 133.2, and 133.4 and PAC SW-1702 from EPA in a letter dated June 12, 2003 (EPA 2003).

Comments

Sites 32 and 33 referenced in the BZ Contamination Report Area are part of these IHSSs.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, Re: Approval of NFA Designation for IHSSs & PACs, February 14.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 5, Woman Creek Drainage, Rocky Flats Plant, Golden, Colorado, February.

DOE, 1996, Final Phase I RFI/RI Report, Woman Creek Drainage, Operable Unit 5, Vol. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Ash Pits Groundwater Contamination Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to R.J. DiSalvo, DOE RFFO, from T. Rehder, EPA Region VIII, Re: No Further Action (NFAA) Justification for Ash Pits PAC Reference Number(s) SW-133.1, SW-133.2, SW-133.4 and 1702 (dated June 11, 2003), NFAA Justification for Trench T-7 PAC Reference Number: NE 11.4 9 dated May 21, 2003, NFAA Justification Trenches T-3 and T-4 PAC Reference Number: 111.1 (dated May 21, 2003), June 12.

EPA and CDPHE, 2002, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, Re: Approval of NFA Designation for IHSSs & PACs, February 14.

PAC REFERENCE NUMBER: SW-133.5

IHSS Number:	133.5
Current Operable Unit:	BZ
Former Operable Unit:	5
IHSS Group:	SW-1
Unit Name:	Incinerator Facility

This Final Update to the HRR for PAC SW-133.5 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 133.5 is summarized in this update. The following HRR volumes contain IHSS 133.5 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2004 Annual (DOE 2004).

Dates(s) of Operation or Occurrence

1952 to 1968

Historical Summary

An Incinerator (Facility 219 or Building 219) was located south of the West Access Road near the original Rocky Flats western boundary. Based upon the OU 5 RFI/RI Report (DOE 1996), the location of IHSS 133.5, as originally reported in the HRR is inaccurate. The revised location of IHSS 133.5 is shown on Figure 12.

The Incinerator was located on the side of a hill that slopes southward towards Woman Creek. The Incinerator was approximately 24 ft high and constructed of rebar reinforced concrete walls, a concrete slab and concrete wing walls. The slab was approximately 12 ft by 16 ft. Design and as-built drawings of the Incinerator indicate it was a significant structure with an emission stack approximately 32 ft high (DOE 1992a).

The Incinerator was in operation from 1952 through August 1968, and was used to burn office wastes or general Site waste. However, an unknown quantity of depleted uranium-contaminated material was burned in the Incinerator and estimated to contain at least 100 g of depleted uranium. Incineration reduced waste volume but resulted in concentrating low levels of radionuclides and metals. Material considered hazardous substances were released with the stack emissions (DOE 1992a).

Records indicated the area around the Incinerator may have been backfilled with ash; however, it was determined that the fill was soil. Low-angle oblique photographs of the Incinerator indicated fill material almost to the height of the Incinerator roof. Ash was also placed in the Ash Pits (PACs SW-133.1-133.4, SW-1701, and SW-1702). An “ash dump” south of the Plant was monitored in May 1959 and found to contain up to 4,000 cpm alpha activity and 20 mrem/hr beta activity (DOE 1992a).

Until 1959, ash and noncombustible material from the Incinerator were placed around the Incinerator and to the south near the concrete wash pad area (PAC SW-133.6). After 1959, the ash was placed in Ash Pits to the south, southeast, and east of the Incinerator (see PACs SW-133.1-133.4, SW-1701, and SW-1702). Residual ash was sampled and found to contain measurable amounts of uranium contamination. A monthly ash sampling program was initiated in January 1962 and data were available in the monthly History Reports by the Waste Disposal Coordination Group (DOE 1992a).

Air emission samples were collected during burning operations in September 1956. Smear surveys of the Incinerator before and after burning of contaminated waste showed no increase in contamination. Air sampling of the Incinerator continued in 1958 during combustion of radioactively-contaminated trash from Buildings 444 and 447; however, no sample results could be located (DOE 1992a).

In 1960, it was necessary to reline the firebox and stack with a plastic refractory. Between 1960 and 1968, the Incinerator continued to deteriorate until it was necessary to cease its use and dispose of trash in some other manner. The Present Landfill (PAC NW-114) was constructed as a substitute for the Incinerator, and waste disposal to the Present Landfill began on August 14, 1968 (DOE 1992a).

A review of aerial photographs indicated the Incinerator was present August 7, 1969, and was partially dismantled by August 6, 1971. No documentation was found that described the dismantling of the Incinerator, however, it was presumed removed. During concrete debris removal from PAC SW-133.6 in April 2003, the buried Incinerator was discovered (DOE 2003a).

IHSS Investigations

IHSS 133.5 was investigated twice. Once as part of the OU 5 RFI/RI (DOE 1996) and again as part of the RFCA accelerated action process (DOE et al. 1996). Based on process knowledge, radionuclides, metals, VOCs, SVOCs, and dioxins/furans were considered PCOCs at this IHSS.

OU 5 RFI/RI Activities

Information presented in the Final Phase I RFI/RI Report OU 5 (DOE 1992b, 1996) indicated there was no risk to human health or the environment from OU 5, including the Incinerator. OU 5 data were reviewed and presented in the 2001 HRR Annual Update (DOE 2001) and are briefly summarized in the following sections.

Soil

Four boreholes (55193, 55293, 55393, and 55493) were placed within, or adjacent to, IHSS 133.5 (Figure 2.2, 2001 HRR Annual Update [DOE 2001]). All analyte concentrations in surface and subsurface soil were less than RFCA Tier I ALs (DOE et al. 2000). Barium, copper, manganese, and uranium-238 concentrations in soil were greater than background values, but significantly less than RFCA Tier II ALs. These data are presented in Table 2.14 of the 2001 HRR Annual Update (DOE 2001) and the OU 5 RFI/RI Report (DOE 1996).

Groundwater

Downgradient wells from IHSS 133.5 include wells 55194, 59093, 55394, and 62593. These wells were used to monitor the Incinerator and Ash Pit area. Groundwater analytical results in comparison to RFCA Tier I and Tier II ALs are presented in Table 2.9 of the 2001 HRR Annual Update (DOE 2001).

Based on analytical data, there are a number of VOCs that appear sporadically in the groundwater data. Specifically, toluene, benzene, 1,1-dichloroethene, and tetrachloroethene have been detected at various times in the same well, 59093. For each sampling event, these compounds were detected only once and never detected again. It is unlikely that these compounds are actually present at these locations and probably represent anomalous data. Additional information is presented in the Annual Groundwater Monitoring Reports.

Uranium-233/234 and uranium-238 were detected at levels slightly above RFCA Tier II ALs. These isotopes have been found at elevated levels in nearby Ash Pits, but were not identified at levels above background from the IHSS 133.5 subsurface soil samples. Based on the data, it is unlikely that IHSS 133.5 is the source for these radionuclides.

Surface Water

Nearby surface water locations have had contaminant concentrations above RFCA standards and ALs for aluminum, antimony, cadmium, copper, iron, lead, manganese, mercury, silver, americium-241, gross alpha, gross beta, and plutonium-239/240. These data are presented in Table 2.12 of the 2001 HRR Annual Update (DOE 2001). Many of these may be from natural sources (aluminum, antimony, iron, manganese, and silver) or from the Ash Pits. These metals were not identified at concentrations greater than RFCA Tier II ALs (DOE et al. 2000) in any of the boreholes installed within or adjacent to IHSS 133.5. Further downgradient, at SW027 (surface water Point of Evaluation [POE]) and at Pond C-2, the IHSS 133.5 PCOCs have never been detected above RFCA surface water standards.

Airborne Pathways

Airborne pathways were evaluated during the OU 5 RFI/RI for IHSSs SW-133.1 through SW-133.6, as part of an investigation for wind resuspension and erosion potential of contaminated soil. Airborne pathways were also evaluated as part of the risk assessment. No substantial risk was found, because there are minimal levels of contaminants in the soil (DOE 1996).

Radiological Surveys

In addition to OU 5 RFI/RI sampling, an HPGe survey was conducted of the entire area. The results of this survey are presented in Figures 2.3, 2.4, and 2.5 of the 2001 HRR Annual Update (DOE 2001). Americium-241 was not detected during the survey. Uranium concentrations were consistent with the uranium detected in the groundwater. Although one measurement for uranium-238 produced an average soil concentration of 18.8 pCi/g, this activity is well below the RFCA Tier II AL of 103 pCi/g (DOE et al. 2000).

Accelerated Action Activities

The buried Incinerator was found during concrete debris removal activities in 2003 although previous documentation indicated the Incinerator had likely been removed. ER RSOP Notification #03-09 (DOE 2003a) was developed for the removal of the Incinerator and RFCA (DOE et al. 1996) accelerated action activities took place from April 2003 to November 2003. The IHSS SW-133.5 Incinerator soot-covered concrete rubble, concrete slabs, potential asbestos-containing material (ACM), two drum carcasses, and ash-like material and laboratory debris mixed with clean fill were removed and disposed (DOE 2003b). Fill in the Incinerator was soil, which was removed and later returned to the excavation. After the Incinerator was removed, the area was backfilled with approximately 20 ft of soil and regraded.

Confirmation samples were collected in accordance with ER RSOP Notification #03-09 (DOE 2003a) from 30 surface soil locations and five subsurface soil locations. Analytical results indicated all COCs were less than RFCA WRW soil ALs (DOE et al. 2003). One confirmation sample at the bottom of the excavation was analyzed for dioxins and furans. While some congeners were detected, the sampling location is beneath approximately 20 ft of soil. Accelerated action activities and results of confirmation sampling are presented in the Final Closeout Report for IHSS Group SW-1 (DOE 2003b).

Maximum analytical result values for selected residual analytes include: antimony - 7.19 mg/kg, arsenic - 18.20 mg/kg, beryllium - 4.40 mg/kg, cadmium - 30.00 mg/kg, chromium - 61.00 mg/kg, lead - 220.00 mg/kg, mercury - 0.28 mg/kg, nickel - 52.40 mg/kg, uranium (total) - 85.00 mg/kg, vanadium - 146.00 mg/kg, uranium-234 - 11.16 pCi/g, uranium-235 - 0.40 pCi/g, and uranium-238 - 11.16 pCi/g.

No Further Action Recommendation

RFI/RI data were summarized in the OU 5 RFI/RI (DOE 1996) and IHSS 133.5 was recommended for an NFA based on the HHRA. Review of the OU 5 RFI/RI data indicated all COC concentrations in soil were less than RFCA ALs (DOE et al. 2000). Groundwater data, collected during the summer 2001 field season, indicated uranium-233/234 and uranium-238 were detected at activities slightly greater than RFCA Tier II groundwater ALs. There is no indication surface water contamination exists from IHSS 133.5.

Accelerated action data indicated all residual COC concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). Results of the SSRS indicate additional action was not necessary. Results of the stewardship evaluation indicate additional action was not necessary.

In accordance with RFCA, an NFAA was justified for IHSS 133.5 based on the following:

- Results of the OU 5 RFI/RI indicated contaminant concentrations in soil were less than RFCA Tier I soil ALs.
- Results of groundwater sampling indicated several VOCs were found only during one sampling episode.
- Results of groundwater sampling indicated uranium-233/234 and -238 were found sporadically in groundwater wells at concentrations greater than RFCA Tier II groundwater ALs.

- Results of surface water sampling indicate some metal concentrations and radionuclide activities were greater than RFCA standards and ALs. However, these constituents were not identified above Tier II ALs in any of the boreholes installed within the Ash Pit and Incinerator area.
- The Incinerator, soot-covered concrete rubble, concrete slabs, potential ACM, two drum carcasses, and ash-like material and laboratory debris mixed with clean fill were removed and disposed (DOE 2003b).
- Results of confirmation sampling indicated contaminant concentrations were less than WRW ALs.
- Results of the SSRS did not indicate additional action was necessary.
- Results of the Stewardship Evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group SW-1 by the regulatory agencies, DOE received approval from EPA (the LRA) of the NFAA status for IHSS 133.5 on December 18, 2003 (EPA 2003).

Comments

None

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 5, Woman Creek Drainage, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996, Final RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report, Woman Creek Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-09, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group SW-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2000, Final Rocky Flats Cleanup Agreement Attachment 5, Rocky Flats Environmental Technology Site Action Levels and Standards Framework For Surface Water, Ground Water, and Soils, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003, Correspondence to J. Legare, DOE RFFO, from M. Aguilar, EPA, RE: Closeout Report for IHSS Group SW-1, December 18.

PAC REFERENCE NUMBER: SW-133.6

IHSS Number:	133.6
Current Operable Unit:	5
Former Operable Unit:	5
IHSS Group:	SW-1
Unit Name:	Concrete Wash Pad

This Final Update to the HRR for PAC SW-133.6 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 133.6 is summarized in this update. The following HRR volumes contain IHSS 133.6 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2004 Annual (DOE 2004).

Dates(s) of Operation or Occurrence

1953 to March 1979

Historical Summary

The location of IHSS 133.6 is shown on Figure 12. Excess concrete from construction activities at Rocky Flats was routinely washed from concrete trucks southwest of the Plant. In March 1979, Plant Services was requested to clean up debris from past cement truck washouts, and all future cement truck washouts were to be conducted at the Present Landfill (PAC NW-114). Reference was made to ash being disposed southwest of the Incinerator, which may have been close to this area (DOE 1992). Ground disturbance in the area is apparent in aerial photographs taken beginning in 1953, and in later Plant photographs (DOE 1992).

The Concrete Wash Pad was a waste concrete disposal site. However, concrete is not a hazardous waste. Potentially contaminated ash generated from the Incinerator may have been deposited southwest of the Incinerator in the area of the Concrete Wash Pad.

IHSS Investigations

During removal of concrete as a best management practice (BMP) at this location, the adjacent buried former Incinerator (PAC SW-133.5) was discovered in April 2003. Notification of the planned accelerated action for the Incinerator was provided in ER RSOP Notification #03-09 (DOE 2003a), which was approved by EPA on September 4, 2003 (EPA 2003a). While the Notification was specific to the Incinerator, the Closeout Report included the removal of the clean concrete from the Concrete Wash Pad. This removal action was not considered an accelerated action because the concrete was not contaminated. The concrete, up to 5 ft thick in some places, was broken up using a hydraulic hammer and recycled in accordance with the RSOP for Recycling Concrete (DOE 2003b). The concrete pieces were turned over and surveyed to determine whether radionuclide contamination was present. Approximately 3,000 cy of

concrete debris were taken from the adjacent area and sent to the Building 850 recycle pile (DOE 2003c).

One surface and two subsurface soil characterization samples were obtained at IHSS 133.6. Analyses included radionuclides and metals. Because all contaminant concentrations in soil were less than RFCA WRW soil ALs (DOE et al. 2003), no soil was removed, and confirmation sampling was not conducted. Results of the accelerated action activities at IHSS 133.6 are reported in the Final Closeout Report for IHSS Group SW-1 (which includes IHSS 133.6) (DOE 2003c).

No Further Action Recommendation

Based on the actions taken and the results of the SSRS, an NFAA status for IHSS 133.6 was recommended in the Final Closeout Report for IHSS Group SW-1 (DOE 2003c). After review of the Closeout Report by the regulatory agencies, DOE received approval from EPA (the LRA) of the NFAA status for IHSS 133.6 on December 18, 2003 (EPA 2003b).

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-09, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2003b, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2003c, Final Closeout Report for IHSS Group SW-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003a, ER RSOP Notification #03-09 Approval Letter, Rocky Flats Environmental Technology Site, Golden, Colorado, September 4.

EPA, 2003b, Correspondence to J. Legare, DOE RFFO, from M. Aguilar, EPA, RE: Closeout Report for IHSS Group SW-1, December 18.

PAC REFERENCE NUMBER: SW-196

IHSS Number: 196

Current Operable Unit: IA

Former Operable Unit: 5

IHSS Group: SW-2

Unit Name: Water Treatment Plant Backwash Pond

The Final Update to the HRR for PAC SW-196 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 196 is summarized in this update. The following HRR volume contains IHSS 196 information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

March 1955 to October 1964

Historical Summary

From the early 1950s until the 1970s, filter backwash wastewater generated by the raw water treatment process in Building 124 to make potable water was discharged to a settling and evaporation pond located roughly in the center of PAC SW-115 (the Original Landfill), and designated the Water Treatment Plant Backwash Pond, IHSS 196 (DOE 2005a).

The water treatment plant backwash pond, also known as Pond 6, was located south of the water treatment plant (Building 124) as shown in Figure 12. It was constructed between January and March 1955. A July 1955 aerial photograph shows a pond on the northern slope of the Woman Creek drainage approximately 800 ft south of Building 124. The water treatment plant backwash discharge pipeline is also apparent on this aerial photograph which suggests that this area was the pond for receiving the water treatment plant backwash (DOE 1992a).

An original HRR reference stated that Pond 6 was used as an "evaporation/settling pond." The pond was described as an unlined pond on the southern side of the water treatment plant building (Building 124). Aerial photographs suggest that it was no longer active in October 1964. However, a 1974 reference suggests that Woman Creek continued to receive filter backwash discharges from the water treatment plant (DOE 1992a).

No documentation was found that specifically identified Pond 6 as the location of a release. However, Pond 6 was built in the vicinity of the water treatment plant backwash discharge pipeline. An indirect reference states that the pond was used for back flushing sand filters. The backwash water would have contained flocculants (aluminum sulfate or lime), residual chlorine, and suspended solids. The effluent from the water treatment plant in 1953 was discontinuous and was made up of filter backwash, filter prewash, sludge blowdown, and other waste water from the treatment of raw water. It contained all of the silt, mud, and filterable solids removed from the raw water. The characteristics of raw water were seasonally variable and therefore, the characteristics of the backwash effluent were also variable. No documentation was found that detailed the fate of any released constituents (DOE 1992a).

It is possible that the Pond 6 location was used prior to pond construction as the "plant burning pit" for dumping, burning, and discharging of miscellaneous waste (DOE 1992a). A soil cover was placed over the disposed waste of the Original Landfill when it was closed in 1968 (DOE 2005a).

IHSS Investigations

IHSSs 115 and 196 were formerly part of OU 5, the Woman Creek Priority Drainage, which was consolidated into the IA OU when RFCA became effective in July 1996 (DOE et al. 1996). Prior to this consolidation, a Phase 1 RFI/RI for OU 5 was conducted in accordance with the RFI/RI Work Plan (DOE 1992b, 1994). Because IHSS 196 was located within the boundaries of IHSS 115, these two IHSSs were addressed together in the OU 5 Phase I RFI/RI (DOE 1996). For purposes of the investigation work, the OU 5 IHSSs (and PACs) were separated into specific AOCs. IHSSs 115 and 196 were designated as AOC 1 (DOE 2005a).

At least five surface soil samples were collected in the IHSS 196 area. Results indicated uranium-233/234, uranium-235, uranium-238, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected at concentrations greater than the RFCA (DOE et al. 2003) WRW soil ALs (DOE 2005a). Results for subsurface soil indicated benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected at concentrations greater than the RFCA WRW soil ALs.

Because IHSS 196 is included in the Original Landfill, the RFCA accelerated action at the Original Landfill encompassed IHSS 196 (DOE 2005a). The RAOs called for surface soil hot spot removals, area grading, buttress fill (a soil cover), engineering controls, and site monitoring (DOE 2005a). Hot spot removal was not conducted at IHSS 196. ER accelerated action activities at the Original Landfill were conducted between February 2005 and August 2005 (DOE 2005b).

Closure of IHSS Group SW-2, including IHSS 196, was conducted in accordance with the Final IM/IRA for the Original Landfill (including IHSS Group SW-2; IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond) (DOE 2005a) and with the Final Design Report and Design Calculation Documentation for the Accelerated Action for the Original Landfill at the Rocky Flats Environmental Technology Site (DOE 2005a) approved by CDPHE on May 13, 2005 (CDPHE 2005).

The RFCA activities were documented in the Construction Completion and Certification Report, Accelerated Action for the Original Landfill, Rocky Flats Environmental Technology Site (DOE 2005c) (Attachment A of the Closeout Report for IHSS Group SW-2 [DOE 2005b]). The Construction Completion and Certification Report was approved by CDPHE (the LRA) and EPA on November 22, 2005 (CDPHE and EPA 2005), which also constituted agreement on the NFAA status of IHSS 196.

Post-accelerated action monitoring and long-term surveillance and maintenance considerations were addressed in a minor modification to Appendix B of the Final IM/IRA for the Original Landfill (DOE 2006a) and incorporated into the Monitoring and Maintenance Plan for the Original Landfill (DOE 2006b). The Monitoring and Maintenance Plan was approved by the regulatory agencies on February 28, 2006 (CDPHE and EPA 2006a) and the modifications to the IM/IRA were approved on March 6, 2006 (CDPHE and EPA 2006b). Three new monitoring wells were installed during the accelerated action (DOE 2005b).

Approval of the Closeout Report (DOE 2005b) was made contingent upon approval of the Monitoring and Maintenance Plan required by the minor modification to the IM/IRA Appendix B. The Closeout Report was approved by CDPHE (the LRA) and EPA for IHSS 196 on May 15, 2006 (CDPHE and EPA 2006c).

No Further Accelerated Action Recommendation

Based on the completion of the Original Landfill accelerated action and review of the subsequent Closeout Report and Construction Completion and Certification Report (DOE 2005c), CDPHE and EPA approved the Construction Completion and Certification Report for the Original Landfill on November 22, 2005 (CDPHE and EPA 2005). The Closeout Report (DOE 2005c) was approved by CDPHE (the LRA) and EPA for IHSS 196 on May 15, 2006 (CDPHE and EPA 2006c).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE, RFFO from S. Gunderson, CDPHE, RE: Original Landfill Design, May 13.

CDPHE and EPA, 2005, Correspondence to J. Rampe, DOE, RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Approval of Construction Certification Report for the Original Landfill (November 2005), November 22.

CDPHE and EPA, 2006a, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Landfill Monitoring and Maintenance Plan – Original Landfill, February 28.

CDPHE and EPA, 2006b, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Final Interim Measure/Interim Remedial Action for the Original Landfill (March 10, 2005), March 6.

CDPHE and EPA, 2006c, Correspondence to R. Schassburger, DOE RFPO, from C. Spreng, CDPHE and M. Aguilar, EPA, RE: Closeout Report for IHSS Group SW-2 Original Landfill (IHSSs 115 and 196) (November 2005), May 15.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 5 Woman Creek Priority Drainage, Volume I, Rocky Flats Plant, Golden, Colorado, February.

DOE, 1994, Draft Final Technical Memorandum No. 15, Addendum to Final Phase I RFI/RI Work Plan, Amended Filed Sampling Plan, Volume 2, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Volume 1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2005a, Final Interim Measure/Interim Remedial Action for the Original Landfill (Including IHSSs Group SW-2; IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005b, Final Closeout Report for IHSS Group SW-2 Original Landfill (IHSS-115 & 196) Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005c, Construction Completion and Certification Report for the Original Landfill at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2006a, Minor Modification to the Final Interim Measure/Interim Remedial Action for the Original Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2006b, Final Landfill Monitoring and Maintenance Plan, Rocky Flats Environmental Technology Site, Original Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: SW-1700

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Fuel Spill into Woman Creek Drainage

The Final Update to the HRR for PAC SW-1700 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC SW-1700 is summarized in this update. The following HRR volumes contain PAC SW-1700 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 19, 1975

Historical Summary

The location of PAC SW-1700 is shown on Figure 12. An armored vehicle overturned into the Woman Creek Drainage in the vicinity of the concrete wash pad (PAC SW-133.6). The event occurred while the vehicle stalled on the steep hill south of the drainage. It rolled back into the drainage and overturned, spilling fuel into the drainage. The volume of spilled fuel and whether it was diesel or gasoline is unknown. During the following week, a visible oil slick was observed on Woman Creek (DOE 1992).

The incident occurred on a Sunday and management personnel were immediately informed of the event. The vehicle was righted and removed from the area. No documentation was found detailing clean-up activities or the fate of the released constituents (DOE 1992).

IHSS Investigations

No further investigation was required (CDPHE and EPA 2002).

No Further Accelerated Action Recommendation

PAC SW-1700 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that PAC SW-1700 met the criteria for NFA as defined in RFCA Attachment 6 (DOE et al. 1996). An NFA was verbally agreed to in the November 14, 2001 meeting, and was formally approved in a letter dated February 14, 2002 (CDPHE and EPA [the LRA] 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO; from S. Gunderson, CDPHE; T. Rehder, EPA Region VIII; RE: Approval of NFA Designation for IHSSs & PACs, February 14, 2002.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July

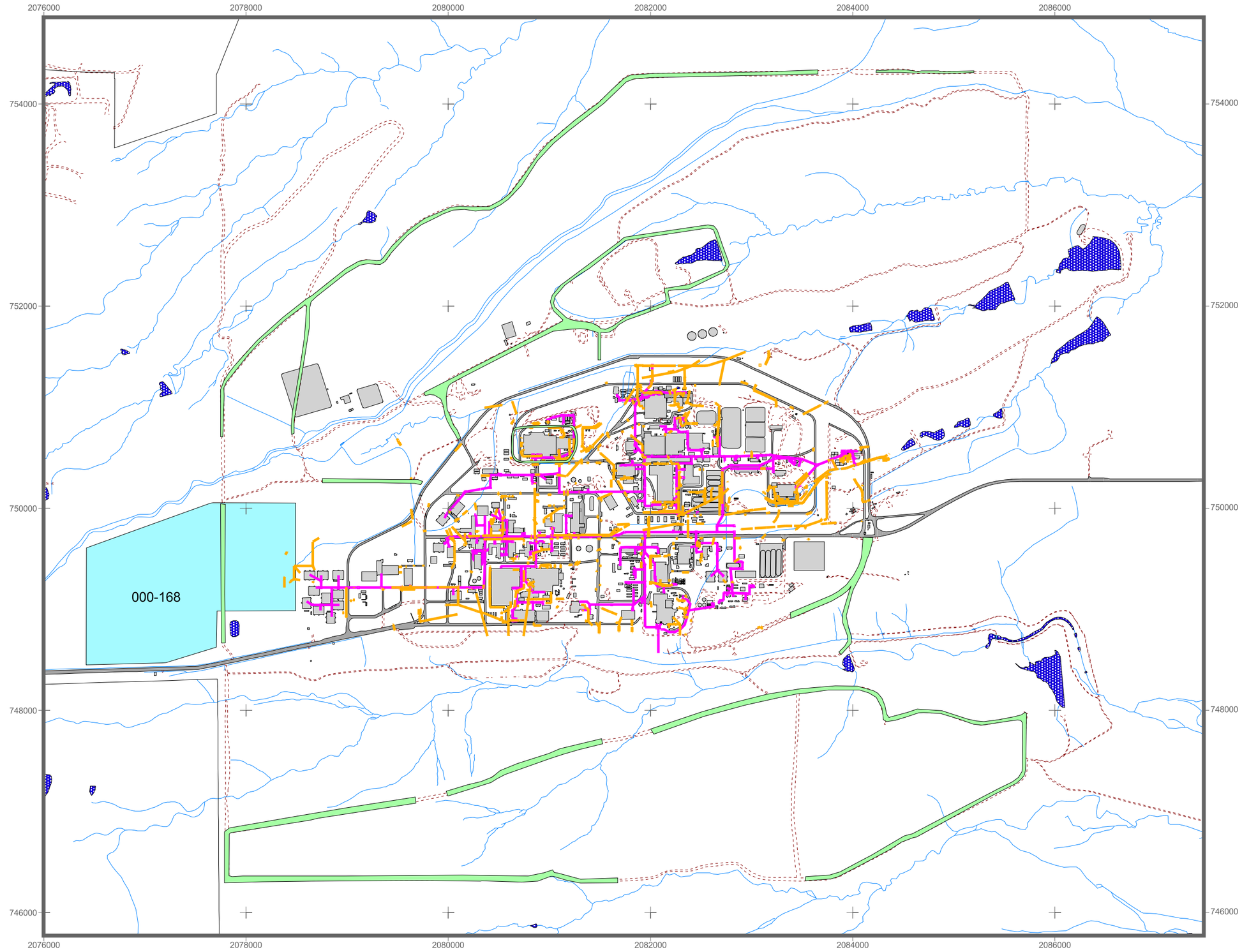

Figure 13
HRR 000 Area
Storm Drains and Sanitary Sewers

KEY

- Storm Drains (000-505)
- Sanitary Sewer (000-500)
- Stream
- Dirt road
- PAC 000-501
- IHSS
- Lake
- Asphalt
- Building
- Site Boundary

N
W E
S

1000 0 1000 Feet

Scale = 1: 18850

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\hrr_000.apr

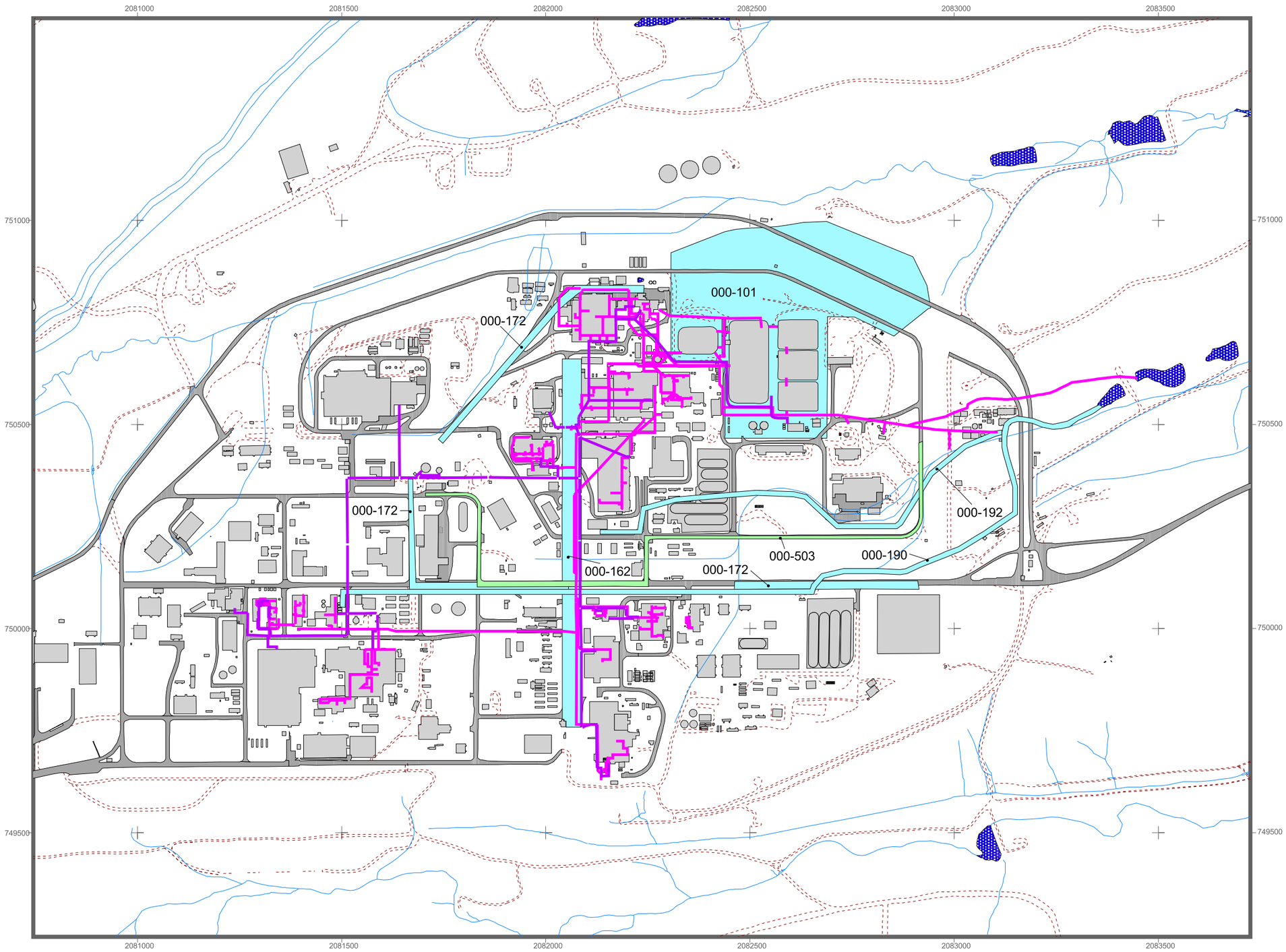

Figure 14
HRR 000 Area
OPWL, NPWL, IHSSs, and PACS

KEY

- Stream
- Dirt Road
- OPWL (000-121)
- NPWL (000-504)
- PAC
- IHSS
- Lake
- Asphalt
- Building

N
W E
S

500 0 500 Feet

Scale = 1: 6200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\hrr_000.apr

PAC REFERENCE NUMBER: 000-101

IHSS Number: 101

Current Operable Unit: IA

Former Operable Unit: 4

IHSS Group: 000-1

Unit Name: Solar Evaporation Ponds

This Final Update to the HRR for PAC 000-101 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 101 is summarized in this update. The following HRR volumes contain IHSS 101 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1953 to 2002

Historical Summary

The Solar Evaporation Ponds (SEP) (IHSS 101) were used primarily for the disposal of low-level radioactive wastes contaminated with high concentrations of nitrate (DOE 2003a). The location of IHSS 101 is shown on Figure 14. The SEP were also used for the disposal of other difficult-to-treat wastes, including cyanide wastes, acid wastes, radiography solutions, sanitary landfill leachate, and sewer sludge. The first pond (Pond 2) was constructed in 1953, and an auxiliary pond was built in 1955 adjacent to the southeastern corner of Pond 2. SEP Pond 207A, the first lined pond, was constructed after nitrate contamination was detected offsite. The lining of this pond consisted of asphalt impregnated wood approximately 1/2-inch thick. SEP Pond 207A was constructed immediately to the east of the two earthen ponds.

Following construction of SEP Pond 207A, the original and auxiliary ponds were upgraded. The original clay-lined pond had additional clay added to the eastern edge, and the auxiliary pond was fully lined with clay. These ponds were then used routinely until June 1960. A third earthen cell, known as either Pond 2C or 2D, was constructed in April 1959. The three earthen cells were used in series, and the effluent from these three ponds was discharged to the sanitary wastewater treatment plant.

Construction of SEP Pond 207B began in November 1959. The ponds were located immediately east of SEP Pond 207A and consisted of three separate cells (North, Center, and South) lined with asphalt planks. However, leaks were almost immediately identified. The cells were taken out of service and repaired one at a time. Repairs were completed in May 1964.

In 1970, Pond 2 and the earthen pond immediately east of it (Pond 2C or 2D) were removed, and SEP Pond 207C was constructed to allow the transfer of water from other SEP so that they could be repaired. The design of SEP Pond 207C included a leak detection pipe placed immediately

beneath the pond running from south to north where it could drain into a leak detection sump. SEP 207C remained in constant service until it was removed in late 2002.

Two sumps, six trenches, and French drains were constructed in the area north of the SEP to allow the collection and return of SEP contaminated groundwater to the SEP. These actions were taken to keep water in the A-Series Drainage below the State's then promulgated limit for nitrates in drinking water (10 mg/L). This system was expanded in the early 1980s because of concerns over the existence of groundwater seeps immediately north of the SEP and was referred to as the ITS. The ITS included a new French drain that paralleled the old Patrol Road. This new French drain was built with gravel backfill from the drain to the surface so that it would collect both groundwater and surface water flow. This extension also provided for the collection of footing drain flows from Buildings 771 and 774 through a 4-inch-diameter poly vinyl chloride (PVC) pipe. This system collected groundwater and surface water runoff (from the area immediately north of the SEP and south of the Perimeter Security Zone (PSZ) perimeter patrol road), which drained by gravity to a pump station located near North Walnut Creek and was pumped to SEP 207B-North. Water from this pond was transferred to other SEP or to the Building 374 evaporator. Some of the water from SEP Pond 207B-North was spray irrigated in the West Spray Field (PAC 000-168).

During November 1960, six groundwater monitoring wells were installed near SEP Pond 207B. The first chemical analysis of water collected from these wells in January 1961 indicated that nitrate contamination was present in the groundwater in concentrations up to 800 mg/L (DOE 2003a).

During removal of Pond 2 Auxiliary (in preparation for the construction of Building 779), surveys of the area soil indicated readings between 2,500 to 5,000 cpm. Clay samples of the pond had 75,000 dpm/kg, which were described as 2.5 times soil background in the area (DOE 2003a). Historically, radiological activities in surface soil near the edges of the SEP were observed to be low level (102 disintegrations per minute per 100 square centimeters [dpm/100 cm^2]) (DOE 2003a).

From fall 1976 to fall 1977, SEP Pond 207B was cleaned and decommissioned for storage of process wastewater. All three cells of SEP Pond 207B were cleaned, but only SEP Pond 207B-South was relined. This relining was done with a hypalon liner. During these cleanout and relining activities, soil to the south, east, and between the SEP was also removed. Process waste was not reintroduced to the ponds. After the cleanout activities, these ponds were used for reverse osmosis (RO) plant brine storage and evaporation, treated sanitary sewage effluent, and contaminated groundwater collected by the ITS.

In 1986, a RCRA Part B operating permit application was submitted to CDH. The Plant reported that the SEP was an interim status unit scheduled to be closed. The SEP and surrounding contaminated area was identified as a SWMU which later became IHSS 101.

The cleanout of process waste sludge in the SEP Pond 207A began in 1986. The first step was to construct Building 788 where pond sludge and Portland cement were mixed to create "pondcrete." Building 788 was constructed between SEP Ponds 207A and 207C. Problems with the cleanout occurred at times, including pondcrete not hardening properly, and flooding of some of the valve pits used to transfer SEP water to the Building 374 evaporator. The removal of the process waste and sludge from SEP 207A was completed in 1988. The final volume of water was transferred to the SEP Pond 207B. However, in March 1990, contaminated groundwater

transferred to the SEP Pond 207B from the ITS was placed in SEP Pond 207A in order to prevent overtopping of SEP Pond 207B. All of the water present in SEP Pond 207A was removed during 1991 and evaporated in Building 374.

Between 1993 and 1995, wastewater and the remaining sludge from the SEP Ponds 207A and SEP B-Series Ponds was removed as part of the Accelerated Sludge Removal Project. The purpose of the removal efforts was to remove the source of nitrate and uranium contamination. The work was completed in 1995 and was conducted as a routine operation within a RCRA Interim Status Unit Undergoing Closure. Following removal, the ponds were rinsed (except for SEP Pond 207C which was rinsed in 2002) and the water was pumped to Building 374 for evaporation. The remaining sludge was stored in tanks on the 750 Pad and has since been dewatered, packaged, and shipped to an off-site disposal facility (DOE 2002a).

IHSS Investigations

The SEP was a RCRA interim status unit which was closed in accordance with the SEP PAM, RCRA Closure of the RFETS Solar Evaporation Ponds (DOE 2002a). Closure was conducted under alternate RCRA interim status closure requirements found in 6 CCR 1007-3, 265.110(d), which allows a risk-based analysis and compliance with the closure performance standards in 6 CCR 1007-3, 265.111(a) and (b). Releases from other units in the area of the SEP also contributed to the SEP area of contamination. These units included RCRA Unit 21 (Building 788 Permacon) and Unit 48 (Clarifier). The Buildings 910/374 above ground pipeline, a portion of New Process Waste Line (NPWL) (PAC 000-504), was also included.

The PAM addressed the closure of the SEP RCRA interim status unit and included a risk assessment for COCs, the HHRA of the SEP (an attachment to the PAM). Results of the risk assessment indicated low risk to a WRW, therefore no action was required for either RCRA or radionuclide COCs. As a BMP, the SEP berms were pushed in, clean fill soil was brought in and the area regraded in accordance with the PAM (DOE 2002a).

As a separate action (and prior to the berms being pushed in), ER RSOP Notification #02-08 (DOE 2002b) was developed to conduct accelerated actions and RCRA closure of portions of IHSSs within the SEP AOC, two RCRA Units (21 and 48), portions of non-RCRA NPWL, and remove soil with contaminant concentrations greater than RFCA Tier soil I ALs (DOE et al. 1996). Also removed were six surface soil locations with activities of americium-241 or plutonium-239/240 that resulted in an excess cancer rate to a WRW greater than 1×10^{-5}, or concentrations of nonradionuclides (for example, cadmium) that increased the noncarcinogenic risk to the WRW.

RFCA accelerated actions (DOE et al. 1996), for IHSSs within the SEP AOC, were conducted between August 6 and November 20, 2002 in accordance with IASAP Addendum #IA-02-07 (DOE 2002c) and ER RSOP Notification #02-08 (DOE 2002b). Removal activities involved the removal of all concrete slabs, associated foundations, all above-ground process waste lines (NPWL), some belowground process waste lines (including OPWL P-26 within the IHSS), Valve Pit No.1, miscellaneous valve components, all sumps and pumps, and contaminated soil (hot spots) (DOE 2003b). Some belowground waste lines and drain lines remain (for example, OPWL P-36, P-37 and P-38); however, all of these lines were disrupted (plugged). The two valve pits in the SEP Ponds 207B berms were not removed, because they are located more than 6 ft below grade; however, the valve stems and casings were removed. The SEP Ponds 207A,

207B, and 207C drain/leak detection lines were disrupted where they discharged to a sump and were filled with grout or foam. Numerous lysimeters in the area also were removed.

The accelerated actions also included closure of two RCRA Units (21 and 48). RCRA Units 21 and 48 had been partially closed prior to the accelerated action, and removal of the remaining concrete slabs associated with Building 788, the clarifier, and the pump transfer station at Building 308A constituted final closure of the two RCRA units (DOE 2003b). Additionally, the aboveground line section of non-RCRA NPWL from Building 910 to Building 774 was also removed.

In accordance with ER RSOP Notification #02-08 (DOE 2002b) soil was removed from six hot spot locations. Confirmation sampling was conducted in the excavations to confirm that sufficient soil had been removed. All contaminant concentrations and activities were less than RFCA Tier II soil ALs, except for one beryllium concentration, which was slightly greater than the RFCA Tier II soil AL (1.10 mg/kg vs 1.04 mg/kg). None of the results exceeded the WRW soil ALs (DOE 2003b).

Fourteen surface and 25 subsurface soil samples were collected and analyzed for radionuclides and metals. Some of the samples were also analyzed for nitrate. All contaminant concentrations and activities in the sampled areas were less than RFCA Tier II soil ALs (DOE et al. 1996), except for one beryllium concentration and 16 arsenic concentrations (DOE 2003b). The beryllium concentration that exceeded the Tier II soil AL was 1.10 mg/kg, and the AL was 1.04 mg/kg. The arsenic concentrations that exceeded the Tier II soil AL ranged from 13.0 to 36.3 mg/kg, and the AL was 2.99 mg/kg. All exceedances were significantly less than the RFCA Tier I soil ALs. All contaminant concentrations and activities were less than the WRW soil ALs (DOE et al. 2003), except for one subsurface manganese concentration and 8 arsenic concentrations (in surface and subsurface soil). The manganese concentration that exceeded the WRW soil AL was 5,900 mg/kg, and the WRW soil AL is 3,480 mg/kg. The arsenic concentrations that exceeded the WRW soil AL ranged from 22.4 to 36.3 mg/kg, and the WRW soil AL is 22.2 mg/kg.

As part of accelerated actions for IHSSs 165 and 176, six surface soil samples were collected within IHSS 101 east of the SEP in accordance with IASAP Addendum #IA-03-02 (DOE 2002d). Samples were analyzed for metals. All concentrations were less than WRW soil ALs (DOE 2003c).

As part of IHSS Group 700-7 (UBC 779) the southwestern portion of IHSS 101 (area north and east of Building 779, including former SEP Auxiliary Pond 2) was characterized in accordance with IASAP Addendum #IA-03-15 (DOE 2003d). Thirty-two samples were collected and analyzed. Plutonium-239/240 activities exceeded the WRW soil AL (50 pCi/g) at three locations in subsurface intervals within the area of the former Auxiliary Pond 2 (CI46-013, CI46-014 and CI46-029). Activities greater than the WRW soil AL ranged from 52.6 to 670.3 pCi/g. Soil was removed from these locations in accordance with ER RSOP #03-10 (DOE 2003e) and confirmation samples were collected. Confirmation sampling indicated that residual plutonium-239/240 activities in the IHSS 101, Auxiliary Pond 2 area ranged from 80.3 to 527 pCi/g at depths greater than 3 feet. Based on RFCA (DOE et al. 2003) and the SSRS, additional removal was not required (DOE 2004).

No Further Action Recommendation

After completion of accelerated actions, NFAA was recommended for IHSS 101 based on the following:

- Contaminant concentrations and activities were less than RFCA Tier II soil ALs, with the minor exceptions noted above. No Tier I soil ALs were exceeded.
- Results of the stewardship evaluation indicated additional action was not necessary.

After review of the Closeout Report for IHSS Group 000-1 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for the SEP AOC (IHSS 101) on July 25, 2003 (CDPHE 2003a). Also, after review of the Data Summary Report for IHSS Group 000-1 (DOE 2003c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 101 on July 29, 2003 (CDPHE 2003b). After review of the Closeout Report for IHSS Group 700-7 (DOE 2004) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for the southwestern portion of IHSS 101 (containing Auxiliary Pond 2) on October 1, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2003a, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, and T. Rehder, EPA Region 8, RE: Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern, July 25.

CDPHE, 2003b, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, and T. Rehder, EPA Region 8, RE: Data Summary Report for IHSS Group 000-1, July 29.

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7, October 1.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002a, RCRA Closure of the RFETS Solar Evaporation Ponds, Proposed Action Memorandum, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol Notification #02-08, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002c, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-07, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002d, Industrial Area Sampling and Analysis Plan Fiscal Year 2002, Addendum #IA-03-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003c, Data Summary Report for IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003d, Industrial Area Sampling and Analysis Plan Addendum #IA-03-15, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003e, Environmental Restoration RFCA Standard Operating Protocol Notification #03-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 000-121

IHSS Number: 121

Current Operable Unit: IA

Former Operable Unit: 9

IHSS Group: 000-2

Unit Name: Original Process Waste Lines (OPWL)

This Final Update to the HRR for PAC 000-121 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 121 is summarized in this update. The following HRR volumes contain IHSS 121 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996);
Update Report – 1998 Annual (DOE 1998);and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 1975

Historical Summary

The OPWL system was a network of underground pipelines and 62 tanks, in 40 tank locations, used to transport and temporarily store aqueous chemical and radioactive process wastes. The location of IHSS 121 is shown on Figure 14. Placed in service during 1952, with additions and repairs made to the system through 1975, the OPWL transported a variety of wastes, including acids, bases, solvents, radionuclides, metals, oils, PCBs, biohazards, paints, and other chemicals (DOE 2005a). Numerous leaks are known or suspected to have occurred throughout the system, including those listed in RFCA Attachment 14 (DOE et al. 2003). Based on these leaks, the following PACs were identified:

- PAC 000-121 – Original Process Waste Lines (OPWL);
- PAC 000-162 – Radioactive Site 700 Area;
- PAC 100-602 – Building 123 Process Waste Line Break;
- PAC 700-123.2 – Valve Vault West of Building 707;
- PAC 700-127 – Low-Level Radioactive Waste Leak;
- PAC 700-147.1 – Process Waste Line Leaks; and
- PAC 700-149.1 – Effluent Lines.

Portions of the OPWL system and leaks are discussed in other PAC writeups and in closeout reports. Characterization results and accelerated actions for specific portions of the OPWL system are presented the Closeout Report for IHSS Group 000-2 (DOE 2005a) as well as in individual closeout and data summary reports for the following IHSS Groups:

- IHSS Group 000-1 (DOE 2003a) approved by CDPHE (CDPHE and EPA 2003);
- IHSS Group 000-2 (DOE 2005a) approved by CDPHE (CDPHE 2005a);
- IHSS Group 100-1 (DOE 2004b) approved by CDPHE (CDPHE, 2004a)
- IHSS Group 100-4 (DOE 2003b) approved by CDPHE (CDPHE 2003a);
- IHSS Group 400-3 (DOE 2003c) approved by CDPHE (CDPHE 2003b);
- IHSS Group 400-8 (DOE 2004c) approved by CDPHE (CDPHE 2004b);
- IHSS Group 500-3 (DOE 2005b) approved by CDPHE (CDPHE 2005b);
- IHSS Group 700-2 (DOE 2005c) approved by CDPHE (CDPHE 2005c);
- IHSS Group 700-3 (DOE 2005d and 2005e) approved by CDPHE (CDPHE 2005d and 2005e);
- IHSS Group 700-4 (DOE 2004d) approved by CDPHE (CDPHE 2004c)
- IHSS Group 700-7 (DOE 2004e) approved by CDPHE (CDPHE 2004d);
- IHSS Group 800-1 (DOE 2004f) approved by CDPHE (CDPHE 2004e);
- IHSS Group 800-2 (DOE 2003d) approved by CDPHE (CDPHE 2003c)
- IHSS Group 800-3 (DOE 2005f) approved by CDPHE (CDPHE 2005f);
- IHSS Group 800-4 (DOE 2003e) approved by CDPHE (CDPHE 2003d)
- IHSS Group 800-5 (DOE 2004g) approved by CDPHE (CDPHE 2004f);
- IHSS Group 800-6 (DOE 2003f) approved by CDPHE (CDPHE 2003e); and
- IHSS Group NE-1 (B-Ponds (DOE 2005g, approved by EPA (EPA, 2005).

IHSS Investigations

The OPWL system was characterized extensively as part of the RFCA (DOE et al. 1996) accelerated actions conducted at IHSS Group 000-2 and other IHSS Groups listed above. Thirty-four sampling locations were characterized under IHSS Group 000-2 in accordance with IASAP Addendum #IA-03-11 (DOE 2003g), and 401 other sampling locations were characterized under other IHSS Groups in accordance with IHSS Group-specific IASAP Addenda listed in the Closeout Report for IHSS Group 000-2 (DOE 2005a). Sampling targets included known and suspected leaks along OPWL (DOE et al. 2003), OPWL tanks and valve pits, and major OPWL joints. In addition, to ensure comprehensive sampling coverage, line segments not sampled based on specific targets were sampled at 100-ft intervals. Samples were analyzed for radionuclides, metals, VOCs, SVOCs, nitrate/nitrite, PCBs, pesticides, herbicides, and/or miscellaneous other analytes depending on specific targets and related historical and process knowledge.

Based on characterization results, soil was removed from some areas under and adjacent to the OPWL system, and confirmation samples (74) were collected to ensure that residual activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). As described below, some areas were not remediated based on RFCA and the SSRS (DOE et al. 2003). There are 11

sampling locations containing residual contaminants at activities and concentrations greater than RFCA WRW soil ALs in subsurface soil (DOE 2005a).

- BV38-002 – The benzo(a)pyrene concentration exceeds the WRW soil AL but at a depth below 6 inches from the ground surface (at 10 ft bgs).
- BW38-004, CI46-001, CJ46-DR01 and CF33-010 – The arsenic concentrations exceed the WRW soil AL but at depths below 6 inches from the ground surface (at 4.5, 3.5, 7.5, and 5.0 ft bgs, respectively).
- CG48-008 and CG46-009 – Americium-241 and plutonium-239/240 activities exceed the WRW soil AL but at depths greater than 6 ft below final grade.
- CH47-051, CJ46-000, CJ46-002 and CQ44-003 – Plutonium-239/240 activities exceed the WRW soil AL but at depths greater than 6 ft below final grade (at 10, 11, 11 and 12 ft bgs, respectively).

In addition, at sampling locations CJ48-000 and CJ48-001, arsenic concentrations (at 36.3 and 31.1 mg/kg, respectively) in surface soil exceed the WRW soil AL. Soil removal at these area was not required because the concentrations were less than RFCA Tier I soil ALs (DOE et al. 1996, DOE 2003a).

OPWL System Removal

Sitewide, approximately 17,000 ft of OPWL were excavated, and approximately 14,700 ft of OPWL were grouted and left in place (DOE 2005a). OPWL associated with buildings was dispositioned under other IHSS Group accelerated actions. The remainder were dispositioned as part of the IHSS Group 000-2 project in accordance with ER RSOP Notification #03-14 (DOE 2003h). Approximately 5,300 ft of OPWL were excavated and removed as part of the IHSS Group 000-2 accelerated action. All remaining OPWL are greater than 3 ft below final grade, and all remaining pipeline ends were grouted. All OPWL excavations were backfilled with clean onsite soil, regraded and revegetated.

All of the manways and valve pits (29 total) were completely removed as part of the IHSS Group 000-2 project (DOE 2005a). All OPWL tanks were removed prior to building demolition, during building demolition, or as part of an ER removal action, with the following exceptions. Tanks 36 and 37 were sumps in the Building 771 Annex located 3.5 ft below final grade. After the metal inserts were removed, the tanks were decontaminated, left in place, and backfilled with soil (DOE 2005a). The sumps associated with Tanks 19 and 20 were flow filled when the Building 779 basement was flow filled. OPWL and tanks removed or left in place are shown on Figure 16 of the OPWL Closeout Report (DOE 2005a).

<u>No Further Action Recommendation</u>

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSS 121 based on the following:

- All tanks, valve pits, and manways associated with the OPWL system were removed.
- More than 50 percent of the OPWL (approximately 17,000 ft) was removed.
- Remaining OPWL were tapped, drained, and grouted, reducing potential future releases of contamination.

- Most residual activities and concentrations were less than RFCA WRW soil ALs. Nonradionuclide concentrations greater than WRW soil ALs occur at a depth greater than 6 inches bgs, except for the two arsenic concentrations noted above. Radionuclide activities greater than WRW soil ALs were less than 3 nCi/g and occur at a depth greater than 6 ft bgs.
- The OPWL "hot spots" beneath the Building 771/774 basements are in an area mapped as prone to landslides; however, regrading of the area has buried residual contamination to depths greater than 6 ft bgs. Additionally, regrading, compacting, and revegetating this area further reduced the likelihood of erosion in this area. Other areas of the Site containing OPWL are not prone to significant erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.
- OPWL system components removed and remaining, soil excavation boundaries, and residual contamination are presented on Figure 16 of the Closeout Report for IHSS Group 000-2 (DOE 2005a).

After review of the Closeout Report for IHSS Group 000-2, Original Process Waste Lines (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of NFAA status for IHSS 121 on October 6, 2005 (CDPHE 2005a). In addition, after review of other closeout and data summary reports by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for portions of IHSS 121 within other IHSS Groups as indicated below:

- Tank 40 within IHSS Group 800-6 on March 25, 2003 (DOE 2003f, CDPHE 2003e).
- OPWL within IHSS Group 100-4 on April 22, 2003 (DOE 2003b, CDPHE 2003a).
- Tanks 4, 5, and 6 within IHSS Group 400-3 on December 18, 2003 (DOE 2003c, CDPHE 2003b).
- Tanks 8, 12, 13, 14, 15, 16, 17, 36, and 37 within IHSS Group 700-4 on February 6, 2004 (DOE 2004d, CDPHE 2004c).
- OPWL within IHSS Group 800-1 on March 19, 2004 (DOE 2004f, CDPHE 2004e).
- Tank 40 within IHSS Group 400-8 on March 19, 2004 (DOE 2004c, CDPHE 2004b).

Comments

IHSS 121 includes PIC 50.

References

CDPHE, 2003a, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, Colorado, April 22.

CDPHE, 2003b, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 400-3 (Buildings 444, 447 et al.), March 19.

CDPHE, 2003c, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-2, July 16.

CDPHE, 2003d, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-4, May 15.

CDPHE, 2003e, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March 25.

CDPHE, 2004a, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 100-1, December 13.

CDPHE, 2004b, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-8 (B441) - Approval, March 19.

CDPHE, 2004c, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774), February 6.

CDPHE, 2004d, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7 (B779) – Approval, October 1.

CDPHE, 2004e, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1 (B865) - Approval, March 19.

CDPHE, 2004f, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-5 (B887 & B885), NFAA – Approval, June 21.

CDPHE, 2005a, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 000-2, Original Process Waste Lines, PAC 000-121, IHSS Group 000-4, October 6.

CDPHE, 2005b, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 500-3 (B559) – NFAA Approval, June 24.

CDPHE, 2005c, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 700-2 (UBC 707 – Plutonium Fabrication and Assembly, and UBC 731 – Building 707 Process Waste), February 2005, Rocky Flats Environmental Technology Site, Golden, Colorado, March 15.

CDPHE, 2005d, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3 Volume I (B701) – Approval, Rocky Flats Environmental Technology Site, Golden, Colorado, April 19.

CDPHE, 2005e, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume II, Rocky Flats Environmental Technology Site, Golden, Colorado, October 6.

CDPHE, 2005f, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-3 (B883) – Approval, Rocky Flats Environmental Technology Site, Golden, Colorado, June 7.

CDPHE and EPA, 2003, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, and T. Rehder, EPA Region 8, RE: Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, July 25.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2003b, Closeout Report for IHSS Group 100-4 (UBC 123, IHSS 148, PAC 100-611 and 100-5 (PAC 100-609), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003c, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003d, Data Summary Report for IHSS Group 800-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003e, Final Closeout Report for IHSS Group 800-4 UBC 886 - Building 886 IHSS 164.2 - Radioactive Site #2, Building 886 Spill IHSS 000-121 - Building 828 Sump, Tanks, and OPWL, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003f, Final Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003g, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003h, FY03 ER RSOP Notification #03-14 for IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 100-1 UBC 122 (Medical Facility) and IHSS 000-121 Tank T-1 (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004c, Closeout Report for IHSS Group 400-8 UBC 441, IHSS 400-122, and Portions of IHSS 000-121, including Tanks T-2 and T-3, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004d, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004e, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004f, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004g, Data Summary Report IHSS Group 800-5 UBC 887 – Process and Sanitary Waste Tanks and PAC 800-177 – Building 885 Drum Storage, Rocky Flats Environmental Technology Site, Golden, July.

DOE, 2005a, Closeout Report for IHSS Group 000-2, Original Process Waste Lines, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005b, Closeout Report for IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005c Closeout Report for IHSS Group 700-2, UBC 731 – Building 707 Process Waste, and IHSS 121 – Building 731, Tanks 11 and 30, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005d, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005e, Closeout Report for IHSS Group 700-3, Volume II, UBC 776, UBC 777, UBC 778, and Portion of IHSS 000-121, including Tank 18, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005f, Closeout Report for IHSS Group 800-3, UBC 883, PAC 800-1200, PAC 800-1201, and Portion of IHSS 000-121, including Tanks 25 and 26, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005g, Closeout Report for IHSS Group NE-1, Ponds B-1 (IHSS NE-142.5), B-2 (IHSS NE-142.6), B-3 (IHSS NE-142.6), Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE RFPO, from C. Mark Aquilar, EPA Region 8, RE: Closeout Report for IHSS Group NE-1, B-Ponds (B-1, B-2, and B-3), May.

PAC REFERENCE NUMBER: 000-162

IHSS Number:	162
Current Operable Unit:	IA
Former Operable Unit:	14
IHSS Group:	000-2
Unit Name:	Radioactive Site 700 Area

This Final Update to the HRR for PAC 000-162 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 162 is summarized in this update. The following HRR volume contains IHSS 162 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

Prior to 1974 to 1981

Historical Summary

IHSS 162 is located along Eighth Street and extends from the southern end of Building 771 to the northern end of Building 881. The location of IHSS 162 is shown on Figure 14. Radioactivity was identified during groundwater monitoring activities in 1974. In response to this contamination, Eighth Street was paved over to prevent mobilization of the contamination. In January 1981, an air sample collected during excavation activities at Eighth Street and Central Avenue yielded a long-lived alpha activity, indicating the presence of residual activity in the area (PIC 15) (DOE 1992).

No releases occurring in IHSS 162 are documented. It is possible that the contamination detected in the IHSS is the result of releases in the surrounding IHSSs. There are at least 10 other IHSSs involving radioactive releases overlapping or in close proximity to IHSS 162 (DOE 1992).

OPWL lines within IHSS 162 include P-6, P-9, P-11, P-12, P-13, P-15, and short segments of P-4, P-10, P-16, and P-51. All OPWLs within IHSS 162 were grouted and left in place, with the exception of short segments of P-4, P-10, and P-51, which were removed in a RFCA (DOE et al. 1996) accelerated action implemented in accordance with ER RSOP Notification #03-14 (DOE 2003a, 2005a). There are two known leaks that have occurred along these lines (one along P-6 and P-9 and one along P-12 and P-13). OPWLs P-6, P-9, P-11, P-13, P-15 were left in place and grouted. OPWLs P-12 and P-14 could not be found. Additional details on OWPL in this IHSS are described in the Closeout Report (DOE 2005a). NPWL lines were also present within this IHSS. The southern portions of this NPWL were removed while the segment between Valve Vaults 2 and 3 were clean closed (DOE 2005b).

IHSS Investigations

HPGe survey data collected along the length of IHSS 162 during RFI/RI activities in the early 1990s did not indicate elevated activities in southern portion of the IHSS (DOE 1995). HPGe survey data at northern locations indicated elevated activities for thorium-232,

uranium-238, americium-241, and plutonium-239/240. The proximity to Building 569 and other IHSSs, including 150.2(S), may have influenced the measurements.

Twenty-three surface soil samples were collected in and around IHSS 162 as part of the OU 14 RFI/RI (DOE 1995). Organics, inorganics, and radionuclides were detected; however, all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2000 and 2005a, DOE et al. 2003).

IHSS 162 was characterized as part of accelerated actions in accordance with IASAP Addenda #IA-03-04 (IHSS Group 700-3) (DOE 2003b), #IA-03-11 (IHSS Group 000-2/OPWL) (DOE 2003c), and #IA-04-02 (IHSS Group 700-2) (DOE 2003d). Seventeen subsurface soil samples were collected along the length of the lines. Six of the samples were collected as part of IHSS Group 700-3 and analyzed for radionuclides, metals, and VOCs (DOE 2005c). Two of the samples were collected as part of IHSS Group 700-2 and analyzed for radionuclides, metals, VOCs, and SVOCs (DOE 2005d). Nine of the samples were collected as part of IHSS Group 000-2 (OPWL) and analyzed for radionuclides, metals, VOCs, and SVOCs (DOE 2005a). All contaminant activities and concentrations were less than RFCA WRW soil ALs.

No Further Action Recommendation

NFAA was recommended for IHSS 162 based on the following:

- All contaminant activities and concentrations were less than RFCA WRW soil ALs.
- Results of the SSRS indicated that additional action was not necessary. The IHSS is not in an area susceptible to high erosion.
- Results of the stewardship evaluation indicated that additional action was not necessary.

After review of the Closeout Report for IHSS Group 700-2 (DOE 2005d) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for the portion of IHSS 162 within IHSS 700-2 on March 15, 2005 (CDPHE 2005a). Also, after review of the Closeout Report for IHSS Group 700-3 (DOE 2005c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 162 on October 6, 2005 (CDPHE 2005b). In addition, after review of the Closeout Report for IHSS Group 000-2 (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 162 on October 6, 2005 (CDPHE 2005c).

Comments

IHSS 162 includes PIC 15.

References

CDPHE, 2005a, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March 15.

CDPHE, 2005b, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for, IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, October 12.

CDPHE, 2005c, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Data Summary 1, Operable Unit 14, Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, FY03 ER RSOP Notification #03-14 for IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003b, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003c, Final Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, September .

DOE, 2003d, Industrial Area Sampling and Analysis Plan FY04 Addendum #IA-04-02, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005a, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), RFETS, Golden, Colorado, October.

DOE, 2005b, Closeout Report for the IHSS Group 000-4 New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005c, Closeout Report for the IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005d, Closeout Report for the IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 000-168

IHSS Number: 168

Current Operable Unit: 11

Former Operable Unit: 11

IHSS Group: Not Applicable

Unit Name: West Spray Field

This Final Update to the HRR for PAC 000-168 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 168 is summarized in this update. The following HRR volumes contain IHSS 168 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Dates(s) of Operation or Occurrence

April 1982 through October 1985

Historical Summary

The location of IHSS 168 is shown on Figure 14. The West Spray Field was used for the periodic spray application of excess water pumped from SEP Ponds 207B North and 207B Center (PAC 000-101). When the storage capacity of these ponds was reached, the liquids were pumped to the West Spray Field through an aboveground pipeline for spray application. The sources of wastewater stored in the SEP and sprayed at IHSS 168 included treated sanitary wastewater from the STP and groundwater collected in the interceptor trench system north of Building 771. Approximately 66 million gallons from the SEP were sprayed at IHSS 168 (DOE 1992a).

The pond liquids applied to the West Spray Field contained high nitrate concentrations, elevated levels of radionuclides, trace levels of VOCs and SVOCs, and metals (DOE 1993).

IHSS Investigations

A CEARP initiated in 1986 identified IHSS 168 as a SWMU. IAG negotiations held in 1991 changed the designation from SWMU to IHSS and initiated the investigatory program for OU 11 (which is comprised solely of IHSS 168) to evaluate potential contamination within the IHSS. The Final Phase I RFI/RI Work Plan (DOE 1992b) was completed in 1992; the Final Combined Phases RFI/RI Report (DOE 1995a) was completed in June 1995, and the CAD/ROD (DOE 1995b) was approved in October 1995. IHSS 168 was classified as a low-hazard site, requiring No Action under a residential-use scenario.

Plutonium-239/240, americium-241, tritium, and nitrate/nitrite were the only constituents identified during the field sampling in 1994 that were considered PCOCs. Americium-241 and plutonium-239/240, identified in surficial soil at maximum activities of 0.43 and 2.2 pCi/g respectively, have exhibited little migration since spray activities ceased in 1985. Most of the nitrate/nitrite, found at maximum concentrations of 37 mg/kg in surficial soil, appeared to have been taken up as a nutrient by indigenous plants. Tritium, as tritiated water, behaved similarly to

regular water and was detected at levels above background (maximum 3.4 pCi/g) in OU 11 groundwater. Analysis of the fate and transport characteristics of the PCOCs did not indicate a potential for any changes to the current conditions. The potential for offsite migration of PCOCs was assessed to be extremely limited (DOE 1995b).

No Further Action Recommendation

The CDPHE risk-based conservative screen was performed on the OU 11 soil PCOCs, using data from the surface to a depth of 12 ft. No PCOCs were identified in OU 11 groundwater samples. The total SORs for OU 11 were less than 1, indicating a low-hazard source area. An evaluation of dermal contact for PCOCs in OU 11 surficial soil confirmed this assessment (DOE 1995a).

In addition, the screening-level ERA concluded that past operations at OU 11 had no significant adverse ecological effects. No negative effects to critical habitats, wetlands, or endangered species were identified. Trends in the ecological data were consistent with effects of supplemental watering and fertilizing in semi-arid grassland. While this may have increased biomass and litter, the effects were not detrimental to the grassland ecosystem (DOE 1995b).

Based on information presented in the Final OU 11 Combined Phases RFI/RI Report (DOE 1995a), a CAD/ROD recommending No Action under CERCLA and Clean Closure under RCRA was prepared (DOE 1995b). The CAD/ROD, and IHSS 168's No Action status, was approved on September 21, 1995 (DOE et al. 1995).

Comments

CERCLA Five Year Review: The CAD/ROD for OU 11 (DOE 1995b) indicates that a five-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Draft Phase I RFI/RI Work Plan for the West Spray Field (OU 11), Rocky Flats Plant, Golden, Colorado, September.

DOE, 1993, Draft Phase I RFI/RI Work Plan for the Solar Ponds (OU 4), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Operable Unit 11 Final Combined Phases RFI/RI Report, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1995b, Final Corrective Action Decision/Record of Decision for OU11: West Spray Field, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, EPA, and CDPHE, 1995, Corrective Action Decision/Record of Decision Declaration, Rocky Flats Environmental Technology Site Operable Unit 11: West Spray Field, Jefferson County, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 000-172

IHSS Number: 172

Current Operable Unit: IA

Former Operable Unit: 8

IHSS Group: Not Applicable

Unit Name: Central Avenue Waste Spill

This Final Update to the HRR for PAC 000-172 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 172 is summarized in this update. The following HRR volumes contain IHSS 172 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

June 11, 1968

Historical Summary

The location of IHSS 172 is shown on Figure 14. A drum being transported from the 903 Drum Storage Area (PAC 900-112) to Building 774 leaked, causing contamination to the roadways. Four 55-gallon drums, one empty and three containing liquid waste material, were transported by forklift truck from the 903 Drum Storage Area to Central Avenue, west to Sixth Street, and north to Building 774, a distance of about 1.3 miles. The drums were checked for integrity prior to movement and at the off-loading point. The latter examination revealed that some liquid dripped from the bung hole of one drum during transit. Apparently the plastic spigot on one of the full drums had been unknowingly damaged during movement. This damage allowed the contaminated solution to drip onto the roads traveled. Only the west and northbound lanes were affected (DOE 1992).

The drum leaked contaminated material at a rate of about one drop every 3 ft the length of Central Avenue to Sixth Street and down Sixth Street to Building 774. Roadway alpha radioactivity contamination was measured up to 100,000 cpm. One reference states that the incident resulted in radioactive contamination of approximately 140,000 dpm/cm^2 on the west bound lane of Central Avenue and along Sixth Street. In addition, a 500 ft^2 area north of the west dock of Building 774 was contaminated to a level of 50,000 cpm (PAC 700-1114a and 700-1114b). The forklift was contaminated to a level of 100,000 cpm (DOE 1992).

Discrepancies in information were found regarding the actual composition of the liquid waste material. The descriptions include contaminated perclene solution, contaminated waste solvent, solvent rinse, contaminated material, contaminated oil, contaminated wash solution, plutonium-contaminated oils, and oils with lathe coolant (consisting of 70 percent oil and 30 percent carbon tetrachloride), radioactive waste oil, and uranium oil (DOE 1992).

The contaminated areas of the road were promptly barricaded. The route of the forklift truck was examined and monitored disclosing small spots of contaminated drippings on the road. Contaminated areas of the road were cleaned up. Some fixed contamination still remained after washing. Following cleanup activities, the affected roadway was sealcoated. The forklift truck was decontaminated and released. Vehicles that had been on the road during the interval between movement of the drums and discovery of the leakage were surveyed and no contamination was detected. Four barrels of contaminated soil were removed from the contaminated 500 ft^2 area north of the west dock of Building 774 (DOE 1992).

In July 1970, as an unrelated project, a section of asphalt between Eighth and Tenth Streets on Central Avenue was replaced. The old asphalt was monitored before and after removal with negative results. This monitoring was performed, in part, as a response to this incident (DOE 1992).

IHSS Investigations

Assessment of contamination associated with IHSS 172 was initiated in accordance with the OU 8 RFI/RI Work Plan (DOE 1994a) and recommendations presented in the OU 8 Technical Memorandum (DOE 1994b). The OU 8 Technical Memorandum included the results of data compilation efforts to establish the paving history of the IHSS and an assessment of any significant realignment of the roadways or drainage ditches within the IHSS. The purpose of this exercise was to identify areas of contamination that had been mitigated by implementation of routine construction activities and paving. This information was then used to focus the data needs associated with IHSS 172 characterization. It was concluded that residual contamination resulting from this release, if present, would likely be confined to the immediate vicinity of the roadway and unloading points. This conclusion took into account the small quantities of material believed to have been released (that is, less than 10 gallons) and cleanup efforts undertaken at the time of this incident (DOE 1994b).

Based on the results of the data compilation, the recommended sampling for IHSS 172 included collection of three asphalt samples (one near the intersection of Central Avenue and Sixth Street and two in the Central Avenue portion of the IHSS near the 903 Pad), one surface soil sample (at the Building 774 dock area), and one vertical soil profile sample (in the northeast-bound portion of Sixth Street, southeast of Building 371) (DOE 1994b). The results are presented in the OU 8 Data Summary Report (DOE 1995). With the exception of low levels (that is, estimated concentrations less than the MDL) of SVOCs, americium-241, plutonium-239/240, and sodium were the only PCOCs detected at activities slightly above background in the surface soil sample (DOE 1995). The only contaminant detected above background in the vertical soil profile sample was uranium-235. The uranium-235 activity was detected slightly above background in the 4- to 6-inch interval. Sodium was eliminated as a PCOC because it is an essential nutrient. Analytical results for these PCOCs are summarized in Table 1 of the 1998 Annual Update to the HRR (DOE 1998).

No Further Action Recommendation

IHSS 172 was proposed for NFA status in the 1998 Annual Update to the HRR (DOE 1998) for the following reasons:

- The chemicals detected are significantly different between the sampling locations, indicating that a distinguishable source of contamination associated with the release cannot be identified.
- Analytical data for the surficial soil/asphalt collected show that the contaminants associated with IHSS 172 are orders of magnitude below RFCA Tier II surface soil ALs (DOE et al. 1996).
- A preliminary estimate of the Risk Based Ratio Sum, which is used in the CDPHE Conservative Screen, is 0.12 and includes both the radionuclides and organics detected. For radionuclides only, the sum is equal to 0.009.

After review of the 1998 Annual Update to the HRR by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFA status for IHSS 172 on July 9, 1999 (CDPHE 1999).

Comments

None

References

CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994a, Operable Unit 8 Phase I RCRA Facility Investigation/Remedial Investigation Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1994b, Operable Unit No. 8, Technical Memorandum No. 1, Investigations of Foundation Drains and Other Data Compilation, Addendum to the Operable Unit 8 Work Plan, Rocky Flats Environmental Technology Site, 700 Area (Operable Unit No. 8), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1995, Operable Unit 8, Data Summary Report, 700 Area, Vol. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, EPA, CDPHE, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 000-190

IHSS Number: 190

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: 000-3

Unit Name: Caustic Leak (also referred to as Central Avenue Ditch)

This Final Update to the HRR for PAC 000-190 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 190 is summarized in this update. The following HRR volumes contain IHSS information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

December 3 and 4, 1978, and January 6, 1989

Historical Summary

The location of IHSS 190 is shown on Figure 14. On December 3 and 4, 1978, a Building 443 bulk caustic storage tank leaked into its spill catch basin. A NaOH solution was released from the catch basin to the Central Avenue Ditch. The NaOH solution flowed eastward down the Central Avenue Ditch and was diverted to South Walnut Creek and Pond B-1 (PAC NE-142.5). Approximately 1,000 to 1,500 gallons of 2.5 Normal NaOH was released (DOE 1992).

Immediate steps were taken to isolate the contamination, treat the contaminated runoff, and divert drainage from adjacent areas. These steps included the following (DOE 1992):

- Diverted the 400 Area snowmelt water across Central Avenue Ditch to the 700 Area drainage;
- Dammed the upper Central Avenue Ditch above the B-Series Ponds near the cattle fence;
- Diverted Building 995 sewage effluent to SEP Pond 207B-South (PAC 000-101) and retained Pond B-3 (PAC NE-142.7) as a reserve pond;
- Roped off the upper portion of the Central Avenue Ditch;
- Pumped water from Pond B-2 (PAC NE-142.6) to Pond A-2 (PAC NE-142.2) and held Pond B-2 as a last resort catch pond; and
- Neutralized Pond B-1 by adding 1,400 lbs of alum and then pump this liquid to SEP Pond 207B-North.

Follow up response activities to the December 1978 incident included (DOE 1992):

- Neutralized the Central Avenue Ditch water between Fifth and Tenth Streets by adding 5,000 lbs of alum;
- Completed final sampling of SEP Pond 207B-North in January 19, 1979;

- Monitored the pH of the ditch. On March 23, 1979, the ditch was considered to no longer be a problem and runoff from the ditch was allowed to be discharged offsite;
- Drained SEP 207B-North liquid into Pond B-2 in May 1979; and
- Sprayed the remaining liquid in Pond B-1 on the adjacent hillside in June 1979.

On January 6, 1989, caustic solution was released from the same Building 443 tank into its secondary containment (spill catch basin). This release occurred because the outlet pipe and valve on the tank deteriorated to the extent that the pipe disconnected from the tank. Because of cold weather the caustic froze, preventing further leakage from the tank. Approximately 1 to 3 gallons of concentrated NaOH was released (DOE 1992).

The tank was temporarily re-piped and emptied. The removed caustic was neutralized and transferred to Building 374 for treatment as a process waste (DOE 1992). The tank leak was identified and all repairs were completed. The tank and Building 443 were removed in 2004 (DOE 2004b).

IHSS Investigations

No additional investigation was warranted.

No Further Action Recommendation

IHSS 190 was proposed for NFAA status in the 2004 Annual Update to the HRR for the following reasons:

- Sodium (from the neutralization process) is considered a common essential nutrient.
- The maximum aluminum concentration in surface soil samples within and directly adjacent to IHSS 190 is 23,000 mg/kg, an order of magnitude less than the WRW soil AL (DOE et al. 2003) for aluminum.
- Water was adequately neutralized with alum shortly after the spill event.
- The 1978 release occurred more than 25 years ago, a time frame over which a significant quantity of water has flowed through the ditch, thereby further neutralizing/diluting the original NaOH release.

After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 190 on July 9, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval: No Further Accelerated Action (NFAA), PAC 000-190, Caustic Leak, Colorado, July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Close-out Report for Building 443 Steam Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 000-192

IHSS Number: 192

Current Operable Unit: IA

Former Operable Unit: 16

IHSS Group: Not Applicable

Unit Name: Antifreeze Discharge

This Final Update to the HRR for PAC 000-192 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 192 is summarized in this update. The following HRR volumes contain IHSS 192 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Dates(s) of Operation or Occurrence

December 2 or 3, 1980

Historical Summary

The location of IHSS 192 is shown on Figure 14. Approximately 155 gallons of antifreeze solution were discharged from a brine chiller unit evaporator into a floor drain in Building 708 (DOE 1992a, 1992b). The floor drain discharged into a buried culvert south of the building. The buried culvert ran east from Building 708 under the Building 750 parking lot and terminated at an open culvert just east of Tenth Street. This storm-runoff collection system discharged from the culvert into South Walnut Creek. The antifreeze solution contained 25 percent ethylene glycol in water (DOE 1992a, 1992b).

The flow was contained by diverting the storm water discharge into retention Pond B-1(PAC NE-142.5). The Pond B-5 (PAC NE-142.9)dam was closed and there was no off-site discharge of the liquid. Following the release, 5,000 gallons of water were flushed through the drainage system into Pond B-1. Based on visual observations of color and flow, it was believed that the entire spill was contained in Pond B-1 (DOE 1992a, 1992b).

IHSS Investigations

Although no direct documentation was found that detailed the fate of the ethylene glycol, it is highly unlikely that any of this chemical remains in the environment from this release. As described in the Final NFA Justification Documentation for Operable Unit 16, Low-Priority Sites (DOE 1992b), ethylene glycol (250,000 ppm in antifreeze) would degrade to less than 7 ppm in approximately 20 to 40 days at surface conditions. In addition, the degradation of ethylene glycol in multi-media environments was modeled and the results demonstrated that the concentration of ethylene glycol in leachate would decrease to less than 1 part per billion (ppb) in 4 days. Because the degradation models predicted that no ethylene glycol would be detected in leachate or soil less than 1 week following the spill, the source would have been completely degraded in the time

elapsing since 1980. Without a source, there is no risk to human health or the environment (DOE et al. 1994).

No Further Action Recommendation

The Final NFA Justification Document for Operable Unit 16, Low-Priority Sites (DOE 1992b) provided information to show that it is highly unlikely that ethylene glycol from the IHSS 192 release remains in the environment. A No Action remedy for IHSS 192 was proposed (DOE 1992b) and the CAD/ROD approved on October 28, 1994 (DOE et al. 1994).

Comments

CERCLA Five-Year Review: The CAD/ROD for OU 16 (DOE et al. 1994) indicates that a five-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final No Further Action Justification Document for Operable Unit 16 Low-Priority Sites, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, EPA, and CDPHE, 1994, Corrective Action Decision/Record of Decision for OU16: Low Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 000-500

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-3
Unit Name:	Sanitary Sewer System

This Final Update to the HRR for PAC 000-500 consolidates the information in the initial 1992 HRR with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-500 is summarized in this update. The following HRR volume contains PAC 000-500 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1952 to 2004

Historical Summary

The RFETS sanitary sewer system was used for transport, storage, and treatment of sanitary waste since the Plant began operations in 1952. Various drains, sinks, sumps, and toilets located in buildings discharged to central collection lines which transported the waste to the STP (Building 995). Wastes which were incompatible with sanitary sewage treatment were designated process wastes and were handled in a separate system from sanitary wastes (PAC 000-121, OPWL, and PAC 000-504, NPWL). In each building that generated process waste, waste discharge points (drains, sinks, sumps, etc.) were designated as either sanitary waste or process waste receptacles, and were plumbed separately into the appropriate waste system. In some Plant facilities, wastes were, or had historically been, collected and temporarily stored in tanks plumbed into both systems, and transferred to the appropriate system based on analytical results (DOE 1992). The location of PAC 000-500 is shown on Figure 13.

Early in the Site history, some stormwater sources, such as some roof drains, were connected to the sanitary sewer system. These were previously disconnected, except at Manhole 3 north of Building 771 where a storm sewer drained into the sanitary system. In addition, cooling tower sumps were generally pumped into the sanitary sewer system to dispose of cooling tower blowdown water. These were disconnected as the cooling towers were decommissioned (DOE 2004).

The sanitary sewer collection system flowed by gravity from west to east across the IA. However, some facilities, such as the Building 881 and Building 771 clusters, also had lift stations to pump sewage where gravity flow was not possible. There were two sections of the sanitary sewer system: the northern section collected flow from the Plant area formerly located within the PA and the 371 trailers, Building 116 and Trailer T117A; the southern section collected flow from the rest of the Plant exterior to the PA. The two sections joined at Building 990 (DOE 2004).

From Building 990, wastewater flowed into one of three 110,000-gallon influent storage tanks at the Waste Water Treatment Facility (WWTF) allowing inflow to be collected while another tank holding the previous day's flow was processed. In 2003, normal flows were approximately 0.16 million gallons per day (MGD). The flow rate declined as the Site closed until the system was taken out of service in October 2004 (DOE 2004).

Prior to closure, the estimated total length of the sanitary sewer lines was approximately 67,000 ft, including both active and abandoned lines. The diameter of the lines ranged from 3 to 12 inches with about 30,000 ft of 6-inch and larger lines and about 11,500 ft of 4-inch lines. In 1985, some of the system was repaired to reduce infiltration and leaking. Many of these abandoned lines are believed to have been flushed, plugged, or removed. The more recent abandoned lines and the active lines in 2004 were flushed and plugged as part of the closure activities. Only a small fraction of the lines could not be located in the field (DOE 2004).

Sanitary sewer lines were generally greater than 3 ft below grade, with the exception of the lines in the 371 trailer complex, on the northeastern side of Building 371, and the line that ran east-west across the parking lot on the southern side of the building. Lines associated with buildings were occasionally less than 3 ft below grade under or adjacent to the building because the system relied on gravity flow, and shallower lines were required for flow from the buildings into the main lines (DOE 2004).

In addition to the main sanitary sewer system, sanitary waste digestion systems were installed at the East and West Guard Posts when the posts were constructed in the mid 1980s. These systems did not work well and were replaced in the early 1990s by vaults that were pumped out regularly. The pumps were removed when the guard posts were removed (as Type 1 facilities) in the early 2000s.

Discharges to the Sanitary Sewer System

In the past, some nondomestic wastes were discharged into the sanitary sewer system, including laundry water, laboratory wastes, treated process waste effluents, photographic processing wastes, miscellaneous waste chemicals, and other waste streams. These discharges changed over time in response to internal guidelines and to State and Federal regulations. Much of the potential contaminants discharged to the sanitary sewer system were derived from laundry waste. A 1967 survey indicated that of the average daily flow of 250,000 gallons, 21,000 gallons were laundry waste. A 1973 investigation of plutonium releases to the sanitary sewer system indicated that 88 percent of the plutonium in the sanitary sewer system at that time originated from the laundries on Site. This primary source of contaminated discharges was eliminated when potentially contaminated laundry was sent offsite in 1996. Known discharges of nonsanitary waste are listed in the NFAA Justification for Sanitary Sewer System (DOE 2005a).

Releases from the Sanitary Sewer System

Treated effluent from Building 995 was discharged to Pond B-3 (PAC NE-142.7). Sanitary sewer system sludge containing low levels of radionuclides was originally disposed of onsite in burial trenches (Trenches T-2 through T-11 [PACs NE-110, 900-109, and NE-111.1 through 111.8). Later, the sludge was disposed offsite as waste.

The available information on other releases from the sanitary sewer system is summarized in other PAC narratives (DOE 1992). PAC 700-144 (Sewer Line Break) and PAC 800-145 (Sanitary Waste Line) target releases from sanitary sewer lines that handled laundry water

containing low concentrations of radionuclides. PAC 900-141 (Sludge Dispersal) addresses wind dispersion of radioactively contaminated sanitary system sludge from drying beds near Building 995. PAC 100-604 (T130 Complex Sewer Line Breaks) targets sanitary sewer line leaks in 1990 at the T130 office trailer complex.

Sanitary Sewer System Closure

Closure of the sanitary sewer system was completed in early 2005 (DOE 2005b). Closure was conducted in accordance with the Technical Memorandum – Closure Strategy for the Rocky Flats Environmental Technology Site Sanitary Sewer System (DOE 2004). Closure activities associated with the system were performed as a BMP, or were part of the building Decontamination and Decommissioning (D&D) Program. Specific releases to or from the sanitary sewer system that are designated PACs were closed with regulatory agency approval (see PAC writeups).

Sewer lines within 3 ft of the surface, including lines within 3 ft of the surface beneath building slabs on grade, were flushed and removed. The ends of remaining lines were grouted. Equipment in lift stations was removed. In most cases, manholes and lift stations were removed to 3 ft below final grade, pipe ends were surveyed and plugged, and remaining bottoms of manholes and lift stations were grouted; however, some manholes and lift stations were completely removed. Pipe bedding material was disrupted at strategic locations. Disruption of the utility trenches associated with the sanitary sewer system occurred at two places to further reduce east west flow of groundwater through or around the sanitary sewer lines (DOE 2005a):

- 700 Area where the alluvium thins over an apparent bedrock high; and
- 800 Area north of former Buildings 865 and 886 along Central Avenue.

Other areas that were disrupted as part of Site closure that also act to reduce the flow of groundwater are (DOE 2005a):

- South of Building 881 where the sanitary sewer lift station was removed and backfilled.
- West of the WWTF where sanitary sewer lines were removed, the bedding material disrupted and the excavations backfilled.
- North of Building 771 where the sanitary sewer lift station was abandoned in place and the area was backfilled, reducing the potential for groundwater to reach surface water.
- South and west of Building 371 where a segment of the sanitary sewer line was removed during the land reconfiguration activities, significantly reducing the potential for groundwater collection in the sanitary sewer.

During removal of sewer lines, the abandoned sewer line on the northern side of the street at Eighth Street and Central Avenue was found. The pipe was asbestos-containing concrete. Sanitary Sewer System pipes and manholes are shown on Figure 2 of the NFAA Justification for the Sanitary Sewer System (DOE 2005a).

PAC Investigations

In consultation with CDPHE, eight grab samples of solids within the sewer pipes were collected to determine if additional BMPs were recommended beyond those generally described in the Closure Strategy (DOE 2004). These samples were analyzed for metals and radionuclides, and

activities and concentrations were compared to WRW soil ALs (DOE et. al 2003). Although the waste in the sewer lines is not soil, the comparison was made to the WRW soil ALs because of the potential for the material to impact surface water. Only two locations had waste solids where contaminant activities and concentrations were greater than the WRW soil ALs. Arsenic (26.0 mg/kg) exceeded the WRW soil AL (22.2 mg/kg) at the Building 771 lift station, and chromium (1,300 mg/kg) and uranium-235 (9.8 pCi/g) exceeded the WRW soil ALs of 268 mg/kg and 8 pCi/g, respectively, at the Building 881 lift station. However, additional BMPs were not considered at these locations, because there is no pathway to surface water at the B771 lift station and the B881 lift station was removed. In addition, contaminant activities and concentrations in surface soil south of Building 881 were less than WRW soil ALs (DOE 2005a).

No Further Action Recommendation

PAC 000-500 was proposed for NFAA in March 2005 (DOE 2005a) for the following reasons:

- All of the major contaminant discharges to the sewer system happened prior to 1990. Significant quantities of sewage have been discharged through these lines since then, which has served to flush the lines. Additional flushing (jetting) of the main lines served to further eliminate significant solids. Sample results show that remaining solids are below WRW soil ALs.
- Infiltration and inflow studies indicated water was more likely to leak into the system than out. Therefore, significant contamination surrounding the sewer lines is unlikely.
- Shallow sanitary sewer lines and components were removed to a depth of 3 ft below final grade, and the closure of deeper lines, trunk lines, manholes, and lift stations by grouting, as well as the disruption of some utility trenches, have effectively disrupted contaminant pathways to surface water from the sanitary sewer.
- Results of the SSRS indicated additional action was not necessary. Residual contamination is not susceptible to significant erosion.

After review of the NFAA Justification for Sanitary Sewer System (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 000-500 on March 21, 2005 (CDPHE 2005).

Comments

PAC 000-500 includes PIC 17.

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: No Further Accelerated Action (NFAA) Request for the Sanitary Sewer System, PAC 000-500, part of IHSS Group 000-3, March 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2004, Technical Memorandum – Closure Strategy for the Rocky Flats Environmental Technology Site Sanitary Sewer System, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, No Further Accelerated Action Justification for Sanitary Sewer System, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005b, Closeout Report for 995 Complex and Sanitary Sewer System, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 000-501

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Roadway Spraying

This Final Update to the HRR for PAC 000-501 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-501 is summarized in this update. The following HRR volumes contain PAC 000-501 information:

Original Report – 1992 (DOE 1992);
Update Report – Fourth Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

January 1974 to September 1983

Historical Summary

The location of PAC 000-501 is shown on Figure 14. Roadway spraying primarily involved waste oils used as a dust suppressant, but also included occurrences involving RO brine solutions and footing drain water containing rhodamine WT dye. Roadway spraying is briefly described below:

- In January 1974, two roads near the 903 Pad (PAC 900-112) needed to be oiled as soon as possible to suppress re-suspension of contaminants. The roadways were inside the perimeter fence from Central Avenue south and west to a point due south of the western edge of the 903 Pad and outside the perimeter fence, from Central Avenue south to Pond C-1 (PAC SE-142.10) (DOE 1992).
- Starting in April, 1977 waste motor oil, drained from Plant vehicles, was used on the main roads and construction areas around Building 371. Motor oil use near streams or other drainages was avoided until evidence could be provided to show that there was no pollution of drinking water systems (DOE 1992).
- In May 1981, waste oil on-hand from equipment used in non-plutonium and non-uranium areas was applied to the Present Landfill (PAC NW-114) access road (DOE 1992).
- In October 1982, 120 liters of Number 2 diesel fuel from a tank spill on the northern side of Building 371 was used on roads, and is discussed in detail in the write-up for PAC 300-151 (DOE 1992).
- In September 1983, 1,200 gallons of Mobil Number 634 gear lubrication oil from a Building 883 rolling mill lubrication system was used on Plant gravel roads (DOE 1992).

- In early June 1979, Building 371 footing drain water containing 800 ppb rhodamine WT dye was distributed on BZ roads (DOE 1992). This solution was the result of a preoperational footing drain tracer test at Building 371.
- From June 1979 through approximately fall 1979, high salt content liquid from the RO facility, Building 910, was sprayed on approximately 7.6 miles of BZ dirt roads. Each truck load of the brine solution was to be analyzed for gross alpha activity, gross beta activity, and total dissolved solids (TDS). If gross alpha activity exceeded 40 pCi/L and/or gross beta activity exceeded 50 pCi/L, operations ceased. One reference noted that beta activity of approximately 150 pCi/L had been measured in brine from the RO process (DOE 1992).

PAC Investigations

No additional investigation deemed necessary because NFA was granted based on existing data.

No Further Action Recommendation

PAC 000-501 was addressed through the consultative process in NFA Working Group meetings on November 14, 2001, and December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the December 19, 2001 meeting and was formally approved by EPA (the LRA) and CDPHE in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

The entire PAC is categorized in RFCA as part of the BZ OU, but the portion of PAC 000-501 comprised of the roadway that surrounded Building 371 is geographically in the IA OU.

Roadway Spraying is the original PAC 000-501 as designated in the original HRR. The PAC 000-501 designation was mistakenly re-assigned to the Asphalt Surface in Lay-down Yard North of Building 130 (now PAC 100-613) in the Fourth Quarterly Update to the HRR. This mistake was corrected in the Seventh Quarterly Update to the HRR which redesignated the Asphalt Surface in Lay-down Yard North of Building 130 as PAC 100-613. As reflected in this write-up, PAC 000-501 continues to be Roadway Spraying.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Fourth Quarterly Update for Historical Release Report, April 1, 1993 to July 1, 1993, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 2002, Annual Update for Historical Release Report, Rocky Flats Plant, Golden, Colorado, September.

PAC REFERENCE NUMBER: 000-502

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: ITS Water Spill

This Final Update to the HRR for PAC 000-502 consolidates the information in the Second Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-502 is summarized in this update. The following HRR volumes contain PAC 000-502 information:

Original Report – Second Quarterly (DOE 1993); and
Update Report – Seventh Quarterly (DOE 1994).

Note: The ITS Water Spill was designated as PAC 000-502 in the Second Quarterly Update to the HRR (DOE 1993) but was re-assigned as PAC 900-1310 in the Seventh Quarterly Update to the HRR (DOE 1994). The number 000-502 is no longer in use. Refer to the write-up for PAC 900-1310.

Dates(s) of Operation or Occurrence

Not Applicable

Historical Summary

Not Applicable

PAC Investigations

Not Applicable

No Further Action Recommendation

Not Applicable

Comments

None

References

DOE, 1993, Second Quarterly Update for Historical Release Report, October 1, 1992 to January 1, 1993, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

PAC REFERENCE NUMBER: 000-503

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Solar Pond Water Spill Along Central Avenue

This Final Update to the HRR for PAC 000-503 consolidates the information in the Seventh Quarterly HRR Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-503 is summarized in this update. The following HRR volumes contain PAC 000-503 information:

Original Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

September 30, 1994

Historical Summary

The location of PAC 000-503 is shown on Figure 14. A tanker truck was transporting SEP Pond 207B (PAC 000-101) water from the 750 Pad (PAC 900-214) to Building 374 feed storage tanks (Tanks 231A and 231B) with the top port of the tank inadvertently unlatched. When the truck stopped at a sign, the top jarred open. During continued transport, the water sloshed out of the port onto the asphalt road surface for approximately 1 1/2 miles. An employee witnessed the spill, followed the tanker to Building 374, and notified the trucker of the incident (DOE 1994).

The spill material appeared to have been fully contained on the asphalt road surface between the 750 Pad and the 231 Tanks. Liquid material along the 1 1/2 mile of affected asphalt was removed. No material was observed to have reached soil; thus, no threat to the environment was identified (DOE 1994).

Approximately 35 gallons of the SEP Pond 207B water spilled. As documented in the Waste Stream and Residue Identification and Characterization (WSRIC) manual for OU 4 operations, the EPA waste codes assigned to the SEP sludge and water included F001, F002, F003, F005, F006, F007, F009 and D006 (DOE 1994).

The affected area was cordoned off to prevent the spread of contamination. The RCRA Contingency Plan was implemented because of hazardous wastes documented in the SEP water. Samples of the material in the truck were collected and analyzed for pH and gross alpha. Upon determination that radioactivity levels were below background, a total of 55 gallons of free liquids were vacuumed from the roadway and placed in a container. This liquid included snowmelt from puddles as well as from the tanker. The recovered waste was transferred to the Building 374 Treatment Facility for treatment (DOE 1994).

PAC Investigations

The pH of the truck load was measured during the spill response and reported at a pH of 10. A radiological survey of the truck and puddles on the roadway showed gross alpha at 1,150 pCi/L, a value below background concentrations. Analysis for selected metals was also performed on both the water in the truck and the recovered material, which was believed to be diluted with snowmelt. Results for these analyses are tabulated and compared to SEP 207 A/B pond wastewater characterization data in the Seventh Quarterly Update to the HRR (DOE 1994).

No Further Action Recommendation

PAC 000-503 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in January 31, 2002 meeting and was formally approved by EPA and CDPHE (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA RE: Approval of NFA designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 2002, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 000-504

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-4
Unit Name:	New Process Waste Lines (NPWL)

This Final Update to the HRR for PAC 000-504 consolidates the information in the 1999 HRR Annual Update Report and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-504 is summarized in this update. The following HRR volumes contain PAC 000-504 information:

Original Report – 1999 Annual (DOE 1999); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1984 to 2004

Historical Summary

The NPWL was a network of double-contained underground and aboveground pipelines and tanks used to transport liquid waste streams to Building 374, Waste Treatment Operations (DOE 1999). The location of PAC 000-504 is shown on Figure 14. Approximately 21,500 ft of NPWL and 20 valve vaults existed at the Site. For the most part, the NPWL system replaced the OPWL system (PAC 000-121), which was installed in 1952. Some of the OPWL was converted to NPWL. The NPWL transported a variety of waste streams and included the following (DOE 2005a):

- Laundry water;
- Nonradioactive and chemical laboratory waste;
- Uranium and beryllium waste;
- Americium and plutonium waste;
- PCBs;
- SEP water;
- Incidental water;
- High nitrate waste from Building 774; and
- Utilities waste.

PCOCs included radionuclides, metals, acids, bases, solvents, oils, PCBs, and photographic chemicals (2005a).

Releases from NPWL were documented at several PACs (DOE 1999) and are summarized below.

- Nitric acid, hydrofluoric acid, and hydrochloric acid was spilled from the Building 123 scrubber (PAC 100-611). Spilled material was containerized and transferred into the Building 123 process waste system on November 7, 1989.
- Nitrate, radionuclides, and acids leaked from Valve Vaults 11, 12, and 13 (PAC 300-186). Valve vaults and piping were repaired, and contaminated soil was removed.
- Nitrate and radionuclides leaked from process waste lines (PAC 700-147.1). Contaminated soil was removed.

Specific portions of the NPWL system are described in the Closeout Report for IHSS Group 000-4 (NPWL) (DOE 2005a) and other PAC writeups, including 000-101, 100-148, 100-602, 100-611, 300-186 and 800-1200.

The NPWL system was a RCRA-permitted unit, and portions were cleaned and closed in accordance with approved RCRA closure description documents (DOE 2002, 2003a) and the RFETS RCRA Part B Permit (CO-097-05-03-01), Part X, Closure (CDPHE 1997). NPWL closure began under the 1997 permit and was finalized under the 2004 permit. Closure of the unit is described in the Closure Summary Report for the 700/800 Process Waste Transfer System, RCRA Unit 374.3 (DOE 2005b) and the Closure Summary Report for Partial Closure of RCRA Unit 374.3 – 400 Area Process Waste Transfer System (DOE 2003b).

PAC Investigations

Surface soil under aboveground NPWL sections was sampled as part of OU 13 RFI/RI. Results indicated americium-241 and plutonium-239/240 were above background (DOE 1995).

Accelerated action characterization and removal activities within PAC 000-504 were planned and executed in accordance with the IASAP (DOE 2001), the ER RSOP (DOE 2003c), ER RSOP Notification #05-01 (DOE 2004b), and the IABZSAP (DOE 2004c). Soil sampling targeting NPWL and locations near NPWL was conducted from January 2002 to July 2005. A total of 151 locations were sampled to target valve vaults during removal, breaks in the pipeline containment, stained soil, pipe joints, and sections of NPWL that could not be clean-closed under the RFETS RCRA Part B Permit (CDPHE 1997). NPWL that were clean-closed under the Part B Permit did not require soil sampling. Samples were analyzed for radionuclides, metals, VOCs, SVOCs, nitrate and/or total recoverable petroleum hydrocarbons (TRPH) depending on specific targets and related historical and process knowledge. Only two soil sampling locations contained contaminants at activities or concentrations greater than RFCA WRW soil ALs (DOE 2005a, DOE et al. 2003).

In the 500 Area, at sampling location BX44-001 between Valve Vaults 12 and 13, americium-241 was detected at 566.5 pCi/g (the WRW soil AL is 76 pCi/g), plutonium-239/240 at detected at 3,290.1 pCi/g (the WRW soil AL is 50 pCi/g), uranium-234 was detected at 2,056 pCi/g (the WRW soil AL is 300 pCi/g), uranium-235 was detected at 27.41 pCi/g (the WRW soil AL is 8 pCi/g), and uranium-238 at detected at 2,056 pCi/g (the WRW soil AL is 351 pCi/g). An area approximately 5 ft by 7 ft and 8 ft deep was excavated to remove contaminated soil. Following the removal of contaminated soil, confirmation sampling indicated radionuclide activities in the remaining soil were below RFCA WRW soil ALs (DOE 2005a).

In the 800 Area, at sampling location CF33-010 south of former Building 881, arsenic was detected at a concentration of 25.5 mg/kg (the WRW soil AL is 22.2 mg/kg). Soil remediation was not required at this location based on RFCA because arsenic was detected in subsurface soil at a depth greater than 6 inches below the ground surface, and this concentration is in the range of background values at the Site (DOE 2005a).

Characterization results and accelerated actions for specific portions of the NPWL system are presented the Closeout Report for IHSS Group 000-4 as well as in individual closeout and data summary reports for the following IHSS Groups:

- IHSS Group 000-1 (DOE 2003d) approved by CDPHE (CDPHE 2003a);
- IHSS Group 000-2 (DOE 2005c) approved by CDPHE (CDPHE 2005a);
- IHSS Group 100-4 (DOE 2003e) approved by CDPHE (CDPHE 2003b);
- IHSS Group 300-4 (DOE 2003f) approved by CDPHE (CDPHE 2003c);
- IHSS Group 400-7 (DOE 2005d) approved by CDPHE (CDPHE 2005b);
- IHSS Group 500-1 (DOE 2004d) approved by CDPHE (CDPHE 2004a);
- IHSS Group 500-3 (DOE 2005e) approved by CDPHE (CDPHE 2005c);
- IHSS Group 700-2 (DOE 2005f) approved by CDPHE (CDPHE 2005d);
- IHSS Group 700-3 (DOE 2005g, 2005h) approved by CDPHE (CDPHE 2005e, 2005f);
- IHSS Group 700-7 (DOE 2004e) approved by CDPHE (CDPHE 2004b);
- IHSS Group 700-10 (DOE 2004f) approved by CDPHE (CDPHE 2004c);
- IHSS Group 800-1 (DOE 2004g) approved by CDPHE (CDPHE 2004d);
- IHSS Group 800-3 (DOE 2005i) approved by CDPHE (CDPHE 2005g);
- IHSS Group 800-5 (DOE 2004h) approved by CDPHE (CDPHE 2004e); and
- IHSS Group 800-6 (DOE 2003g) approved by CDPHE (CDPHE 2003d).

Approximately 15,300 ft of NPWL were removed, and 6,200 ft of NPWL were clean closed and left in place. Twenty valve vaults were part of the NPWL network. Six valve vaults were completely removed, three valve vaults were partially excavated and flow filled, and 11 valve vaults were partially excavated and backfilled with soil (DOE 2005a). The three valve vaults that were flow-filled contained residual low-level radioactive contamination. Valve Vault 2 contained 0.386 grams of total uranium and 0.00000069 grams of total plutonium and americium. Valve Vault 8 contained 0.0148 grams of total uranium and 0.000124 grams of total plutonium and americium. Valve Vault 9 contained 0.0151 grams of total uranium and 0.0000151grams of total plutonium and americium.

The 11 valve vaults that were backfilled with soil met the unrestricted release criteria.

Portions of the NPWL were removed as part of accelerated actions under other IHSS Groups, as listed below.

- The aboveground NPWL that were present south of the SEP (IHSS Group 000-1) and transferred waste from Building 910 to Building 774 were removed in 2003 (DOE 2003d).

- Two NPWL sections located west of Building 865 (IHSS Group 800-1) were tapped and drained, filled with epoxy, and removed (DOE 2004g). These sections were packaged and sent offsite for disposal as low-level mixed waste (LLMW). The northernmost line was removed up to Valve Vault 6, and all of the line to the Building 889 area was removed (there was no remaining end to grout).
- NPWL from Valve Vault 2 to Building 883 and from Valve Vault 2 to Valve Vault 1 (IHSS Group 800-3) were removed (DOE 2005i). NPWL from Valve Vault 2 to Valve Vault 3 were not removed, but were clean-closed in accordance with the RCRA Part B permit. Valve Vault 2 was removed to greater than 4 ft bgs and grouted.
- An 8-ft section of metal housing around the NPWL adjacent to Building 889 (IHSS Group 800-6) was removed (DOE 2003g). The remaining line consists of a high-density polyethylene (HDPE) line in which the actual waste line resides. The waste line is PVC pipe. The waste line was capped, and the space between the waste line and the HDPE line was filled with grout.

NPWL and valve vaults removed or left in place are shown of Figures 2 through 5 in the Closeout Report for NPWL (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for PAC 000-504 based on the following:

- Analytical results were less than RFCA WRW soil ALs, with the exceptions noted above.
- Most of the potential sources of contamination existing in soil at activities greater than RFCA WRW soil ALs were removed.
- All valve vaults associated with NPWL were either partially excavated and backfilled or flow filled, or were completely removed, thereby eliminating these areas as potential sources of future contaminant releases.
- Approximately 15,300 ft of NPWL were excavated and disposed offsite, including line segments that could not be cleaned closed in accordance with RCRA.
- Approximately 6,200 ft of NPWL were cleaned closed and left in place. All remaining NPWL were rinsed, sampled for RCRA constituents, and shown to be RCRA-clean.
- In accordance with the SSRS, subsurface soil in the area is not subject to significant erosion, and therefore, the subsurface soil with the arsenic concentration exceeding the WRW soil AL did not require remediation.
- Results of the stewardship evaluation did not indicate additional action was necessary.
- RCRA closure of NPWL was approved by CDPHE on October 4, 2005.

After review of the Closeout Report for NPWL (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 000-504 on October 6, 2005 (CDPHE 2005h). Also, after review of closeout and data summary reports for other IHSS Groups by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for portions of PAC 000-504 (refer to above listing).

Comments

PAC 000-504 includes PIC 50.

References

CDPHE, 1997, RCRA Part B Permit CO-097-05-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado.

CDPHE, 2003a, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, and T. Rehder, EPA Region 8, RE: Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, July 25.

CDPHE, 2003b, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, April 22.

CDPHE, 2003c, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Groups 300-3 and 300-4 (B371 & B374) – Approval, August 21.

CDPHE, 2003d, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 800-6, February 28.

CDPHE, 2004a, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-1, IHSS 300-186, IHSS 500-117.1 and IHSS 500-197, data September 2004, September 29.

CDPHE, 2004b, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7 (B779) – Approval, October 1.

CDPHE, 2004c, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 700-10, PAC 700-1101 Laundry Tank Overflow – Building 732, dated September 2004, September 21.

CDPHE, 2004d, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1 (B865) – Approval, March 19.

CDPHE, 2004e, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-5 (B887 & B885), NFAA – Approval, June 21.

CDPHE, 2005a, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 000-2, October 6.

CDPHE, 2005b, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-7 (B442 & 443) – Approval, January 10.

CDPHE, 2005c, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 500-3 (B559) – NFAA Approval, June 24.

CDPHE, 2005d, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 700-2 (UBC 707 – Plutonium Fabrication and Assembly, and UBC 731 – Building 707 Process Waste), February 2005, March 15.

CDPHE, 2005e, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3 Volume I (B701) – Approval, April 19.

CDPHE, 2005f, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume II, October 12.

CDPHE, 2005g, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-3 (B883) – Approval, June 7.

CDPHE, 2005h, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for New Process Waste Lines, PAC 000-504, IHSS Group 000-4, October 6.

DOE, 1995, Draft Data Summary 2, Operable Unit 13, 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Closure Description Document for Partial Closure of Unit 374.3; 400 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003a, Closure Description Document for Partial Closure of Unit 374.3; 700 and 800 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003b, Closure Summary Report for Partial Closure of RCRA Unit 374.3 – 400 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003c Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003d, Closeout Report for IHSS Group 000-1 Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003e, Closeout Report for IHSS Group 100-4 (UBC 123, IHSS 148, PAC 100-611 and 100-5 (PAC 100-609), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003f, Data Summary Report for IHSS Groups 300-3 and 300-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003g, Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #05-01, IHSS Group 000-4, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004c, Industrial Area and Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004d, Data Summary Report for IHSS 500-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004e, Closeout Report for IHSS 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004f, Data Summary Report for IHSS 700-10, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004g, Closeout Report for IHSS 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004h, Data Summary Report for IHSS 800-5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005b, Closure Summary Report for the 700/800 Process Waste Transfer System, RCRA Unit 374.3, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2005c, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005d, Closeout Report for IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005e, Closeout Report for IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005f, Closeout Report for IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005g, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005h, Closeout Report for IHSS Group 700-3, Volume II, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005i, Closeout Report for IHSS Group 800-3, UBC 883, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 000-505

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-3
Unit Name:	Storm Drains

This Final Update to the HRR for PAC 000-505 consolidates the information in the 1999 HRR Annual HRR Update with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 000-505 is summarized in this update. The following HRR volume contains PAC 000-505 information:

Original Report – 1999 Annual(DOE 1999).

Date(s) of Operation or Occurrence

1952 to 2004

Historical Summary

Storm drains were identified as a PAC in the 1999 Annual Update to the HRR (DOE 1999). At that time, 239 storm drains were thought to be present at RFETS. This estimate originally included the ITS which is not part of the storm drain system and was inadvertently included in the original figure. The total linear feet of storm drains in PAC 000-505 measures 50,975 ft. The location of PAC 000-505 is shown on Figure 13.

The storm drains provided site drainage from roads, parking lots, and other areas. The drains discharged into the creeks and drainages north and south of the Site. Some footing drains from Site buildings also discharged to storm drains. The storm drains were designed to convey surface water away from the Site, but unplanned accidental discharges to the system have occurred.

There were eight specific contaminant release areas associated with PAC 000-505, many of which are separate IHSSs or PACs within other IHSS Groups. These contaminant release areas were dispositioned in accordance with RFCA (DOE et al. 2003) and the disposition of these sites is summarized in the following:

- IHSS 143 – Old Outfall – No Further Accelerated Action Justification for 771 Outfall PAC Reference Number 700-143 (DOE 2004a) approved by CDPHE (CDPHE 2004a);
- IHSS 173 – Wash Water From The Degreasing Of Depleted Uranium Parts Near Building 991 – Closeout Report for IHSS Group 900-1 (DOE 2004b) approved by CDPHE (CDPHE 2004b);
- IHSS 400-205 – Release Of Nitric Acid/Nitrad Waste Solution From Building 460 – Data Summary Report for IHSS Group 400-5 (DOE 2004c) approved by CDPHE (CDPHE 2004c);
- PAC 400-803 – Release Of Miscellaneous Materials Into The Storm Drain West Of Building 446 – Data Summary Report for IHSS Group 400-4 (DOE 2004d) approved by CDPHE (CDPHE 2004d);

- PAC 400-801 – PCB Runoff From Building 444 Courtyard – Data Summary Report for IHSS Group 400-3 (DOE 2003) approved by CDPHE (CDPHE 2003) and Data Summary Report for IHSS Group 000-3, PAC 000-505 (DOE 2005a) approved by CDPHE (CDPHE 2005a);
- PAC 700-1103 – PCB Runoff From Building 707 – Closeout Report for IHSS Group 700-2 (DOE 2005b) approved by CDPHE (CDPHE 2005b);
- Building 776 Storm Drain (IHSS 700-150.2[S]) – Closeout Report for IHSS Group 700-3 Volume I (DOE 2005c) approved by CDPHE (CDPHE 2005c) and Data Summary Report for IHSS Group 000-3, PAC 000-505 (DOE 2005a) approved by CDPHE (CDPHE 2005a); and
- Building 371 Ditch And Storm Drain Runoff – Data Summary Report for IHSS Group 000-3, PAC 000-505 (DOE 2005a) approved by CDPHE (CDPHE 2005a).

Storm drains were disrupted, removed or retained for use after site closure (DOE 2005a). For the most part, storm drains were removed unless they were very deep or removal presented slope stability problems. Storm drains ranged from 1.5 to 45 ft below the surface. Approximately 45,475 ft of storm drains were removed and approximately 5,500 ft of the storm drains remain in place. Storm drains left in place were flow filled or grouted except for the storm drain associated with Functional Channel 2 (C-126). Approximately 210 ft of this storm drain remains. Storm drains disrupted, removed, or retained are shown on Figure 2 of the Data Summary Report for Storm Drains (DOE 2005a).

All manholes and catch basins within 3 ft of the surface were removed (DOE 2005a and 2005d). Manholes at a depth of 3 ft below the surface were flow filled. Grates and associated rings were removed to a depth of 3 ft below the surface and the remaining structure was flow filled. Manholes and grates removed and remaining are shown on Figure 2 of the Data Summary Report for Storm Drains (DOE 2005a)

PAC Investigations

Building 371 Ditch and Storm Drain Runoff

Although there were no reported specific contaminant release events to a Building 371 storm drain or ditch, these drains and ditches were sampled in 1987. It is not known if samples were collected during a storm event or from standing water (DOE 1999). Results showed that the gross alpha and beta concentrations in the storm drains and ditches were of the same order of magnitude as the surface water standards, and nitrate was well below the surface water standard (DOE 2005a).

More recent surface water data from a performance monitoring location (SW018), established in October 2003 in the unnamed drainage just east of Building 371/374, indicated americium-241, plutonium-239/240, and total uranium activities at SW018 were well below their surface water standards of 0.15 pCi/L, 0.15 pCi/L, and 10 pCi/L, respectively (DOE 2005a).

Ponds A-3 and A-4

As a result of the routine predischarge sampling for Pond A-4 (PAC NE-142.4), conducted on November 3, 2004, elevated americium-241 activities were noted in Pond A-4. These elevated activities were detected in samples collected by both DOE and CDPHE. Activities exceeded the RFCA surface water ALs for americium-241 and, as a result, the pond water was not discharged.

In December 2004, DOE collected a number of surface water samples in the North Walnut Creek Drainage to investigate the source of elevated americium-241 noted in Ponds A-3 (PAC NE-142.3) and A-4. The sampling was concentrated in the area where Buildings 771/774 formerly stood. One sample, collected from a pool of water in OPWL (PAC 000-121) Manway 3, northwest of Building 771, contained elevated americium-241 activities without significant plutonium-239/240 activity, which is the same americium-241/plutonium-239/240 signature observed in Ponds A-3 and A-4. This manway received outfall from former Building 771 and consisted of a series of sanitary sewer lines, footing drains, and other lines that dumped into storm drain Grate 771-4 at Sixth Street.

Based on this sampling result, actions to stop additional water from this source from entering North Walnut Creek were taken. The manway, which had been covered with soil as a result of site grading activities at Building 771, was excavated and flows from the incoming pipes were intercepted, analyzed, and treated as needed. Pipes to and from the manway and the manway were removed. The storm drain from Building 771 was grouted. The water in Pond A-4 was treated using a co-precipitation and filtration process and met stream standards for discharge.

No Further Action Recommendation

PAC 000-505 was proposed for NFAA because of the following:

- Storm drains and culverts were removed or disrupted except for a few drains in the IA that will continue to function as originally intended.
- The specific potential release areas were dispositioned.
- The SSRS does not indicate that subsurface soil removal is necessary.
- Results of the stewardship evaluation indicated that additional action was not necessary.

After review of the Data Summary for IHSS Group 000-3 PAC 000-505, Storm Drains (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 000-505 on October 6, 2005 (CDPHE 2005a). Additionally, after review of other documentation by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for storm drains within specific IHSS Groups as referenced above.

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et. al.) dated November 2003, December 18.

CDPHE, 2004a, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action (NFAA) Request for IHSS 143 (B771) – Approval, September 7.

CDPHE, 2004b, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) – Approval, March 31.

CDPHE, 2004c, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump #3 Acid

Site, PAC 400-813 and PAC 400-815 – Tank Leaks in Building 460 & Status of "RCRA Unit 8", December 7.

CDPHE, 2004d, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 400-4, PAC 400-803 – Miscellaneous Dumping, Building 446 Storm Drain and PAC 400-804 – Road North of Building 460, August 23.

CDPHE, 2005a, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Data Summary for IHSS Group 000-3 PAC 000-505, Storm Drains, October 6.

CDPHE, 2005b, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE, RE: Approval, Draft Closeout Report, IHSS Group 700-2 (UBC 707 – Plutonium Fabrication and Assembly, and UBC 731 - Building 707 Process Waste), February 2005, March 15.

CDPHE, 2005c, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3 Volume I (B701) – Approval, April 19.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Data Summary Report, IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, No Further Accelerated Action Justification for 771 Outfall PAC Reference Number 700-143, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2004b, Closeout Report for IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, Data Summary Report for IHSS Group 400-5, Rocky Flats Environmental Technology Site, Golden, Colorado December.

DOE, 2004d, Data Summary Report for IHSS Group 400-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Data Summary Report for IHSS Group 000-3 PAC 000-505, Storm Drains, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Closeout Report for IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005c, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005d, Closeout Report for 995 Complex and Sanitary Sewer System, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

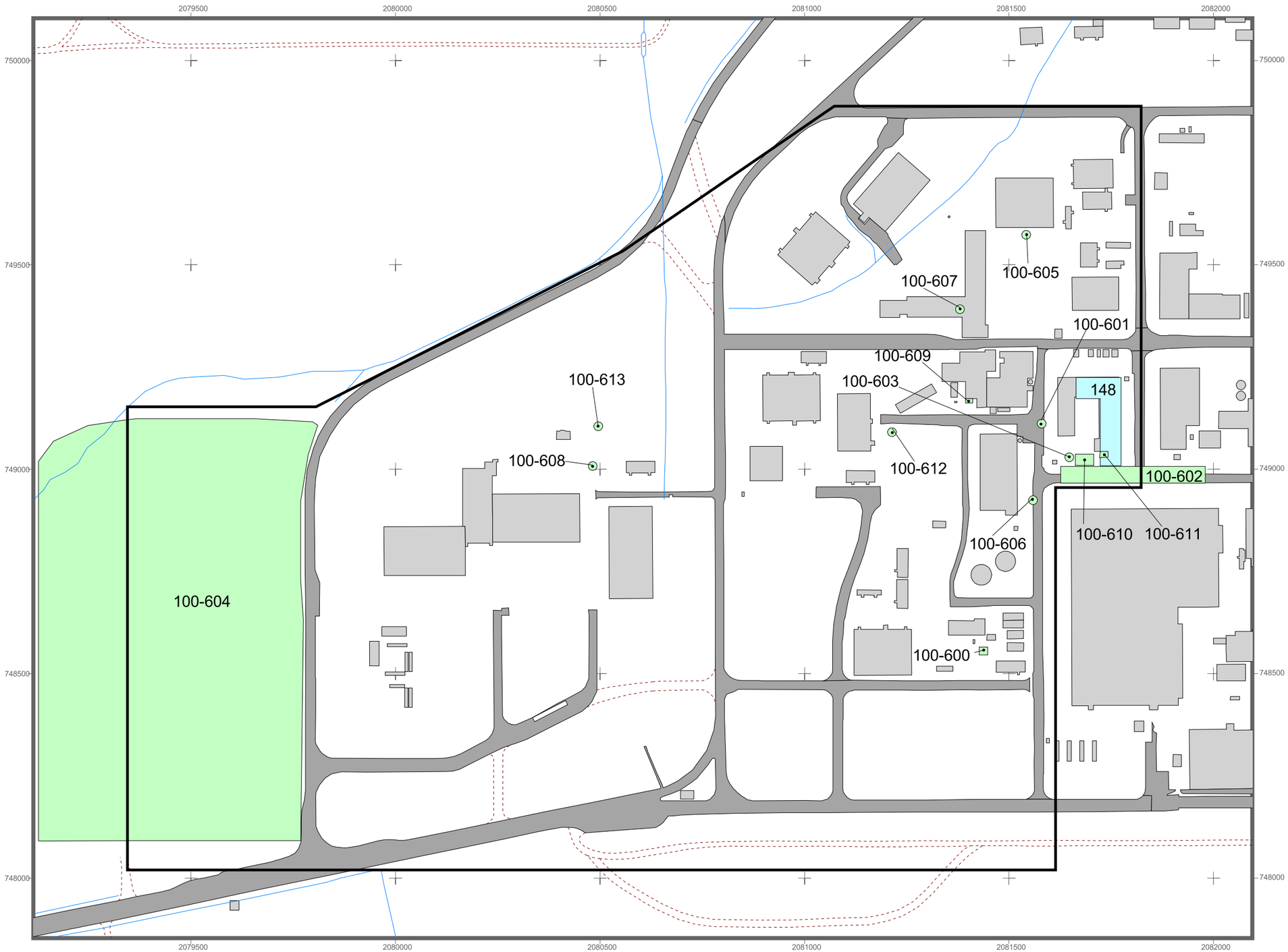

Figure 15
HRR 100 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

200 0 200 Feet

Scale = 1: 3600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_100.apr

PAC REFERENCE NUMBER: 100-148

IHSS Number: 148

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: 100-4

Unit Name: Waste Leaks (IAG Name: Waste Spills)

This Final Update to the HRR for PAC 100-148 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 148 is summarized in this update. The following HRR volumes contain IHSS 148 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998a);
Update Report – 2002 Annual (DOE 2002a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1953 to approximately 1975.

Historical Summary

PAC 100-148 encompasses the eastern wing of Building 123. The location of IHSS 148 is shown on Figure 15. Building 123, the Health Physics Laboratory, generated low-level radioactive waste, as well as chemical wastes. Process wastes reportedly leaked from the OPWL (PAC 000-121), including nitrate-bearing wastes that may have contained radionuclides. Unconfirmed reports of contaminant spills were also indicated in interviews with building employees. In the late 1960s or early 1970s, a cesium-contaminated liquid was reportedly spilled on the concrete floor in Room 109. The floor was immediately sealed to immobilize the contamination. Room 109 also contained source storage pits. Undocumented thorium research was performed in Room 105. Scoping surveys conducted in May through July 1997 revealed elevated levels of radioactivity in both Rooms 105 and 109. In-situ gamma spectroscopic measurements performed in August 1997 indicated the presence of cesium-137 and thallium-232 in Rooms 109 and 105, respectively (DOE 1998b). In 1998 Building 123 was decontaminated and removed down to the building slab (DOE 1998c).

Persons interviewed for the CEARP Phase I document indicated several small spills of nitrate-bearing wastes occurred around the outside of Building 123. These wastes may have contained radionuclides. Additionally, interviewees indicated there were potential releases of nitrate-bearing wastes from the OPWL buried beneath Building 123. This pipeline was in use from the start of operations in Building 123 until the OPWL were replaced by the NPWL. The abandonment of the OPWL beneath Building 123 occurred no later than February 1975 when engineering drawings documented the abandonment of the OPWL system. The abandoned OPWL were typically left in place.

Building 123 was serviced by a 4-inch-diameter process waste line buried beneath the north and east wings of the building. The main process waste line drained from west to east in the north wing, and from north to south in the east wing. The pipe was sloped at 1 percent. A number of connections were made to the main pipe, some of which consisted of headers servicing a number of process waste drains in the building. The pipe was constructed of iron. The OPWL piping from Building 123 led to an underground tank system south of Building 441 that collected wastes generated by both Buildings 123 and 441. From this tank system, the process waste materials were pumped out for treatment in the process waste system.

The OPWL drain was not double-contained, and varied in depth from approximately 0.5 to 3 ft beneath the bottom of the concrete floor of Building 123. The line came out from beneath the southern end of the east wing of the building, with an invert elevation of approximately 6,032.5 ft. Interviewees have stated that this line probably leaked considerable amounts of waste without personnel being aware of the leak. The types of waste consisted of laboratory wastes from analysis of urine, fecal, and other bioassay samples. Nitrates and low levels of radionuclides were associated with the wastes carried in the OPWL. The NPWL that replaced the OPWL consisted of either double-contained or overhead lines (DOE 2000a).

IHSS Investigations

As described in IASAP Addendum #IA-02-01 (DOE 2001a), PCOCs at IHSS 148 were determined based on data collected during the characterization of UBC 123, as summarized in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (DOE 2001b), and data collected during previous studies (DOE 2000b, 2001c). These pre-accelerated action data, which were greater than background mean plus two standard deviations or MDLs, along with RFCA Tier I and Tier II soil ALs (DOE et al. 1996), are referenced in the Closeout Report for IHSS Groups 100-4 and 100-5 (DOE 2003b). PCOCs at IHSS 148 included radionuclides, metals, and VOCs. Because a sufficient number of samples were collected during previous studies to characterize IHSS 148, additional characterization was not required. Results from previous sampling and analysis of surface and subsurface soil at UBC 123 and IHSS 148 indicated that:

- Lead was detected in subsurface soil at concentrations greater than the Tier I soil AL at one location.
- Radionuclides and metals were detected in subsurface soil at concentrations greater than background mean plus two standard deviations at UBC 123 and IHSS 148.
- An arsenic concentration exceeding the Tier II soil AL but less than background mean plus two standard deviations was detected at one location in surface soil.
- A beryllium concentration exceeding the Tier II soil AL was detected at one location in surface soil.
- Methylene chloride was detected in subsurface soil at levels slightly greater than the RFCA Tier II soil AL.

A RFCA (DOE et al. 1996) accelerated action was implemented in 2002 in accordance with ER RSOP Notification #02-01 (DOE 2002b) that included removal of the Building 123 slab, footers, source pits, manholes, sumps, process waste lines (OPWL and NPWL), and contaminated soil, as well as site reclamation (DOE 2002b). Sumps and process waste lines within IHSS 148 were

excavated and packaged for disposal. Confirmation sampling results from the soil beneath the sumps and process waste lines indicated all contaminant concentrations were less than RFCA Tier II soil ALs. Activities were conducted between January 29 and April 18, 2002. Details are provided in the Closeout Report (DOE 2003b).

Remaining conditions at IHSS 148 include the following:

- Residual radionuclide activities in subsurface soil were less than RFCA Tier II soil ALs (DOE et al. 1996) and the WRW soil ALs (DOE et al. 2003) and only slightly greater than background mean plus two standard deviations.
- Residual lead concentrations in subsurface soil ranged from 1.13 to 12.2 mg/kg and were less than the Tier II and WRW soil ALs.
- Residual SVOC concentrations were less than Tier II and WRW soil ALs and include naphthalene (10μg/kg), fluoranthene (410 – 810 μg/kg) and pyrene (429 – 740 μg/kg).
- Radionuclide activities in surface soil were less than Tier II and WRW soil ALs and only slightly greater than background mean plus two standard deviations. Americium-241 was detected at activities ranging from 0.05 to 0.13 pCi/g, plutonium-239/240 was detected at activities ranging from 0.06 to 0.13 pCi/g, uranium-235 activities ranged from 0.13 to 0.30 pCi/g, and uranium-238 activities ranged from 1.66 to 5.06 pCi/g.
- A beryllium concentration in surface soil, outside of UBC 123, IHSS 148, and PAC 100-611 but within the AOC, was detected at only one location, and was 0.16 mg/kg greater than the RFCA Tier II soil AL but less than the WRW AL.
- Methylene chloride concentrations in subsurface soil, outside of UBC 123, IHSS 148, and PAC 100-611 but within the AOC, were greater than the RFCA Tier II soil AL at six locations and ranged from 12 to 29 μg/kg. Methylene chloride was found in laboratory blanks associated with the data set.

The RFCA accelerated action initiated by ER RSOP Notification #02-01 (DOE 2002b) also resulted in the complete removal of NPWL Valve Vault 18 and the line segment that connected it to Building 123. The rinsate from Valve Vault 18 had a gross alpha/gross beta activity of 7.08 pCi/L (DOE 2005).

All excavated areas were backfilled and revegetated after confirmation sampling results were received and discussed with regulatory agencies through the consultative process.

No Further Action Recommendation

Based upon characterization sample results collected in accordance with IASAP Addendum #IA-02-01 (DOE 2001a), no potential contaminant or residual contaminant source could be identified. Therefore, in accordance with RFCA (DOE et al. 1996), IHSS 148 was proposed for NFAA.

DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 148 on April 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE, RFFO, from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, April 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1998a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998b, Proposed Action Memorandum for the Decommissioning of Building 123, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1998c, Final Close-Out Report, Building 123 Decommissioning Project, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Final Sampling and Analysis Plan for the Characterization of Under Building Contamination for UBC 123 and Building 886 Implementing Horizontal Directional Drilling and Environmental Measurement While Drilling, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2000b, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2001b, Final Data Summary Report for the Characterization of UBCs 123 and 886, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001c, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol Notification #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Groups 100-4 and 100-5, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005, Closeout Report for IHSS Group 000-4, New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996 Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 100-600

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Mercury Spill – Valve Vault 124-B, Building 124

This Final Update to the HRR for PAC 100-600 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-600 is summarized in this update. The following HRR volumes contain PAC 100-600 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

July 25, 1990

Historical Summary

The location of PAC 100-600 is shown on Figure 15. On July 25, 1990, while removing two water flow transmitters from Valve Vault 124-B, located approximately 50 ft south of Building 124, mercury leaked out of one transmitter that was inverted for removal. Approximately 15 minutes after the transmitters were removed, mercury was found on the Valve Vault floor and on the ground. Although the majority of the spilled mercury was confined to a 6-ft-square area on the concrete floor of the Valve Vault, some mercury was spilled on the ground and concrete outside the Valve Vault. The mercury spill outside of the Valve Vault occurred while one of the transmitters was carried approximately 6 ft to the corner of the Valve Vault surface cement apron.

The spill consisted of approximately 2.75 lbs of mercury.

Upon notification, the HAZMAT Team responded immediately. The immediate response activities included the following:

- Flow transmitters were secured and bagged to prevent further releases of mercury.
- The area of contamination was secured and cordoned off.
- The sump pump was turned off and lockout/tagout was performed.
- The HAZMAT Team attempted to remove the mercury from the Valve Vault floor using a vacuum system (proved ineffective).
- The HAZMAT Team covered the mercury with sulfur and swept it off the ground.
- The HAZMAT Team removed contaminated soil outside the Valve Vault.
- Industrial Hygiene personnel monitored the activities with a Jerome Model No. 411 Gold Film mercury analyzer.

- A plastic cover was constructed over the area to prevent rainwater from spreading the mercury.

Additional follow up response activities were conducted. The incident was reported to CDH, EPA's National Response Center, DOE Headquarters, and the local EPA. In addition, RCRA CPIR No. 90-007 was prepared.

PAC Investigations

On July 27, 1990, an outside contractor conducted an emergency cleanup of the Valve Vault and the surrounding ground and concrete. The contractor vacuumed the mercury from the Valve Vault and excavated mercury-contaminated soil. Following the cleanup, soil samples were collected and analyzed. Analyses indicated mercury concentrations above desired cleanup levels. Excavation and sampling efforts were repeated three more times until the desired cleanup levels were achieved. In addition to excavation activities, cleanup operations included the application of sodium thiosulfate, a mercury absorbent, to the Valve Vault floor, the cement floor within Building 222 (Building 222 houses Valve Vault 124-B), and south of the building. Following this activity, vacuuming was conducted.

Following excavation, soil samples were analyzed using both the TCLP and an inorganic analysis for total metals in order to verify that the cleanup was complete. Following the last phase of excavation, the results of these analyses were:

- TCLP analysis in mg/L: 0.001, 0.030, and 0.040; and
- Inorganic analysis for total metals in mg/kg or ppm: 3.0, 5.3, and 6.9.

No Further Action Recommendation

PAC 100-600 was addressed through the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 100-600 because the spill was cleaned up and sampling results demonstrated that the cleanup had effectively removed the spilled mercury. An NFA was verbally agreed to in the December 19, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval Letter for NFA Designation for IHSSs and PACs, Rocky Flats Environmental Technology Site, Golden, Colorado, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-601

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Building 123 Phosphoric Acid Spill

This Final Update to the HRR for PAC 100-601 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-601 is summarized in this update. The following HRR volumes contain PAC 100-601 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

April 13, 1989

Historical Summary

The location of PAC 100-601 is shown on Figure 15. Two 5-gallon plastic containers of phosphoric acid, which were among old chemicals awaiting disposal in a storage cabinet outside of Building 123, deteriorated and leaked part of their contents onto the ground. Approximately 1 gallon of 1,2-ethylhexyl phosphoric acid leaked from the two containers. At the time the release was detected (April 13, 1989), approximately 1 cup (8 ounces) of the acid was on the ground around the cabinet. The quantity of phosphoric acid released to the environment was minimal and is expected to have been rapidly neutralized through interaction with soil in the immediate vicinity of the spill. The Rocky Flats RCRA Compliance Coordinator was notified.

PAC Investigations

No further investigation was required because the spill was small and the phosphoric acid was rapidly neutralized.

No Further Action Recommendation

PAC 100-601 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-602

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-2
Unit Name:	Building 123 Process Waste Line Break

This Final Update to the HRR for PAC 100-602 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-602 is summarized in this update. The following HRR volume contains PAC 100-602 information:

Original Report – 1992 (DOE 1992).

Dates(s) of Operation or Occurrence

April 13, 1989

Historical Summary

The location of PAC 100-602 is shown on Figure 15. Valve Vault 17, located on Cottonwood Avenue between Buildings 443 and 444, was flooded with approximately 1,200 gallons of aqueous waste on April 13, 1989. Subsequent investigation showed the source of the waste was a break in the process waste line in Manhole 1, south of Building 123. Leaks from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (soil) or a polyvinyl chloride (PVC) electrical conduit. The release also migrated into a section of the abandoned OPWL network (PAC 000-121). Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, 5 days after the release to Valve Vault 17 was first detected. The potentially affected area included the process waste line between Manhole 2 and Valve Vault 18 (immediately south of Building 123), the process waste line between Valve Vault 18 and Valve Vault 17, soil around Valve Vault 18 and Valve Vault 17, and the OPWL pipeline between Manhole 2 and Manhole 3. In July 1989, groundwater containing blue dye used several months earlier to trace the release, was observed seeping into excavations around Valve Vault 18. According to one report, the release may also have reached the storm sewer system (PAC 000-505).

The release consisted of Building 123 process waste. During the 5-day period between detection of the release and diversion of Building 123 wastes from the broken line, the following materials were likely released to the environment (based on typical daily quantities of wastes discharged from Building 123):

- 25 gallons urine;
- 12.5 gallons nitric acid (unknown concentration);
- 20 gallons hydrochloric acid (unknown concentration);
- 1.5 pounds ammonium thiocyanate;
- 1.0 pound ammonium iodide; and

- 2.5 gallons ammonium hydroxide (unknown concentration).

The above constituents would have been diluted in approximately 2,000 gallons of tap water.

Process waste discharge to the broken line was discontinued. Soil sampling was conducted to determine the source and extent of the release. A temporary aboveground line was installed, and a replacement underground line was planned for completion by June 1, 1989. Because the affected areas were near existing IHSSs scheduled for investigation and remediation activities (see PACs 400-122 and 100-148), no cleanup was initiated.

> Minor amounts of naturally occurring uranium were detected in soil and water samples collected after the release. Alpha activity up to 140 pCi/L was recorded in samples of the waste from Valve Vault 17. One water sample from a manhole south of Building 123 also contained 8 percent ethylene glycol.

Water and soil samples collected for several weeks after the release indicated contamination levels (nitrate, chloride, and pH) decreased steadily after the broken line was bypassed.

PAC Investigations

A RFCA (DOE et al. 1996) accelerated action was conducted at this PAC in accordance with ER RSOP Notification #03-14 (DOE 2003). (Note that Notification #03-14 addresses potential OPWL actions, but that the features discussed under PAC 100-602 are part of the NPWL system.) In accordance with Notification #03-14 the top 4 ft of Valve Vault 18 was removed and the remainder of the vault was filled with dirt. The line from Valve Vault 18 to Valve Vault 17 was RCRA clean closed and left in place. The line from Valve Vault 18 to Building 123 was removed as well as the lines to Buildings 122 and 460 (DOE 2005a). Analytical results indicated aluminum was the only analyte detected above background at a concentration of 40,000 mg/kg (DOE 2005b). This value is less than the WRW soil AL (DOE et al. 2003).

No Further Action Recommendation

Based on the removal of the Valve Vault and the lines, PAC 100-602 was proposed for NFAA in the Closeout Report for IHSS Group 000-2 (DOE 2005b). DOE received approval of NFAA status for PAC 100-602 from CDPHE (the LRA) on October 6, 2005.

Comments

None

References

CDPHE, 2005 approval Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), October 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, FY03 Environmental Restoration RFCA Standard Operating Protocol Notification #03-14 for IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005a, Closeout Report for IHSS Group 000-4 New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October

DOE, 2005b, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 100-603

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 123 Bioassay Waste Spill

This Final Update to the HRR for PAC 100-603 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-603 is summarized in this update. The following HRR volumes contain PAC 100-603 information:

Original Report – 1992 (DOE 1992);
Update Report – 2001 Annual (DOE 2001a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

June 9, 1989

Historical Summary

The location of PAC 100-603 is shown on Figure 15. An underground process waste line from Building 123 was being excavated and replaced because of a break in the line (PAC 100-602). The excavated end of the broken line was temporarily capped with a plastic bag, and process waste from Building 123 was rerouted to bypass the broken line. The pump used to reroute the waste failed and allowed some of the waste to overflow into the broken line. Part of this waste leaked around the plastic bag and into the excavation where the broken line was capped. The release occurred within the excavation. Rainwater that was being pumped out of the trench at the time of the spill was not contaminated, as confirmed by sampling (DOE 1992).

The release consisted of bioassay waste containing hydrochloric acid and nitric acid with a pH of approximately 1. The waste also may have contained urine, and up to a combined total of 1.5 gallons of ammonium thiocyanate, ammonium iodide, and ammonium hydroxide. The calculated maximum volume of the release was 30 gallons. Due to inclement weather, the released material mixed with rainwater in the excavation.

Results from 11 samples collected shortly after the incident to evaluate the spread of contamination indicated contamination was restricted to the excavation within 8 ft of Building 123. Approximately 100 gallons of rainwater potentially contaminated by the spill was neutralized, pumped from the excavation, and transferred to the process waste system for treatment in Building 374.

PAC Investigations

Samples were collected to evaluate the spread of contamination. The release was documented in RCRA CPIR No. 89-006 (DOE 1992).

In late 2000, four subsurface soil samples were collected in and around PAC 100-603 as part of the UBC 123 characterization project. Each sample was analyzed for VOCs, SVOCs, total metals, and isotopic radionuclides. Data analysis is presented in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (DOE 2001b).

Samples from locations HDD-3-Trench-A and HDD-3-Trench-B (Figure 2.7, DOE 2002) were collected within the PAC boundaries at approximately 20 inches below the top of existing asphalt. VOC and SVOC concentrations were reported below MDLs or well below RFCA Tier II soil ALs (DOE et al. 1996). Most radionuclide and metal results were reported to be nondetects or at levels less than Site background mean plus two standard deviations (DOE 2001b). All of the reported concentrations were significantly less than the RFCA Tier II soil ALs. Analytical results for HDD-3-01 and HDD-3-02 are included in the Final Data Summary Report for the Characterization of UBCs 123 and 886 (DOE 2001b). During UBC 123 remediation, sampling location HDD-3-02 was removed. Residual contamination at sampling location HDD-3-01 indicated acetone was present at 30 µg/kg and naphthalene was present at 13 µg/kg.

No Further Action Recommendation

The results from samples collected shortly after the spill and subsequently, during the UBC 123 characterization project, identified no current or potential contaminant source for PAC 100-603. Based upon this finding, PAC 100-603 was proposed in the 2001 Annual HRR Update (DOE 2001a) for NFA consistent with criteria set forth in RFCA (DOE et al. 1996). DOE received NFA approval from CDPHE (the LRA) and EPA on February 14, 2002 (CDPHE and EPA 2002) with the caveat that further clarification would be provided. Clarification was provided in a Working Group Quarterly Letter (No. 32 of AR1) and in the 2002 HRR Annual Update (DOE 2002).

Comments

The original HRR (DOE 1992) mentions that the waste stream for Building 123, a bioassay laboratory, may have had small concentrations of ammonium thiocyanate, ammonium iodide, and ammonium hydroxide. While these compounds were not specifically sampled in 2000, it is very unlikely that RFCA Tier II ALs could have been exceeded. The RFCA Tier II soil ALs for ammonium and cyanide are greater than both 1 million and 40,900 mg/kg, respectively.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Final Data Summary Report for the Characterization of UBCs 123 and 886, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 100-604

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: T130 Complex Sewer Line Leaks

This Final Update to the HRR for PAC 100-604 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-604 is summarized in this update. The following HRR volumes contain PAC 100-604 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

Late September to early October 1990

Historical Summary

The location of PAC 100-604 is shown on Figure 15 (entire T130 trailer complex). Sanitary sewer pipes serving Trailer T130A, Trailer T130B, Trailer T130C, and Trailer T130D in the T130 trailer complex were discovered to be leaking on numerous locations. The leaks were blamed on poor construction coupled with inadequate inspection during initial installation. Poor cold weather precautions were also identified as a likely cause, suggesting that the pipes froze and cracked. The T130 complex was installed in 1989 and 1990 and was used solely for offices. The material released from the sewage lines was not described in detail. No estimate is available of the amount of material released.

> Domestic water to the trailers was turned off and repairs were completed within 1 day. The Site Clean Water Group determined that the release did not require a report to the State of Colorado provided water systems were not reactivated until repairs were complete.

PAC Investigations

No further investigation was required because the release was not reportable.

No Further Action Recommendation

PAC 100-604 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that a NFA was justified because the release was not reportable. A NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

The released material is believed to have been typical sanitary sewage. Although references indicate the leakage occurred in sewer lines serving Trailers T130A, T130B, T130C, and T130D, the precise locations of the leaks are not known.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-605

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 115 Hydraulic Oil Spill

This Final Update to the HRR for PAC 100-605 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-605 is summarized in this update. The following HRR volumes contain PAC 100-605 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

Week ending May 23, 1989

Historical Summary

The location of PAC 100-605 is shown on Figure 15. During the week ending May 23, 1989, hydraulic oil spilled near Building 115 when a forklift hydraulic line ruptured. Several nearby vehicles were sprayed with oil. It is not known whether the oil spilled onto soil or pavement. Approximately 2 gallons of hydraulic oil were released.

PAC Investigations

No further investigation was required because the spill was very small.

No Further Action Recommendation

PAC 100-605 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. An NFA was justified because the spill was probably not a reportable quantity. An NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

The precise location of the hydraulic oil leak is not known. The location shown on Figure 15 is based on the roadway configuration around Building 115 and should be considered approximate.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-606

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 125 TCE Spill

This Final Update to the HRR for PAC 100-606 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-606 is summarized in this update. The following HRR volumes contain PAC 100-606 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

Week ending January 13, 1989

Historical Summary

During the week ending January 13, 1989, a small spill of trichloroethene occurred just south of the Building 125 south dock. The spill originated from a faulty valve on a supply drum. Approximately 1 cup (8 ounces) of trichloroethene was released to the asphalt pavement. The location of PAC 100-606 is shown on Figure 15. The trichloroethene supply drum was immediately righted to prevent further leaks. It was determined that the release did not constitute a reportable quantity for EPA.

PAC Investigations

No further investigation was required because the spill was small and was to asphalt.

No Further Action Recommendation

PAC 100-606 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified because the release was not a reportable quantity. An NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

An NFA was justified for PAC 100-606 because the spill was not a reportable quantity.

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-607

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 111 Transformer PCB Leak

This Final Update to the HRR for PAC 100-607 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-607 is summarized in this update. The following HRR volumes contain PAC 100-607 information:

Original Report – 1992 (DOE 1992);
Update Report – 2000 (DOE 2000a);
Update Report – 2001 Interim (DOE 2001a);
Update Report – 2001 Annual (DOE 2001b); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 1954 to mid-1986

Historical Summary

The location of PAC 100-607 is shown on Figure 15. A large electrical transformer was located inside the Building 111 basement (Figure 2.7, DOE 2001b). The transformer held approximately 500 gallons of dielectric cooling oil which, at one time, contained PCBs (DOE 1992). In February 1984, the transformer (111-1) was first documented leaking into the gravel filled secondary containment (DOE 1992). The secondary containment basin for Transformer 111-1 was designated PAC 100-607 in the HRR in June 1992.

On January 30, 1986, EPA conducted a survey of Rocky Flats to determine compliance with federal PCB regulations. The inspection identified a number of leaking transformers, including the Building 111 transformer (DOE 1992). Follow up inspection and repair by Plant personnel indicated leaks originated at the transformer tap changer and oil sample valve.

An unknown amount of PCB-bearing dielectric oil leaked from the transformer between February 1984 (possibly earlier) and early to mid-1986. It is not known whether the leaks during this period were continuous or intermittent. Samples of the oil collected in early 1984 indicated 17 ppm Aroclor-1260. Service records indicated oil samples were collected on July 12, 1985 (251 ppm PCBs), and on January 7, 1987 (7.3 ppm PCBs). Engineering design drawings show that an isolated footing drain system was installed within the secondary containment structure and routed approximately 30 ft east of the building to a manhole sump. A waterproofing compound was used during installation of the manhole to prevent seepage into and out of the structure. The system was installed during the original construction of the building because of groundwater infiltration into the building basement.

PAC Investigations

Sampling conducted in early 1984 (17 ppm Aroclor-1260) indicated PCB levels in the cooling oil were less than the EPA regulatory limit of 50 ppm and, therefore, no corrective actions were taken at that time (DOE 1992). The gravel lining in the secondary containment was removed and the footing drain structure grouted closed prior to January 8, 1986. Service records document that the transformer was cleaned and repaired in August 1986 and retrofilled on September 20, 1986, with non-PCB-containing oil as part of a Sitewide transformer retrofill program. Residual staining on the transformer concrete pad was noted in January 1987, and it was suggested that the pad be coated with a sealant. Three water samples were collected and analyzed for PCBs from the associated manhole east of Building 111 on September 4, 1986 (DOE 2001b). Results from the sampling indicated PCB concentrations in all three samples were less than 1 part per billion (ppb).

During a 1991 Plantwide investigation of PCB contamination, 14 wipe samples were collected from the 111-1 Transformer. The samples were analyzed, using EPA Method 8080, by an off-site laboratory. All PCB sample results from exterior of the transformer and surrounding area were nondetect (DOE 1991).

In September 2000, D&D sampling for the Building 111 cluster was conducted. Nine samples were collected in and around the 111-1 Transformer and the extended footing drain area. Analytical results for PCBs are shown in Table 2.17 of the 2001 HRR Annual Update (DOE 2001b). Characterization sampling included analysis for PCBs and other parameters at the following locations (DOE, 2000b):

- One water sample and two sludge samples from the parking lot manhole 30 ft east of Building 111 (outfall of footing drain);
- One sludge sample from the footing drain sump in the mechanical room;
- One sludge sample from the drain next to the elevator lift at the southeastern corner of the building; and
- Four (2-inch-deep) concrete cores from the floor of the secondary containment surrounding the transformer.

The maximum concentration of PCBs identified from concrete cores in the secondary containment area (PAC 100-607) was 0.283 ppm Aroclor-1260. The maximum concentrations of PCBs identified in sludge from the associated sanitary drain manhole located 30 ft to the east of the building was 2.3 ppm Aroclor-1254 and 0.9 ppm Aroclor-1260 (Figure 2.7 and Table 2.17, DOE 2001b).

Maximum sludge sample concentrations of 2.5 ppm Aroclor-1016 and 4.1 ppm Aroclor-1254 were identified in a sample collected from the sump located in the mechanical room adjacent to the electrical room. A sludge sample collected from the storm drain located in the outer dock lift area had a maximum concentration of 3.3 ppm Aroclor-1254. These data indicate that PCB dielectric oil was contained within the containment system as originally designed.

Sampling was conducted within and adjacent to PAC 100-607 in accordance with the RLCP (DOE 2000b). The Reconnaissance Level Characterization Report/Predemolition Survey Report (RLCR/PDSR) (DOE 2000c) documented the results of the sampling prior to demolition and was

approved by the regulatory agencies. D&D of Building 111 and the transformer were completed on November 26, 2001 (DOE 2002c).

No Further Action Recommendation

The PCB characterization results for PAC 100-607 and other areas characterized in the Building 111 basement were less than the approved cleanup criteria of 25 ppm for PCBs. The D&D material disposition concentration level of 50 ppm was also met. Therefore, PAC 100-607 was proposed for NFA in accordance with RFCA (DOE et al. 1996) in an interim update to the 2001 HRR Annual Update submitted in April 2001 (DOE 2001a).

DOE received approval from CDPHE (the LRA) and EPA of NFA status for PAC 100-607 on April 12, 2001 (CDPHE and EPA 2001).

Comments

Groundwater was modeled to determine whether PCBs in paint from Building 111 were impacting groundwater. Results of the study indicated that because leaching of the PCBs from paint is very unlikely and PCBs are very immobile, there is no risk to human health or the environment. Additionally, groundwater monitoring downgradient of Building 111 is not necessary (DOE 2005).

References

CDPHE and EPA, 2001, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA RE: NFA Justification Document for the Building 111 Transformer Area (PAC 100-607), April 12.

DOE, 1991, Assessment of Known, Suspect, and Potential Environmental Releases of Polychlorinated Biphenyls, Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1997, Closeout Report for the Source Removal of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden Colorado, July.

DOE, 2000a, Annual Update to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000b, Reconnaissance Level Characterization Plan (RLCP) for the Building 111 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000c, Reconnaissance Level Characterization Report/Predemolition Survey Report (RLCR/PDSR) for the Building 111 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001a, Interim Update to the Historical Release Report for PAC 100-607, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2001b, Annual Update to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Correspondence to M. Aguilar, EPA, Region VIII from J. Rampe, DOE, RFPO, September 7.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 100-608

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 131 Transformer Leak

This Final Update to the HRR for PAC 100-608 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-608 is summarized in this update. The following HRR volumes contain PAC 100-608 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

June 3, 1989

Historical Summary

The location of PAC 100-608 is shown on Figure 15. A pole-mounted electrical transformer located north of Building 131 leaked dielectric fluid (cooling oil) onto the asphalt surface beneath the pole. The cause of the leak was not identified in the documentation. Approximately 0.25 gallon of oil leaked from the transformer. The oil had been previously tested and found to contain 19 ppm PCBs (DOE 1992).

PAC Investigations

Because the release contained less than the 10 lbs reportable quantity of PCBs and the material released contained less than the 50 ppm PCBs as regulated by EPA, no investigation or cleanup was initiated (DOE 1992). No documentation regarding repair or replacement of the transformer was found.

No Further Action Recommendation

Based on the following criteria, PAC 100-608 was proposed for NFA in the 1998 Annual Update to the HRR (DOE 1998) in accordance with RFCA (DOE et al. 1996):

- The PCB concentration in the dielectric oil was 19 ppm and was less than the approved cleanup criteria of 25 ppm documented in the Final PAM for the Remediation of PCBs (DOE 1995) for cleanup of PCB sites at RFETS (DOE 1997);
- The small quantity of the release (0.25 gallon); and
- The age of the release (June 1989).

DOE received approval of NFA status from CDPHE (the LRA) and EPA for PAC 100-608 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DPE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Environmental Technology Site, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1997, Closeout Report for the Source Removal of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden Colorado, July.

DOE, 1998, Annual Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 100-609

IHSS Number:	Not Applicable
Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	100-5
Unit Name:	Building 121 Security Incinerator

This Final Update to the HRR for PAC 100-609 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-609 is summarized in this update. The following HRR volumes contain PAC 100-609 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

December 1980 to 1985

Historical Summary

The location of PAC 100-609 is shown on Figure 15. The security incinerator was located south of Building 121 and was used for incineration of classified documents. During some period in its operating history, the incinerator was used to burn no carbon required (NCR)-type paper containing PCBs. It is known that ash from the incinerator was being disposed of at the Present Landfill (PAC NW-114) in December 1980. It is not known whether this was standard practice throughout the incinerator's operating history.

NCR paper, containing up to 10 to 20 percent PCBs, was burned in the incinerator. Dioxins and furans could potentially have been generated from incineration of this paper; however, no documentation was found detailing a release of contaminants from the operation of this incinerator.

PAC Investigations

The two slabs associated with PAC 100-609 were removed in accordance with ER RSOP Notification #02-01 (DOE 2002b). The main slab was 20 inches thick. One composite sample was collected from the concrete for waste characterization and analyzed for radionuclides, metals, dioxins, and furans. Concrete was recycled in accordance with the RSOP for Recycling Concrete (DOE 1999). After removal of the two slabs, surface soil samples were collected from six sampling locations beneath the incinerator concrete slab and analyzed in accordance with IASAP Addendum #IA-02-01 (DOE 2001).

All analytical results from soil sampling beneath the slab indicated PCB concentrations were less than RFCA Tier II (DOE et al. 1996) and WRW soil ALs (DOE et al. 2003). Maximum PCB concentrations were Aroclor-1016 at 19.5 μg/kg, Aroclor-1221 was not detected, Aroclor-1232 was not detected, Aroclor-1242 at 23 μg/kg, Aroclor-1248 at 42 μg/kg, Aroclor-1254 at

30 µg/kg, and Aroclor-1260 at 17.5 µg/kg. Because there are no existing RFCA ALs for dioxin/furans, a different framework was used for comparison of analytical results. Both EPA cleanup guidelines (EPA 1998) for residential and industrial use (in accordance with RFCA) and a value of 9 parts per trillion (ppt) toxicity equivalency (TEQs) (consultative process) were used for comparison. Results for dioxin/furan were converted to TEQ using a toxicity equivalency factor (TEF) in accordance with SW-8290 (EPA 1994) and a recent World Health Organization (WHO) (WHO 1998) study, and compared directly with the TEQ of 9 ppt. The TEQ values for dioxin and furan congeners were summed separately for each sampling location and compared to the TEQ of 9 ppt. There were no exceedances of 9 ppt for the separately summed dioxin or furan congeners. Results at one location indicated a value of 10.87 ppt when the dioxin and furan congeners were summed together. While this value is slightly higher than the reference value of 9 ppt, it, as well as all other summed TEQ values, are well within the cited Front Range background range of 0.1 to 155 ppt TEQ. The maximum concentration of dioxin and furan congeners is 290 ppt of 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD).

Because all analytical results from sampling beneath the slab indicated dioxin and furan concentrations were less than EPA cleanup guidelines for residential use and PCB levels were less than RFCA Tier II ALs, no soil was removed. Results of the stewardship evaluation indicated further action is not necessary. The shape and location of this PAC was changed based on field information to reflect the actual location of the former incinerator.

No Further Action Recommendation

Based upon the removal of the two concrete slabs in accordance with ER RSOP Notification #02-01 (DOE 2002b) and subsequent sampling in accordance with IASAP Addendum #IA-02-01 (DOE 2001), no potential contaminant or residual contaminant source could be identified. Therefore, in accordance with RFCA (DOE et al. 1996), PAC 100-609 was proposed for NFA. After review of the Closeout Report for IHSS Groups 100-4 and 100-5 (DOE 2003b), DOE received approval from CDPHE (the LRA) of NFA status for PAC 100-609 on April 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE, RFFO, from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, April 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Groups 100-4 and 100-5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 1994, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Integrated Manual (SW-846), 3rd Edition, Office of Solid Waste and Emergency Response, September.

EPA, 1998, EPA Cleanup Guidelines for Residential and Industrial Use.

WHO, 1998, Assessment of the Health Risk of Dioxins: Re-Evaluation of the Tolerable Daily Intake (TDI), WHO European Center for Environment and Health, Geneva, Switzerland, May.

PAC REFERENCE NUMBER: 100-610

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Asbestos Release – Building 123

This Final Update to the HRR for PAC 100-610 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-610 is summarized in this update. The following HRR volumes contain PAC 100-610 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

February 9, 1987

Historical Summary

The location of PAC 100-610 is shown on Figure 15. A truck traveling west on Cottonwood Avenue, en route to Building 123, Door 5, hit overhead steam and air pipes while taking a right-hand turn on a driveway south of Building 123. The steam pipes were insulated with asbestos. This incident involved disturbing approximately 12 linear feet of overhead pipe with asbestos insulation.

Response activities included barricading Third Street and Cottonwood Avenue, wetting down the asbestos on the truck and surrounding ground, transporting the truck to Building 331 for further decontamination, and repair of the overhead pipes. Personnel conducted air monitoring during the response activities. The spill was on the asphalt.

PAC Investigations

No investigation was necessary because the spill was on asphalt and was cleaned up.

No Further Action Recommendation

PAC 100-610 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. A NFA was justified because the release was on asphalt and it was cleaned up. An NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

According to the site visit conducted on December 11, 1991, the incident location was approximately 105 ft east of Third Street near the Building 123 driveway and Cottonwood Avenue intersection.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-611

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	100-4
Unit Name:	Building 123 Scrubber Solution Spill

This Final Update to the HRR for PAC 100-611 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-611 is summarized in this update. The following HRR volumes contain PAC 100-611 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

November 7, 1989

Historical Summary

An inoperative pump in the Building 123 process waste transfer system caused the Building 123 scrubber system to overflow, spilling scrubbing solution into a bermed area outside the building and into three pits beneath the floor of the building. The location of PAC 100-611 is shown on Figure 15. In addition, approximately 5 gallons of liquid were present in and around a nearby stormwater drainage ditch that served the Building 123 parking lot. It was speculated that this liquid leaked from the berm wall interface with the underlying asphalt. However, it was later concluded that this liquid was not associated with the incident (that is, it was in the ditch prior to the incident).

Under normal operating conditions, the scrubbing solution drained into the process waste system when the scrubbing process was completed. The spill occurred because waste pump switches were in the wrong position, and the influent valve was blocked by glass filtering wool from Building 123. Normal scrubbing solution drainage was restored when the glass wool material was cleared and the inoperative process waste pump was restarted.

A submersible pump was used to transfer the scrubbing solution from the bermed area to process waste drains in Building 123. Measures were proposed to prevent the subsequent buildup of glass wool in the process waste system. A RCRA CPIR (89-019) was written. All spilled materials were contained within secondary containment structures and transferred into the Building 123 process waste system for eventual treatment at Building 374 (DOE 1992).

The scrubbing solution consisted primarily of water, which was used to scrub nitric acid, hydrofluoric acid, and hydrochloric acid used in Building 123. Approximately 50 gallons were released to the bermed area, and several hundred gallons were contained in the three pits beneath the Building 123 floor.

PAC Investigations

Analyses indicated the solution in the bermed area had a pH of 1.6, and the solution in the three pits had a pH of 6.0. The 5 gallons of liquid in the parking lot drainage ditch did not react when sodium bicarbonate was applied, indicating it was not acidic and, therefore, was not the scrubbing solution.

Five surface soil samples were collected at PAC 100-611 on February 5, 2002, and analyzed for pH in accordance with IASAP Addendum #IA-02-01 (DOE 2001). Sampling results indicated remediation was not required (DOE 2003b) because pH values ranged from 8.4 to 8.8. PAC 100-611 was located at the southwestern end of the eastern portion of UBC 123 and within IHSS 100-148. Because of the extensive UBC 123 excavation, most of the PAC 100-611 area was excavated and all of the area was regraded.

No Further Action Recommendation

Based upon the characterization sample results collected in accordance with IASAP Addendum #IA-02-01 (DOE 2001), no potential contaminant or residual contaminant source could be identified (DOE 2003b). Therefore, in accordance with RFCA (DOE et al. 1996), PAC 100-611 was proposed for NFA. DOE received approval from CDPHE of the NFA status for PAC 100-611 on April 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE, RFFO, from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, April 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Annual Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update to the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Groups 100-4 and 100-5, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 100-612

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Battery Solution Spill - Building 119

This Final Update to the HRR for PAC 100-612 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-612 is summarized in this update. The following HRR volumes contain PAC 100-612 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

July 9, 1991

Historical Summary

The location of PAC 100-612 is shown on Figure 15. A nickel-cadmium battery fell from a pallet of used batteries onto the pavement adjacent to the southeastern corner of Building 119. Approximately 3 quarts of potassium hydroxide battery solution spilled onto the pavement.

Upon discovery of the spill, the battery was placed upright and the HAZMAT team responded, contained the spill, cordoned off the area, cleaned up the spill using Oil-Dri®, and placed the residue in a drum for disposal. A sample of the battery solution was taken for laboratory analysis.

The spill was confined to the pavement area which prevented any migration to groundwater or surface water. The spilled battery solution was cleaned from the pavement and placed in a drum for disposal. The drum containing the battery solution residue and cleanup supplies was transferred to RCRA Storage Unit No. 1 until shipment for off-site disposal.

PAC Investigations

Solution from another battery used in the same system was analyzed. The specific gravity and pH of the solution analyzed were 1.23 and 14, respectively. The analytical results for cadmium and chromium in the solution were 4.9 mg/L and 7.2 mg/L, respectively. Arsenic was detected at 3.9 mg/L and selenium at 0.86 mg/L.

No Further Action Recommendation

PAC 100-612 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. An NFA was justified because the spill was confined to the pavement area which prevented migration to soil, surface water, and groundwater. A NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE Approval Letter for NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 100-613

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Asphalt Surface in Lay Down Yard North of Building 130

This Final Update to the HRR for PAC 100-613 consolidates the initial information provided in the Fourth Quarterly Update to the HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 100-613 is summarized in this update. The following HRR volumes contain PAC 100-613 information:

Original Report – Fourth Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

March 18, 1993

Historical Summary

Three used, lead-acid batteries fell from a pallet while being transported from a weigh scale on the northern side of Building 130 to a multipurpose receiving and storage yard on the southern side of Building 130. The location of PAC 100-613 is shown on Figure 15. The first battery fell when the forklift hit a bump. The forklift driver could not see the fallen battery and drove over it, resulting in another jolt during which two more batteries fell off the pallet. The first battery was crushed and the other two were overturned, resulting in a 2 ft by 15 ft spill of sulfuric acid on the asphalt and sulfuric acid on the forklift's front wheels and forks.

PAC Investigations

The forklift operators (who were wearing personal protective equipment [PPE]) restored the fallen batteries to an upright position. The HAZMAT team roped off the area and all personnel near the incident and within 300 ft downwind were evacuated. pH measurements taken of the spill solution showed a value of 0. Approximately 5 gallons of sodium bicarbonate was placed on the spill, as well as on the forklift's front wheels and forks. The waste materials from the crushed battery were picked up, double-bagged, and placed into a five-gallon U.S. Department of Transportation (DOT)-approved drum which was stored in a RCRA 90-day accumulation area. The two damaged batteries were placed into a 20-gallon "lab-pack" and returned to the pallet. The HAZMAT equipment was decontaminated with water to a pH of 7. This water was pumped to drums to await treatment in Building 374.

Based on previous analyses of the same type of batteries, the spill was characterized as approximately 2 to 4 quarts of sulfuric acid and lead. These analyses identified lead concentrations in the acid at up to 20 ppm.

No Further Action Recommendation

PAC 100-613 was addressed through the consultative process in a NFA Working Group meeting on February 27, 2002. A NFA was justified because the release was to the asphalt surface and it was cleaned up. A NFA was verbally agreed to in the February 27, 2002 meeting and formally approved by CDPHE (the LRA) and EPA in a letter dated September 26, 2002 (CDHPE and EPA 2002).

Comments

This PAC was formerly identified as PAC 000-501 in the Fourth Quarterly Update (DOE 1993). It was renumbered in the Seventh Quarterly Update (DOE 1994) to better reflect its location on the PAC map.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1993, Fourth Quarterly Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1994, Seventh Quarterly Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2002, Annual Update for the Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

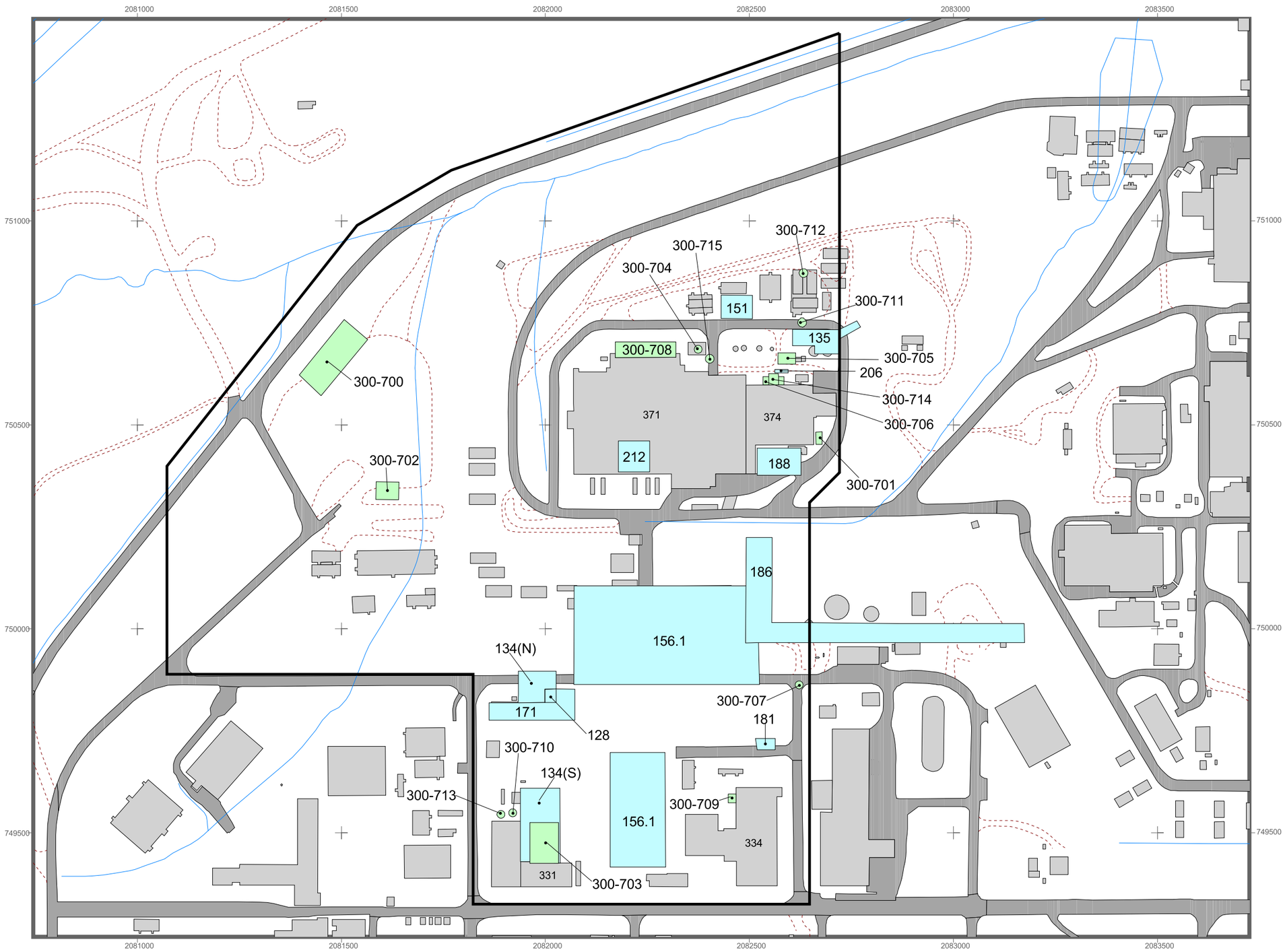

Figure 16
HRR 300 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

200 0 200 Feet

Scale = 1: 3600

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_300.apr

PAC REFERENCE NUMBER: 300-128

IHSS Number:	128
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	300-1
Unit Name:	Oil Burn Pit No. 1

This Final Update to the HRR for PAC 300-128 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 128 is summarized in this update. The following HRR volumes contain IHSS 128 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

August 18, 1956

Historical Summary

IHSS 128 is located northeast of Building 335 and south of Sage Avenue. As indicated on Figure 16, IHSS 128 is contained within two larger PACs 300-134N and 300-171. IHSSs 134N and 171 were used for various fire training exercises that included burning metals, fuels, and solvents.

On August 18, 1956, an experiment was conducted that involved burning contaminated oil from Buildings 444 and 881 in an area referred to as the garage oil-burning pit (IHSS 128). Barrels were dumped on the southern side of the pit and ignited. At one point rocks were thrown into the oil to agitate the surface to facilitate burning. Reports documenting the incident conflict on the exact amount, but between 6 and 10 drums of waste oil were burned that day (DOE 1992a).

Prior to the burning, several high-volume air samplers were started to obtain background data; however, not all the samplers were started at the same time, and several were not started for approximately 1 hour after the fire had been initially ignited. The report also documents the refueling and failure of a generator that was powering many of the samplers. One sampler was placed in the path of a "black plume," which was moving at a 30-degree angle and rising to a height of 40 to 100 ft. The plume moved in the general direction of Building 123 (DOE 1992a).

Monitoring results from the air samplers yielded alpha radiation readings ranging from 0.1 disintegrations per minute per square meter (dpm/m^2) to 30 dpm/m^2. The low reading was taken from the roof of Building 123, and the high reading was taken approximately 60 ft south of the burning pit directly in the smoke plume (DOE 1992a).

A direct survey was conducted of the soil and oil residue within the pit. Two spots along the southern bank of the pit where the oil was dumped had readings of 500 and 750 cpm alpha activity. Soil samples were collected; however, the results are unknown (DOE 1992a).

After burning, the residue was left in place, and the pit was backfilled. It is not known when the backfilling took place. The residues were not removed prior to further construction in the area (DOE 1992a).

IHSS Investigations

One surface soil sample and one soil gas sample were collected in IHSS 128 in accordance with the OU 13 RFI/RI Work Plan (DOE 1992b). The soil gas sample was analyzed for VOCs and the only analyte detected was trichlorofluoromethane at 1.9 µg/L. Soil gas samples collected in the immediate area outside IHSS 128 contained chlorinated solvents and benzene, toluene, ethylbenzene, and xylenes (BTEX). These detections were attributed to solvent and fuel burning as part of firefighter training exercises at IHSS 128 and the surrounding IHSSs. The surface soil sample collected in IHSS 128 was analyzed for lithium, magnesium, and radionuclides. All results were less than background levels (DOE 1995).

A RFCA (DOE et al. 1996) accelerated action was conducted at IHSS 128 as part of IHSS Group 300-1, in accordance with IASAP Addendum #IA-02-01 (DOE 2001) and ER RSOP Notification #02-10 (DOE 2002, CDPHE 2002). Accelerated action characterization sampling at IHSS 128 included one biased sampling location in the approximate center of the IHSS that was analyzed for radionuclides and SVOCs, and one statistical sampling location at the southern edge of the IHSS that was analyzed for radionuclides, metals, SVOCs, and VOCs. Two additional statistical samples were collected near IHSS 128, within 10 ft of its northern and eastern boundaries. The sample near the northern boundary was analyzed for radionuclides and metals, while the sample near the eastern boundary was analyzed for radionuclides, metals, SVOCs, and VOCs. The variability in analytical suites is due to the overlap of IHSS 128 with IHSS 134N and IHSS 171. Radionuclides and SVOCs are the analyte groups relevant to IHSS 128. Results were uniformly below RFCA WRW soil ALs (DOE et al. 2003). Maximum radionuclide activity was detected for uranium-235 at 0.21 pCi/g; the WRW soil AL is 8 pCi/g. Maximum concentrations for benzo(a)pyrene and fluoranthene were 280 and 760 µg/kg, respectively. WRW soil ALs for benzo(a)pyrene and fluoranthene are 3,490 and 27,200,000 µg/kg, respectively. Based on the results of accelerated action sampling, no remediation was required within IHSS 128. Details and analytical results are provided in the Final Closeout Report for IHSS Group 300-1 (DOE 2003b).

No Further Accelerated Action Recommendation

Based on the soil characterization results, there were no constituents in IHSS 128 at concentrations greater than WRW soil ALs. The SSRS conducted as part of the accelerated action further indicated NFAA was justified. The IHSS is not located in an area susceptible to landslides or high erosion.

DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS Group 300-1 on June 20, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE RE: Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY02 Notification #02-10, October 24.

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE, Final Closeout Report for IHSS Group 300-1, June 20.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, Rocky Flats Plant 100 Area, Operable Unit 13, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 300-1, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBERS: 300-134N AND 300-134S

IHSS Numbers:	134N and 134S
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Groups:	300-1 and 300-2
Unit Names:	Metal Disposal Site North Area (IAG Name: Lithium Metal Destruction Site), and Reactive Metal Destruction Site South Area

This Final Update to the HRR for PACs 300-134N and 300-134S consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The dispositions of IHSSs 134N and 134S are summarized in this update. For ease of understanding, each IHSS is described separately below.

IHSS 134N

The following HRR volumes contain IHSS 134N information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1963 to 1970

Historical Summary

Reactive metal disposal associated with fire training was conducted north of Building 331. IHSS 134N is north of and beneath portions of former Building 335. The location of IHSS 134N is illustrated on Figure 16.

Many documents indicate lithium was burned in this area; however, interviews with RFETS Fire Department employees present during these activities contradict this information. They indicated, although some small amounts of lithium may have been destroyed at this location, magnesium was the primary constituent of concern. EPA aerial photographs reveal the presence of two pond-like structures roughly 250 ft north of Building 331. IHSS 134N was originally located in a depression north of Building 331 and west of Building 553. IHSS 134N is approximately 300 ft north of Building 331 and may be the location of one of the pond-like structures. Documents describing the operations indicate various sizes of ponds (DOE 1992a). Sage Avenue was constructed over part of the area during the late 1960s and early 1970s.

Photographs taken in 1966 show a white residue coating the depression where the metal destruction took place. Other photos taken from a distance show a dense black cloud coming from this area. It is not known whether the smoke plume was the result of metal destruction or a grass fire, which was often caused by burning activities (DOE 1992a).

Lithium was originally burned by placing it on the ground and sprinkling it with water. Sometimes magnesium chips or fuel, such as gasoline, were used as initiators. The exact amount of lithium disposed at IHSS 134N as a distinct disposal area is not documented; however, Rocky

Flats records indicate by 1970 approximately 400 to 500 lbs of metallic lithium were burned and their residues buried. This quantity is thought to be a combination of lithium disposal that took place at this site and at two other sites (PAC 300-134S and 900-140). The waste lithium originated in Buildings 444 and 881 and was not radioactively contaminated (DOE 1992a).

IHSS Investigations

OU 13 RFI/RI activities at IHSS 134N included soil gas sampling and surface soil sampling in accordance with the OU 13 RFI/RI Work Plan (DOE 1992b). In addition, a sludge sample was collected in IHSS 134N at a location where sludge was encountered during soil gas sampling (DOE 1992b).

Soil gas was sampled at 15 locations in IHSS 134N. VOCs were detected in approximately 60 percent of all the samples associated with IHSS 134N. The detected analytes included chlorinated solvents, BTEX, acetone, and chlorofluorocarbons. The presence of these analytes was attributed to the burning of spent solvents, oil, and fuel in this area for firefighter training (DOE 1995).

Surface soil samples were collected at three locations in IHSS 134N. All three were analyzed for radionuclides, and one of these was also analyzed for metals. Americium-241, plutonium-239/240, and lithium were present at concentrations exceeding background means plus two standard deviations (DOE 1995).

The sludge sample collected in IHSS 134N contained 100,000 µg/L tetrachloroethene, as well as lesser amounts of other chlorinated solvents. Cadmium, nickel, and zinc were present in the sludge at concentrations greater than background levels (DOE 1995). The detection of 100,000 µg/L trichloroethene in an OU 13 sludge sample is less than the RFCA WRW soil AL for trichloroethene (615,000 µg/kg).

A RFCA (DOE et al. 1996) accelerated action was conducted at IHSS 134N as part of IHSS Group 300-1, in accordance with IASAP Addendum #IA-02-01 (DOE 2001) and ER RSOP Notification #02-10 (DOE 2002, CDPHE 2002). Accelerated action characterization sampling at IHSS 134N included two biased surface soil sampling locations and seven surface soil statistical locations within the boundaries of the IHSS. Seven of these samples were analyzed for radionuclides and metals. One location, sampled in the area of overlap with IHSS 128, was analyzed for radionuclides and SVOCs, and one location on the boundary with IHSS 171 was analyzed for radionuclides, metals, SVOCs, and VOCs. Results for these samples were uniformly below RFCA WRW soil ALs (DOE 2003b, DOE et al. 2003). Maximum radionuclide activity of plutonium-239/240 was 4.86 pCi/g and iron was detected at a maximum concentration of 53,100 mg/kg. Based on the results of accelerated action sampling, no soil remediation was necessary in IHSS 134N. RFCA (DOE et al. 1996) accelerated action activities at this IHSS were limited to the removal of an approximately 88-ft^2 equipment slab located in the southwestern portion of the IHSS, immediately north of Building 335. Details and analytical results are provided in the Final Closeout Report for IHSS Group 300-1 (DOE 2003b).

No Further Accelerated Action Recommendation

Based on the OU 13 and accelerated action data, accelerated actions taken, and the SSRS (DOE et al. 2003) conducted as part of the accelerated action, NFAA was justified for IHSS 134N.

DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS Group 300-1 on June 20, 2003 (CDPHE 2003).

IHSS 134S

The following HRR volume contains IHSS 134S information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1963 to 1970

Historical Summary

Reactive metal disposal and firefighting training was conducted at IHSS 134S, located in the corner formed by the L-shape of former Building 331. Part of the roof and adjacent parking lot are included. This location is illustrated on Figure 16. Activities at IHSS 134S are not easily differentiated from activities at IHSS 134N because documentation conflicts with interviewee statements. IHSS 134S is in the L-shaped corner of Building 331 and the parking lot to the north. RFETS Fire Department personnel indicate lithium destruction took place in this area (DOE 1992a).

Lithium was originally burned by placing it on the ground and sprinkling it with water. Sometimes magnesium chips or fuel, such as gasoline, were used as initiators. The use of this location for disposal of lithium on the ground was discontinued because a fireman was injured during lithium disposal activities on October 13, 1966. However, lithium burning in drums at the adjacent Building 331 parking lot is documented as late as 1969. On September 5, 1969, lithium was being burned inside a barrel when it exploded, causing lithium to be dispersed in the Building 331 parking lot and onto the roof of Building 331.

The exact amount of lithium disposed at IHSS 134S as a distinct disposal area is not documented; however, Rocky Flats records indicate by 1970 approximately 400 to 500 lbs of metallic lithium were burned and their residues buried. This quantity is thought to be a combination of lithium disposal that took place at this site and at two other sites (IHSS 134N and IHSS 140). The waste lithium originated in Buildings 444 and 881 and was not radioactively contaminated (DOE 1992a).

IHSS Investigations

Soil gas and surface soil sampling were conducted at IHSS 134S in accordance with the OU 13 RFI/RI Work Plan (DOE 1992b).

Soil gas was sampled at 33 locations in and near IHSS 134S. VOCs were detected in approximately 60 percent of all the samples associated with the IHSS. The analytes detected included chlorinated solvents, BTEX, acetone, and chlorofluorocarbons. The presence of these analytes was attributed to the burning of spent solvents, oil, and fuel in this area for firefighter training (DOE 1995).

Surface soil samples were collected at 11 locations in IHSS 134S and were analyzed for radionuclides and lithium. All results were less than background means plus two standard deviations except for americium-241, plutonium-239/240, and uranium-235 (DOE 1995).

Accelerated action characterization was conducted at IHSS 134S as part of IHSS Group 300-2, in accordance with IASAP Addendum #IA-03-08 (DOE 2003c). Accelerated action characterization sampling at IHSS 134S included 11 statistical and 16 biased soil sampling locations. Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. The only results that exceeded RFCA WRW soil ALs (DOE et al. 2003) were benzo(a)pyrene in surface soil at three sampling locations and dibenz(a,h)anthracene at 3,500 µg/kg at one location. The maximum detection was 17,000 µg/kg. The maximum concentrations of other prominent contaminants in surface soil include 87 mg/kg of lead and 68 mg/kg of chromium. The maximum activities of radionuclides in surface soil were 0.852 pCi/g americium-241, 4.856 pCi/g plutonium-239/240, 2.253 pCi/g uranium-234, 0.467 pCi/g uranium-235, and 5.739 pCi/g uranium-238. In subsurface soil, maximum concentrations of metal included 170 mg/kg lead. VOCs were either not detected or detected very close to detection limits. Maximum radionuclides in subsurface soil were 5.612 pCi/g uranium-234, 0.181 pCi/g uranium-235, and 5.612 pCi/g uranium-238. As documented in the Data Summary Report, no soil remediation was required in IHSS Group 300-2 following accelerated action sampling (DOE 2004).

In accordance with the consultative process (RCR dated December 2, 2004) the location with the benzo(a)pyrene detection of 17,000 µg/kg in surface soil was excavated during the removal of overlying asphalt in March, 2005. Three samples were collected from the excavation. After soil removal, benzo(a)pyrene concentration ranged from 460 µg/kg to 11,000 µg/kg. The maximum benzo(a)pyrene concentration was less than three times the WRW soil AL (Section 1.2.1).

No Further Accelerated Action Recommendation

Based on the OU 13 data, the accelerated action characterization sampling data, and the SSRS (DOE et al. 2003), NFAA was justified for IHSS 134S.

DOE received approval of the NFAA status for IHSS 134S on December 1, 2004, in the form of CDPHE (the LRA) approval (CDPHE 2004) of the Data Summary Report for IHSS Group 300-2 on December 17, 2004. (DOE 2004).

Comments

None

References

CDPHE, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY02 Notification #02-10, October 24.

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 300-1, June 20.

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, Draft Data Summary Report for IHSS Group 300-2 UBC-331 (Maintenance) and IHSS 300-134(S) (Lithium Metal Destruction Site), December 17.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, Rocky Flats Plant 100 Area, Operable Unit 13, October.

DOE, 1995, Data Summary Report for No. 2 Operable Unit 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 300-1, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003c, Industrial Area Sampling and Analysis Plan Addendum #IA-03-08, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Final Data Summary Report for IHSS Group 300-2, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 300-135

IHSS Number:	135
Current Operable Unit:	Not Applicable
Former Operable Unit:	8
IHSS Group:	Not Applicable
Unit Name:	Cooling Tower Blowdown

This Final Update to the HRR for PAC 300-135 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 135 is summarized in this update. The following HRR volumes contain IHSS 135 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1980 to 1982

Historical Summary

IHSS 135 consists of a former pond area and culvert where cooling tower blowdown was discharged. The location of IHSS 300-135 is indicated on Figure 16.

Aerial photographs indicated the Building 373 Cooling Tower was present as early as 1978. Water from the Cooling Tower was allowed to drain into Walnut Creek as late as October 1979. A June 1, 1980 aerial photograph indicated a pond-like structure north of Building 374 where Tanks 808A and 808B were later located. The feature was identified in utility drawings as the Cooling Tower retention pond. The drawings indicated a sluice gate at the northeastern corner of the pond with a connecting culvert extending to the northeast. Interviewees for the CEARP Phase I document indicated the retention pond was located south of Building 374; however no documents could be found to support this, and no cooling towers have ever been located in that area (DOE 1992).

The first documented use of the Building 373 Cooling Tower pond was on June 12, 1981, when the cooling tower was cleaned and the blowdown was pumped into a small retention pond. During the night, some of the water leaked through the dirt dike and gate valve and drained into Walnut Creek. In response to this incident, a new gate valve was installed (DOE 1992).

Chromate was typically added to cooling water as a corrosion inhibitor until the late 1970s, when phosphate compounds were substituted. Because the switch from chromate to phosphate occurred in the same time period as the initiation of activity at the Building 373 Cooling Tower, it is possible the chromate was present in the cooling water blowdown. Analysis of the water from the above incident resulted in no detectable quantities of phosphates. It is possible that prior to use of the pond, effluent from the Cooling Tower may have contained tritium (DOE 1992).

IHSS Investigations

In accordance with the OU 8 RFI/RI Work Plan (DOE 1994), surface soil in IHSS 135 was sampled at five locations and samples were analyzed for metals, radionuclides, and total petroleum hydrocarbons (TPH). Americium-241, plutonium-239/240, copper, molybdenum, and zinc were all detected in excess of their background means plus two standard deviations. Maximum values are americium-241 at 0.12 pCi/g, plutonium-239/240 at 0.74 pCi/g, copper at 65.2 mg/kg, molybdenum at 4.8 mg/kg, and zinc at 146 mg/kg. Chromium was not detected at levels exceeding background means plus two standard deviations (DOE 1995).

No Further Accelerated Action Recommendation

Based upon the sampling results, the total cumulative risk to human receptors from this site was deemed negligible. Based on the RFCA Attachment 6 criteria (DOE et al. 1996), NFA was recommended for IHSS 135 (DOE 1997).

After a review of IHSS 135 information presented in the HRR 1997 Annual Update by regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 135 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Vol. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary No. 2 Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-151

IHSS Number:	151
Current Operable Unit:	Not Applicable
Former Operable Unit:	8
IHSS Group:	Not Applicable
Unit Name:	Tank 262 Fuel Oil Spills (IAG Name: Fuel Oil Leak)

This Final Update to the HRR for PAC 300-151 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 151 is summarized in this update. The following HRR volumes contain IHSS 151 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1981 to 1988

Historical Summary

Tank 262 was a 47,500-gallon underground diesel storage tank located north of Buildings 371 and 374. It was installed in 1980 and was overlain by a 15- by 25-ft concrete pad. The location of IHSS 151, which consists of the area impacted by spills from this tank, is shown on Figure 16.

The first documented spill was on August 12, 1981, when approximately 196 gallons of No. 2 diesel fuel were spilled on the ground north of Building 374. The spill area was approximately 30 by 35 ft, and an estimated 400 cy of soil were affected. One reference stated the spill did not reach a water course. A report at the time of the incident indicated cleanup would be initiated when the ground dried (DOE 1992). A site visit conducted for the OU 8 Phase I RFI/RI Work Plan (DOE 1994) indicated only small areas of staining 1 to 3 ft in diameter remained around the pad, suggesting the area had been cleaned up after the 1981 spill.

A second spill released 50 gallons of diesel fuel in July 1982, and in October of the same year 32 gallons were spilled. No environmental impact was expected from the 50-gallon spill and no cleanup is documented. The diesel recovered from the 32-gallon spill may have been used for dust suppression on site roads (DOE 1992).

Another spill of 10 to 20 gallons occurred in September 1988 when a vent was left open during routine system circulation. The State Oil Inspector was notified and cleanup of adjacent saturated soil is documented (DOE 1992).

In accordance with RFCA Attachment 13, Tank 262 was drained and filled with polyurethane foam in September of 2002. The tank was not removed because it is at least 3 ft below the ground surface.

IHSS Investigations

In accordance with the OU 8 RFI/RI Work Plan (DOE 1994), IHSS 151 was sampled in five locations for TPH, metals, and BTEX. Soil gas sampling revealed one detection of trichlorofluoromethane at a very low ppb range. TPH was not detected. Some metals were detected in surface soil including arsenic at 4.8 mg/kg, beryllium at 0.74 mg/kg, and copper at 22.75 mg/kg (DOE 1995). There were no other detections of hydrocarbon contaminants (or any other contaminants), supporting the conclusion that past diesel fuel spills were adequately cleaned up.

No Further Accelerated Action Recommendation

OU 8 RFI/RI sampling data for IHSS 151, described above, indicate historic spills at this site were adequately remediated. The IHSS was therefore proposed for NFA, consistent with the RFCA Attachment 6 criteria (DOE et al. 1996) for NFA decisions (DOE 1997).

After a review of IHSS 151 information presented in the HRR 1997 Annual Update by regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 151 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Vol. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Operable Unit 8, Data Summary Report, 700 Area, Vol. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-156.1

IHSS Number:	156.1
Current Operable Unit:	Not Applicable
Former Operable Unit:	14
IHSS Group:	Not Applicable
Unit Name:	Building 371 Parking Lot (IAG Name: Building 334 Parking Lot)

This Final Update to the HRR for PAC 300-156.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 156.1 is summarized in this update. The following HRR volumes contain IHSS 156.1 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Interim (DOE 2000a);
Update Report – 2000 Annual (DOE 2000b);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1969(?) to February 1973

Historical Summary

Historical records and employee interviews indicated a pile of radioactively contaminated soil of uncertain origin was present either west of Building 334 or south of the location where Building 371 was later built. Although employee interviews place the pile west of Building 334, aerial photographs indicate it was probably located in the area where the Building 371 parking lot was later constructed, and was present as early as 1969. Both areas are indicated as IHSS 156.1 on Figure 16 (DOE 1992a).

Some of the soil reportedly originated from construction of an addition to Building 774 or from the removal of underground tanks at Building 774. An interview with a former employee on December 6, 1991, revealed that some of the soil might have originated at Building 707 (DOE 1992a).

In February 1973, the soil, estimated to be 250 cy, was moved to an area east of the Swinerton and Walberg (S&W) contractor storage yard (PAC 900-165). The soil was sampled and analyzed prior to the move, yielding 3 to 704 dpm/g. A former employee recalled that some of the soil might have been transported to north and west of Building 559 until the area was eventually leveled out. This augments CEARP Interview Notes that state the soil was spread out over the hillside southeast of where Building 374 is located (DOE 1992a).

IHSS Investigations

In accordance with the OU 14 RFI/RI Work Plan (DOE 1992b), IHSS 156.1 was investigated. Because of the uncertainty in the location of this unit, both the area west of Building 334 and the

Building 371 parking lot area were investigated. A total of 42 samples were collected in the Building 371 parking area and the smaller area west of Building 334. Based on historical knowledge, the samples were analyzed for radionuclides. Nine radionuclide detections slightly exceeded the background means plus two standard deviations. The maximum detected activity of plutonium-239/240 was 0.16 pCi/g, which is less than the resident PPRG of 2.5 pCi/g. The maximum detected activity of americium-241 was 0.039 pCi/g, which is well below the resident PPRG of 1.9 pCi/g (DOE 1995, 2000a).

No Further Accelerated Action Recommendation

All OU 14 RFI/RI analytical data for IHSS 156.1 were less than the established PPRGs (DOE 1995). As agreed upon in a meeting held May 18, 2000 with the regulatory agencies, no contaminant source was indicated. Therefore NFA was proposed.

DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 156.1 on February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Workplan Operable Unit No. 14 Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Data Summary No. 1 Operable Unit No. 14 Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Historical Release Report (Interim Update) and Response to Comments for HRR Annual Updates (1997, 1998, and 1999), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2000b, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-171

IHSS Number:	171
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	300-1
Unit Name:	Fire Department Training Ground (IAG Name: Solvent Burning Ground)

This Final Update to the HRR for PAC 300-171 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 171 is summarized in this update. The following HRR volumes contain IHSS 171 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1969 to 2003

Historical Summary

IHSS 171 covers approximately one-quarter of an acre and includes the area beneath Building 335, as well as areas to the southeast and northeast. IHSS 171 contains all of the area included in PAC 300-128 and overlaps PAC 300-134N. Figure 16 shows the locations of these IHSSs and illustrates these relationships.

Building 335 was used for training Fire Department personnel. The original, prefabricated building was placed after the 1969 fire at Building 776. Experiments took place to test the effects of heat and water on different types of materials (for example, filter plenums). Some exercises were conducted inside the building and provided a smoky, cramped, firefighting experience (DOE 1992a).

When this area was first used for training purposes, magnesium chips coated with a water-soluble material were burned, along with diesel fuel, gasoline, and possibly waste solvents. On June 9, 1972, steel beams were tested in a fire created by burning diesel oil in an open pit. Other types of training included the use of a large cross-shaped pan or a smaller square pan in which diesel fuel was burned. Most of the fuel was consumed; however, some was allowed to remain in the pan and mix with rainwater, and the mixture was eventually dumped on the ground (DOE 1992a).

On December 11, 1990, the large cross-shaped pan was found to have holes in it and oil-contaminated soil was present around the pans. The contamination was thought to have spread to a nearby storm drain catch basin where an oily sheen could be seen on the surface of standing water. Running water in a nearby ditch reportedly had no visible sheen. It was uncertain whether the sheen in the catch basin was related to firefighter training activities or to the presence of an 18,000-gallon gasoline underground storage tank (UST) approximately 250 ft south of the catch basin (DOE 1992a).

Later exercises involved the use of a "tree" constructed of metal tubing that allowed propane to escape from the "branches" of the tree. The propane was ignited and firefighters extinguished the resulting fires with a large quantity of water, which drained from the area into the storm drain system (PAC 000-505) (DOE 1992a).

At a site visit conducted on November 21, 1991, the cross-shaped pan was present but covered. The water standing in the catch basin had an oily sheen on the surface, as observed during the 1990 inspection. There was no evidence of soil contamination. A black residue was observed along the top of the large, east-facing door of Building 335 (DOE 1992a).

IHSS Investigations

IHSS 171 was investigated in accordance with the OU 13 RFI/RI Work Plan (DOE 1992b), and seven surface soil samples were collected within the IHSS boundaries. Based on site history, all seven of the samples were analyzed for radionuclides, and five were also analyzed for lithium and magnesium. All results were less than the applicable PPRGs (DOE 1995). The maximum detected concentration of magnesium, americium-241, and plutonium-239/240 exceeded the background mean plus two standard deviations for surface soil (DOE 1995).

RFCA (DOE et al. 1996) accelerated action activities were conducted at IHSS 171 as part of IHSS Group 300-1 in accordance with IASAP Addendum #IA-02-01 (DOE 2001) and ER RSOP Notification #02-10 (DOE 2002; CDPHE 2002). Accelerated action sampling in IHSS 171, included 16 sampling locations within and immediately adjacent to the IHSS. The samples were analyzed for radionuclides, metals, and SVOCs in the 0- to 0.5-ft and 0.5- to 2.5-ft intervals, and for VOCs in the subsequent sampling intervals down to 10.5 ft. The only result that exceeded the RFCA WRW soil ALs (DOE et al. 2003) was arsenic (29.3 mg/kg) in subsurface soil (0.5 to 2.5 ft), at a sampling location approximately 15 ft south of Building 335. Based on the RFCA SSRS (DOE et al. 2003), soil at this location did not require accelerated action (RCR dated December 17, 2003). Accelerated action activities at this IHSS were limited to removal of the Building 335 slab and foundation walls, all drain lines less than 3 ft below grade, a corrugated metal sump, and electric lines. Residual data indicated the maximum radionuclide activity of plutonium-239/240 was 3.48 pCi/g and the maximum arsenic concentration was 19 mg/kg in surface soil. Historical and accelerated action data and all remedial activities are documented in the Final Closeout Report for IHSS Group 300-1 (DOE 2003b).

No Further Action Recommendation

Based on the actions taken, results of soil characterization, and SSRS conducted as part of the accelerated action, NFAA was justified.

DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 171 on June 20, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2002, Correspondence to R. DiSalvo, DOE, RFFO from S. Gunderson, CDPHE RE: Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY02 Notification #02-10, October 24.

CDPHE, 2003, Correspondence to R. DiSalvo, DOE, RFFO from S. Gunderson, CDPHE RE: Final Closeout Report for IHSS Group 300-1, June 20.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan, Rocky Flats Plant 100 Area, Operable Unit 13, October.

DOE, 1995, Draft Data Summary No. 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 300-1, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 300-181

IHSS Number: 181

Current Operable Unit: None

Former Operable Unit: 10

IHSS Group: None

Unit Name: Building 334 Cargo Container Area

This Final Update to the HRR for PAC 300-181 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 181 is summarized in this update. The following HRR volumes contain IHSS 181 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

Summer of 1984 to July 1986

Historical Summary

This storage area was located to the north of Building 334 and consisted of one cargo container with an area of 160 ft^2. The location of IHSS 181 is shown on Figure 16. Although it had the capacity to hold up to 18 drums, the maximum number of drums ever stored in the container was seven. No berms surrounded the area, but a collection pan was located in the bottom of the cargo container. Wastes stored in the container included machine oils, solvents, machine coolants, and possibly low-level radioactive wastes. While in use, the storage container was monitored weekly on the inside and outside. No other documentation was found that detailed the response to this operation. No documentation of spills or leaks was found in relationship to this unit (DOE 1992a).

IHSS Investigations

As part of the OU 10 RFI/RI Work Plan (DOE 1992b), three soil gas samples were collected within IHSS 181 and analyzed for VOCs. One detection of methane gas was identified at 50 ppm. There were no other positive detections (DOE 1995).

No Further Accelerated Action Recommendation

Based upon the OU 10 analytical data and the history of this IHSS having no documented spills, this IHSS was recommended for no further action.

Following regulatory agency review of IHSS 181 information presented in the 1997 Annual Update to the HRR, DOE received approval from CDPHE (the LRA) and EPA of the NFA status for IHSS 181 (CDPHE and EPA 1999).

Comments

Methane gas is commonly found at levels mentioned above (50 ppm) due primarily to decomposing organic matter and interbedded coal seams along the Front Range.

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Other Outside Closures (Operable Unit No. 10), Rock Flats Plant, Golden, Colorado, May.

DOE, 1995, Technical Memorandum 1, Operable Unit 10, Other Outside Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-186

IHSS Number: 186

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Groups: 500-1 and 000-4

Unit Name: Valve Vaults 11, 12, and 13 (IAG Name: Valve Vault 12)

This Final Update to the HRR for PAC 300-186 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 186 is summarized in this update. The following HRR volumes contain IHSS 186 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1985 to 1989

Historical Summary

IHSS 186 consists of soil associated with NPWL Valve Vaults 11, 12, and 13, which were inline vaults along the process waste line that ran south of Building 374 and west of Building 552. The location of IHSS 186 is shown on Figure 16. The vaults were connected by the process waste lines and the containment lines that surround the pipes. Valve Vaults 11, 12, and 13 as well as associated pipeline are part of PAC 000-504, NPWL. In addition to secondary containment, the process waste lines were equipped with leak-detection sensors. Several incidents occurred in one or more of these vaults resulting in the release of process waste to the environment. The total quantity of waste released to the environment is uncertain because leak-detection equipment was not always triggered immediately and therefore it is not known when some of the leaks began. In spite of clean-up activities undertaken in response to these leaks, radiation levels remained above background when cleanup was complete (DOE 1992a).

The first documented incident was on June 12, 1985. Contractors excavating a drainage ditch along the southern side of the PA in the northeastern corner of the Building 371 Parking Lot broke the outer containment of four lines and the inner line of the low-level transfer line near Valve Vault 13. Soon afterward, pumping began from the process waste tanks in Building 460 to Building 374 allowing liquid to be released from the inner pipe. The waste consisted of Oakite (tri sodium phosphate, used for industrial metal cleaning) and distilled water. An estimated 4.4 gallons were spilled on the ground. The pipe was subsequently repaired and investigation at that time revealed no radioactive contamination associated with the break (DOE 1992a).

In June 1986, acidic waste corroded a 1-inch-diameter hole in a black iron flange connected to a stainless steel piping system, causing a release of waste into Valve Vault 13. In October 1986, soil surrounding the area was found to be saturated with a yellow liquid containing americium, plutonium, and uranium. Monitoring of the area indicated the presence of gross alpha, gross beta, and uranium-238 contamination of up to 1.7×10^5, 5×10^4, and 9×10^2 pCi/L, respectively.

In response to the incident, the black iron flange was replaced with a stainless steel flange without further release of contamination (DOE 1992a).

The process waste line between Valve Vault 12 and Valve Vault 13 was reported leaking on October 24, 1986. The process waste lines were initially designed to provide a constant slope between adjacent valve vaults to allow any liquid in the containment pipe to flow into a vault and trigger an alarm, but some of the lines were repaired or replaced in 1981 or 1982 in a manner that did not allow gravity drainage. Instead a trap was created, allowing saturation of the bedding material and soil around the pipe, and no alarm sounded when the release occurred. An area 30 by 100 ft was excavated to locate the leak, and repairs were completed on November 13, 1986. A series of small cofferdams was built to contain surface and groundwater, and the collected fluids were removed by a tank truck and placed in SEP Pond 207A (PAC 000-101). Approximately 24 waste boxes of uranium-contaminated sand and gravel were shipped offsite as low-level radioactive waste. Cleanup was completed on December 8, 1986. Radiation levels were reduced to slightly above background and the area was backfilled (DOE 1992a).

On June 1, 1987, a radioactive leak was discovered near Valve Vault 13 when contamination was found in the culvert drain collection basin. The leak was in the high-level transfer line between Building 374 and Valve Vault 13. Analytical results from samples collected in the culvert drain collection basin indicated 42,000 pCi/L gross alpha activity and 13,000 pCi/L gross beta activity. Direct counts on soil and the culvert were reported as “high.” In response to the culvert contamination in 1987, dikes were installed in the drain path to prohibit further draining. Liquids were drained from the transfer pipe and pumped to a mobile tanker. The culvert and associated soil were removed until both alpha and beta counts were less than 250 cpm. The high and low level transfer lines were to have been replaced with fibercast piping and the containment piping repaired to the original design specifications (DOE 1992a).

On September 13, 1988 Valve Vault 12 was flooded with 1,700 gallons of high nitrate solution during transfer between Building 774 and Building 374. A connection at a tygon tube became separated, which allowed the leak to occur (DOE 1992a).

In October 1989, approximately 10,000 gallons of SEP water was found in Valve Vaults 11, 12, and 13. The water exhibited 3,122 to 7,134 pCi/L gross alpha activity. Alarms had sounded in the Building 231 Pump House, Pump Station No. 1, and Valve Vault 19 but upon inspection no problems were found at these locations. The inspection continued and resulted in the discovery of liquids in Vaults 11, 12, and 13. Pumping from Buildings 778 and 774 was stopped and the appropriate lockout/tagouts were provided on the valves in Valve Vault 12 and in the Building 231 Pump House. The liquid was removed and repairs to the line were completed by October 22, 1989. The line was flow tested successfully. A RCRA CPIR (89-015) was prepared and submitted (DOE 1992a).

IHSS Investigations

IHSS 186 was investigated in accordance with the OU13 RFI/RI Work Plan (DOE 1992b). Eleven surface soil samples and 69 soil gas samples were collected. Soil gas samples were analyzed for VOCs. Based on the history of this IHSS, the surface soil samples were analyzed only for radionuclides. VOCs in soil gas exceeded 1 µg/L at 10 percent of the locations sampled. Chlorinated solvents and benzene were the compounds detected. All results for surface soil samples were less than PPRGs, but plutonium-239/240 activities were greater than the

background mean plus two standard deviations in all of the samples and americium-241 activities were greater than the background mean plus two standard deviations in all but one of the samples (DOE 1995).

Accelerated Action Activities

RFCA (DOE et al. 1996) accelerated action activities were conducted at IHSS 186 under IHSS Groups 500-1 and 000-4 (NPWL). IHSS Group 500-1 accelerated action activities were conducted at IHSS 186 in accordance with IASAP Addendum #IA-04-03 (DOE 2003b). Accelerated action soil characterization sampling at IHSS 186 included 26 statistical and 11 biased sampling locations. All accelerated action characterization sampling results for samples located within IHSS 186 were less than the applicable RFCA WRW soil ALs (DOE et al. 2003). Based on the results of accelerated action and historical sampling, no remediation was required.

RFCA (DOE et al. 1996) accelerated action activities were conducted in IHSS 186 in accordance with ER RSOP Notification #05-01 (DOE 2004a) for IHSS Group 000-4 (NPWL). Characterization samples collected in accordance with IASAP Addendum # IA-04-03 (DOE 2003b) were collected at 13 locations associated with Valve Vaults 11, 12, and 13, and associated piping. Samples were collected at depths targeted for the depth of the NPWL at each location. Sampling data for 11 characterization sampling locations sampled under the IHSS Group 500-1 sampling program were also considered as NPWL characterization samples. Analytes included radionuclides, metals, VOCs, and SVOCs, but varied with location. All results were less than RFCA WRW soil ALs (DOE et al. 2003), except for radionuclides in subsurface soil sampled at sampling location BX44-001, along the NPWL between Valve Vaults 12 and 13. The plutonium-239/240 activity was 3,229 pCi/g and the activities of americium-241, uranium-234, uranium-235, and uranium-238 were also well above their RFCA WRW soil ALs (DOE 2005a).

An accelerated action was conducted in accordance with ER RSOP Notification #05-01 (DOE 2004a). Soil was removed at the BX44-001 hot spot between Valve Vaults 12 and 13. Seven confirmation samples were collected in the excavation, five of which were analyzed for radionuclides and VOCs, and the remaining two were analyzed for radionuclides and metals. All confirmation sampling results were less than RFCA WRW soil ALs. In addition to the complete removal of Valve Vaults 11, 12, and 13, remedial activities in IHSS 186 included the removal of process waste lines between Valve Vaults 10 and 11, Valve Vaults 11 and 12, between Valve Vaults 12 and 13, north of Valve Vault 13, and connecting Valve Vault 12 to Building 231 and Tanks 231A and 231B. The process waste line west of Valve Vault 13 that connects to Valve Vault 14 was RCRA clean closed and left in place, with a residual rinse of 74.3 pCi/L for gross alpha/gross beta (DOE 2005a).

<u>No Further Accelerated Action Recommendation</u>

NFA was recommended for IHSS 186 based on the following:

- All residual contaminant concentrations in surface and subsurface soil were less than RFCA WRW soil ALs (DOE 2004b).
- NFAA was justified based on the SSRS (DOE et al. 2003) (DOE 2004b).

After review of the IHSS Group 500-1 Data Summary Report (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS Group

500-1, including IHSS 186, on September 29, 2004 (CDPHE 2004). NPWL removal and dispositioning was completed as of July 2005. These activities are documented as part of the IHSS Group 000-4 Closeout Report (DOE 2005a) and the RCRA Closure Description Document (DOE 2005b).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-1, IHSS 300-186, IHSS 500-117.1 and IHSS 500-197, dated September 2004, September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Final Phase I RFI/RI Work Plan, Rocky Flats Plant 100 Area, Operable Unit 13, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, ER RSOP Notification #05-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004b, Data Summary Report for IHSS Group 500-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for IHSS Group 000-4, New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, RCRA Closure Description Document, Rocky Flats Environmental Technology Site, Golden Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 300-188

IHSS Number: 188

Current Operable Unit: IA

Former Operable Unit: 8

IHSS Group: None

Unit Name: Acid Leak

This Final Update to the HRR for PAC 300-188 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 188 is summarized in this update. The following HRR volumes contain IHSS 188 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1983

Historical Summary

IHSS 188 is an unpaved area near the east gate of Building 374 where acid leaked from a drum in 1983. This location of IHSS 188 is shown on Figure 16. The drum contained up to 55 gallons of a mixture of nitric acid and hydrochloric acid, probably a waste metal-leaching solution originating in the 400 Area. The solution may have contained heavy metals. No documentation was found detailing a response to this occurrence (DOE 1992).

IHSS Investigations

Surface soil was sampled at five locations within IHSS 188 in accordance with the OU 8 RFI/RI Work Plan (DOE 1994). The samples were analyzed for metals. There were no detections greater than background concentrations with the exception of cobalt at a slightly elevated level (DOE 1995).

No Further Accelerated Action Recommendation

Based on the OU 8 soil sampling results, the relatively small amount of acid spilled, and the neutralization effect over time, it was concluded that no threat of adverse health effects existed under the exposure conditions evaluated (DOE 1997). NFA was recommended for IHSS 188, consistent with the criteria for recommending NFA decisions presented in RFCA Attachment 6 (DOE et al. 1996).

After a review of IHSS 188 information presented in the 1997 Annual Update to the HRR by regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 188 (CDPHE and EPA 1999).

Comments

IHSS 188 includes PIC 44.

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan, Operable Unit 8, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Data Summary Report 2 Operable Unit 8 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-206

IHSS Number:	206
Current Operable Unit:	IA
Former Operable Unit:	10
IHSS Group:	300-5
Unit Name:	Inactive Hazardous Waste Tank D-836

This Final Update to the HRR for PAC 300-206 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 206 is summarized in this update. The following HRR volumes contain IHSS 206 information:

Original Report – 1992 (DOE 1992a);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1975 to late 1980s

Historical Summary

The location of IHSS 206 (former Tank D-836) is shown on Figure 16 along the northern side of Building 374. Tank D-836 was a 19,000-gallon, carbon steel tank used for hazardous waste storage. The tank had no secondary containment and was located on compacted soil. It was identified as a portion of Unit #42 in the RCRA Part B Permit Application, specifically Unit #42.14 (DOE 1992b). The tank held off-specification product water, which was defined as having conductivity exceeding 150 micromhos per centimeter (µmhos/cm) (DOE 1992a).

A spill of condensate water occurred on February 18, 1980 when a line from the evaporator to the tank was disconnected. The spill in 1980 was found to contain low concentrations of tritium (DOE 2000). The tank was a 90-day accumulation area and was reported removed from IHSS 206 in 1987. Other information indicates that the tank was in operation outside of Building 374 prior to 1990. Photographs taken in 1992 as part of the OU 10 RFI/RI Work Plan (DOE 1992c) confirmed that the tank was removed.

IHSS Investigations

Based on historical information, regarding the 1980 release, sampling was conducted for tritium and total metals in 1994, in accordance with the OU 10 Work Plan (DOE 1992c). Ten surface soil samples and one duplicate were collected from the IHSS. Only two metals were detected at concentrations greater than background. Copper had a maximum concentration of 35.9 mg/kg and zinc had a maximum concentration of 258 mg/kg. All results were below RFCA Tier II soil ALs (DOE 1995, DOE et al.1996).

No Further Accelerated Action Recommendation

Based on the results of the OU 10 soil sampling, no contaminant source was indicated in IHSS 206. Therefore IHSS 206 was proposed for no further action consistent with the RFCA Attachment 6 criteria (DOE et al. 1996) for no further action decisions (DOE 2001).

After a review of IHSS 206 information presented in the HRR 2001 Annual Update (DOE 2001) by regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 206 (CDPHE and EPA 2002).

Comments

Ten of 11 antimony results were rejected because predigestion matrix spike (MS) criteria were not met at the laboratory; however, the one acceptable result of 3.2 mg/kg was well below background levels (DOE 1995).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, RCRA Part B Permit Application Unit #42, (Unit #42.14), Rocky Flats Plant, Golden, Colorado.

DOE, 1992c, Final Phase 1 RFI/RI Work Plan, Outside Closure (Operable Unit 10), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Draft Technical Memorandum 1, Operable Unit 10 (Other Outside Closures), Rocky Flats Plant, Golden, Colorado, January.

DOE, 2000, Reconnaissance-Level Characterization Report (RLCR) Building 371 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-212

IHSS Number:	212
Current Operable Unit:	15
Former Operable Unit:	15
IHSS Group:	Not Applicable
Unit Name:	Building 371 Drum Storage, Unit 63

This Final Update to the HRR for PAC 300-212 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 212 is summarized in this update. The following HRR volumes contain IHSS 212 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1980 to 1997

Historical Summary

Unit 63 was located in Room 3420 of Building 371 and was used to store transuranic (TRU) mixed solid waste. This location of IHSS 212 is shown on Figure 16. The storage capacity was 950 55-gallon drums or 259 cy of solid waste. However, because of the Settlement and Compliance Order of July 1, 1989, the maximum allowed number of drums was 668. No processing was conducted in Room 3420. Drums were brought to Building 371 from various sources at the Plant and stored in Room 3420 prior to shipment to an off-site disposal facility (DOE 1992).

Interviews with operations personnel indicated no releases occurred from any drum stored in Room 3420, and no documentation was found detailing any releases associated with Room 3420. Walls, floors, and berms in the room were constructed of concrete with an epoxy finish and drums were placed on pallets to keep them off the floor and allow for inspection. Waste constituents included TRU waste, carbon tetrachloride, 1,1,1-trichloroethane, and toluene. The Interim Status Closure Plan provides a complete list of hazardous constituents (DOE 1992).

Under a modification of the RCRA Permit, Unit 63 was incorporated into Unit 371.1 and was closed as part of that unit (Personal Communication, C. Hicks, May 10, 2005, DOE 1995).

IHSS Investigations

Because there were no spills at this IHSS, no investigations were necessary.

No Further Accelerated Action Recommendation

No further accelerated action was recommended for IHSS 212 because there was no history of spills in the IHSS.

After a review of IHSS 212 information presented in the 1997 HRR (DOE 1997) by the regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFAA status for IHSS 212 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Phase I RFI/RI Report for Operable Unit 15, Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

C. Hicks, personnel communication May 10, 2005.

PAC REFERENCE NUMBER: 300-700

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Scrap Roofing Disposal

This Final Update to the HRR for PAC 300-700 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-700 is summarized in this update. The following HRR volumes contain PAC 300-700 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1955 to 1981

Historical Summary

During construction of the PSZ (later referred to as the PA) in March 1981, an old burial trench (PAC 300-700) was discovered approximately 500 ft west of Building 371, as shown on Figure 16. The garage foreman in 1981 recalled seeing trash and other building material in an excavation as early as 1955 and also remembers covering the hole in 1968 after roofing material was added from 1965 through 1968. A 1975 document states that valves, pipefittings, tire chains, and other subcontractor material were buried “north of 331” and “north of the firebarn” (DOE 1992).

Material uncovered in 1981 was primarily roofing material, styrofoam, asphalt, and plastic sheeting. The source of the roofing material is not known. One report cites dumping from 1965 to 1968 with the material originating from Buildings 776 and 883. Another source states that it originated from Building 881 or 444 and was disposed of in the early 1970s (DOE 1992).

During the 1981 trench excavation and cleanup activities, the material was monitored with no detection of radioactivity on the material or in the trench. The scrap was moved to the Present Landfill (DOE 1992). Additional building material was uncovered during borrow soil excavation in 2005 and the material was removed as sanitary waste. The area of soil removal is shown on Figure 17.

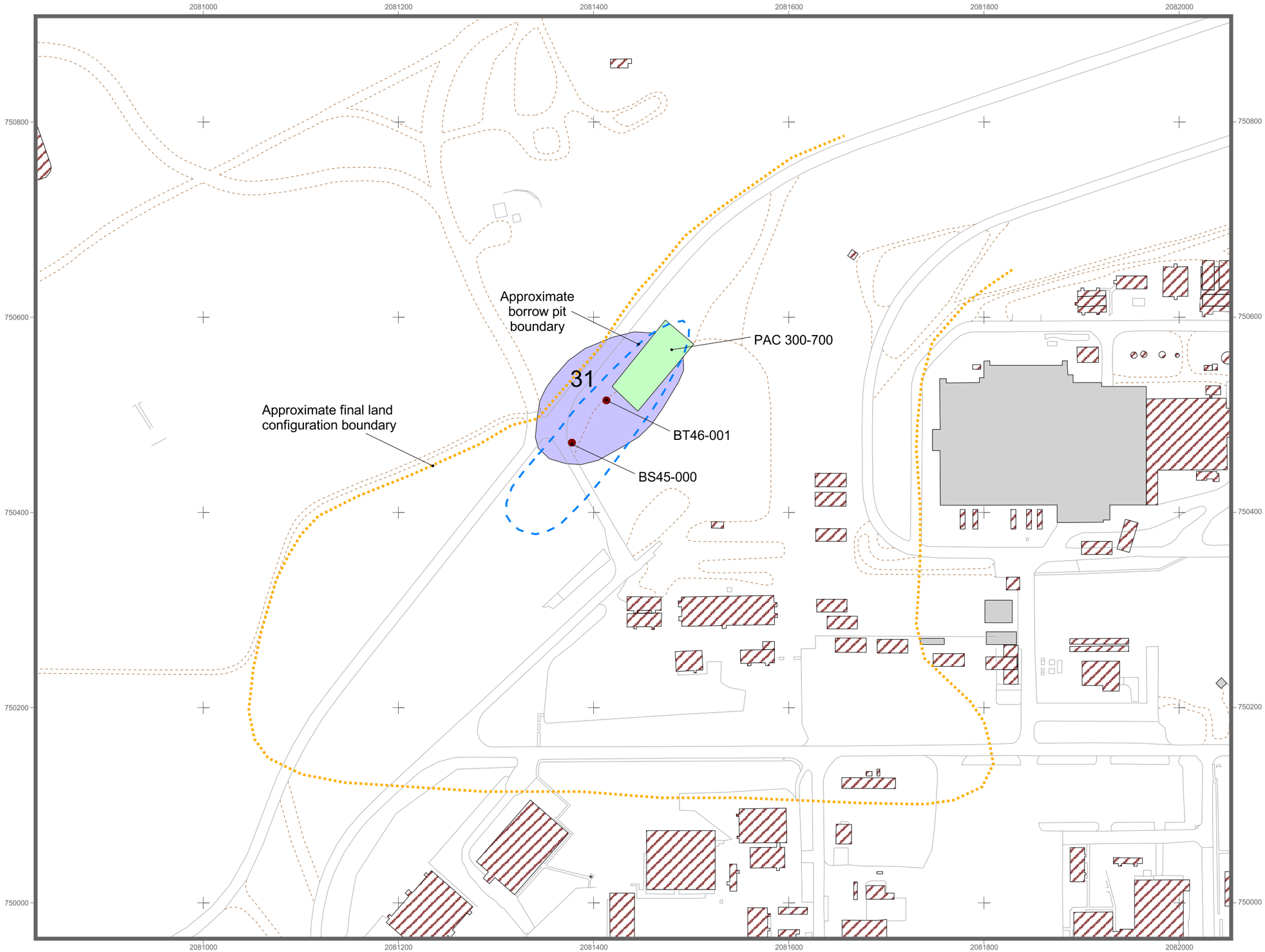

Figure 17
PAC 300-700

KEY

- Sample location
- Approximate borrow pit boundary
- Approximate final land configuration boundary
- Paved road
- Dirt road
- Buffer Zone Site
- Standing building
- Demolished building

N
W E
S

0 100 200 Feet

Scale = 1: 2,400

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.29.05

File: W:\Projects\Fy2005\hrr_update\figure\hrr_fig_17.apr

PAC Investigations

Based on observations and monitoring during trench excavation, material in the trench did not appear to be hazardous. No further investigations were conducted.

No Further Action Recommendation

Based on the results of monitoring performed during cleanup of the trench, no hazardous materials were observed. PAC 300-700 was recommended for NFA consistent with the criteria presented in RFCA Attachment 6 (DOE et al. 1996).

After a review of PAC 300-700 information presented in the Original 1992 HRR by regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA of the NFA status for PAC 300-700 (CDPHE and EPA 2002).

Comments

PAC 300-700 is the same as BZ Contamination Report Site 31 (Figure 17).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-701

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Sulfuric Acid Spill, Building 371

This Final Update to the HRR for PAC 300-701 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-701 is summarized in this update. The following HRR volumes contain PAC 300-701 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

December 20, 1989

Historical Summary

PAC 300-701 is located at the east-facing loading dock near the southeastern corner of Building 374 (Figure 16). On December 20, 1989, a 55-gallon drum containing 20 gallons of sulfuric acid solution was found ruptured on Dock 9T on the eastern side of Buildings 371/374. Approximately 19 of the 20 gallons of solution were spilled. The rupture was attributed to freezing and thawing of the contents during collection and transportation from the generation point to the 90-day accumulation point located at Dock 9T. The solution in the drum was a composite of eight different containers expected to have pHs between 2 and 8 prior to being emptied into the drum. Analytical results of the liquid in the drum indicated a pH of 1.36. Approximately one-half of the spilled solution flowed through Door 8 onto Dock 8 where it was contained in the sloped bermed area (DOE 1992).

The solution was removed from the floor with a wet vacuum, the floor was washed and the wash water was also removed with the wet vacuum. After removal from the vacuum, the mixture was sent to the process waste system through the process sump collection Tank D-85 through the Building 374 floor drain system. The one gallon of acid remaining in the ruptured drum was transferred to another container and then processed (DOE 1992).

RCRA CPIR No. 89-023 was submitted in accordance with 6 CCR 1007-3, 265.56(j).

PAC Investigations

No environmental investigation was required because the spill did not result in a release to the environment.

No Further Accelerated Action Recommendation

Because the spilled solution was contained on Dock 9T and the adjacent Dock 8, there was no release to the environment. No further accelerated action was recommended, consistent with the criteria presented in RFCA Attachment 6 (DOE et al. 1996).

After a review of PAC 300-701 information presented in the original 1992 HRR by regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-701 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14. DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-702

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit	Not Applicable
IHSS Group:	300-6
Unit Name:	Pesticide Shed

This Final Update to the HRR for PAC 300-702 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-702 is summarized in this update. The following HRR volumes contain PAC 300-702 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1952 to 1988

Historical Summary

Building 367 was used to store pesticides and herbicides beginning in 1952, when the first spill is assumed to have occurred. The location of PAC 300-702 is shown on Figure 16. Equipment and pesticide containers were cleaned at this location and the rinsate water was dumped onto the ground outside the building. There were no spill containment features; therefore, release of contamination to a nearby drainage ditch was possible. In 1988, large quantities of pesticides and herbicides were being stored in the buildings, which showed signs of spills and leaks. In 1988, the unused chemicals were disposed of in an unknown location and the area around the building was cleaned up (DOE 1992).

PAC Investigations

RFCA (DOE et al. 1996) accelerated action activities were conducted at PAC 300-702 as part of IHSS Group 300-6 in accordance with IASAP Addendum #IA-02-01 (DOE 2001). Accelerated action soil characterization included surface soil sampling at five locations. One location was in approximately the center of the former pesticide shed, one was at the eastern edge of the former building, and the other three were within 10 ft of the pesticide shed location on the northern, southern, and western sides. The samples were analyzed for organochlorine pesticides, organophosphorus compounds, and chlorinated herbicides. All results were below applicable WRW soil ALs (DOE et al. 2003). Based on the results of accelerated action sampling, no remediation was required at PAC 300-702 (DOE 2003b).

No Further Accelerated Action Recommendation

Based on the IHSS Group 300-6 analytical data (DOE 2003b), there was no soil contamination present in PAC 300-702, and the SSRS (DOE et al. 2003) indicated no further accelerated action was required. Therefore, the site was recommended for NFAA.

DOE received CDPHE (the LRA) approval of the NFAA status for PAC 300-702 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson, CDPHE; RE: Final Closeout Report for IHSS Group 300-6, July 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Characterization Data Summary Report for IHSS Group 300-6, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 300-703

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 331 North Area

This Final Update to the HRR for PAC 300-703 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-703 is summarized in this update. The following HRR volumes contain PAC 300-703 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 7, 1970

Historical Summary

PAC 300-703 is located north of Building 331, as shown on Figure 16. The PAC 300-703 area overlaps with PAC 300-134S.

On October 7, 1970, preheated road oil vapors in a tar trailer ignited when they came in contact with the hot burners that had just been turned off. Vapors were directed against hot burners when the tar trailer lid was closed to transport preheated oil to the job site. The hot oil was to be used on roads. As a result of the fire, oil vapors and the residual of burned road oil was released to the air. The fire was extinguished by the Fire Department with water and dry chemical (DOE 1992).

PAC Investigations

The incident did not involve a release to soil, surface water, or groundwater. Therefore, no investigation was deemed necessary.

No Further Accelerated Action Recommendation

There is no record of a release to soil, surface water, or groundwater at PAC 300-703. No further accelerated action was recommended consistent with the RFCA Attachment 6 criteria for no further action decisions presented in RFCA (DOE et al. 1996).

After a review of PAC 300-703 information presented in the original 1992 HRR by the regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-703 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-704

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Roof Fire, Building 381

This Final Update to the HRR for PAC 300-704 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-704 is summarized in this update. The following HRR volumes contain PAC 300-704 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 1982

Historical Summary

A small fire occurred on the roof of Building 381 involving venting of a leaking cylinder of fluorine. The location of PAC 300-704 is shown on Figure 16. The fluorine gas reacted with the iron vent pipe causing ignition and the release of smoke and vapor. No documentation was found that detailed response to the occurrence. The lack of documentation suggests that damage to the building was minimal (DOE 1992).

PAC Investigations

The incident did not involve a release to soil, surface water, or groundwater. Therefore, no investigations were deemed necessary.

No Further Accelerated Action Recommendation

There was no indication of a release to soil or water in connection with the fire. No further accelerated action was recommended consistent with the RFCA Attachment 6 criteria for NFA decisions (DOE et al. 1996).

After a review of PAC 300-704 information presented in the original 1992 HRR by the regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-704 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-705

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Potassium Hydroxide Spill North of Building 374

This Final Update to the HRR for PAC 300-705 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-705 is summarized in this update. The following HRR volumes contain PAC 300-705 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 1989

Historical Summary

As shown on Figure 16, PAC 300-705 is located on the northern side of Building 374, where there was a potassium hydroxide storage tank.

In May 1989, a small spill of potassium hydroxide occurred at the storage tank. A small amount of the caustic mixed with rainwater in the containment berm. After the spill was discovered, the liquid was pumped back into the process waste stream and a leaking flange was repaired (DOE 1992).

PAC Investigations

Investigation was not deemed necessary because only a minimal amount of caustic was released to the environment, and it is expected that dilution with rainwater and chemical interactions with soil neutralized the pH, thus eliminating the hazardous characteristic of the substance.

No Further Accelerated Action Recommendation

Because of the small quantity released and the prompt cleanup effort, there was no significant release to the environment. This PAC was therefore recommended for NFA consistent with RFCA Attachment 6 (DOE et al. 1996).

After a regulatory agency review of PAC 300-705 information presented in the original 1992 HRR, DOE received approval from EPA and CDPHE of the NFAA status for IHSS 300-705 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-706

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Evaporator Tanks North of Building 374

This Final Update to the HRR for PAC 300-706 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-706 is summarized in this update. The following HRR volumes contain PAC 300-706 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 24 or May 26, 1989

Historical Summary

Figure 16 shows the location of PAC 300-706, where an evaporator tank leaked. A subsequent leak occurred in this same general location in 1994 (see PAC 300-714).

While performing a pressure test of Tank 805, a leak occurred from a defective gasket. Tank 805 was the fourth vapor body on the evaporator system that concentrated LLMW. It was located north of Building 374 and had a 20,000-gallon capacity. The liquid spilled onto the plywood decking, leaked through the decking, and dripped onto the concrete slab located approximately 22 ft below on the ground. The concrete pad sloped toward a sump embedded in sand in which the liquid was contained. The spill consisted of approximately 2 gallons that had mixed with roughly 60 gallons of rainwater. The waste stream, which originated from various buildings, typically involved a variety of chemicals and dissolved salts. The waste was typically slightly basic and had a specific gravity of 1.3. Analytical results of samples collected from the sump pit contained 25 to 50 mg/L nitrate, 0.1 mg/L total chromium, more than 10.02 mg/L silver, 2 to 32 pCi/L gross alpha activity, and 1.03 pCi/L gross beta activity (DOE 1992).

Pressure was relieved on the tank and the test was discontinued. Smear samples collected around the area did not indicate any contamination. The plywood was cleaned with soap, wipes, and cotton towels. The concrete was washed with soap and water with all liquid contained in the sump. The liquid was pumped to Tank D-852 through the main process waste system. The saturated sand and all cleaning materials were bagged and treated as LLMW. The gasket was repaired and the tank was placed back in service (DOE 1992).

RCRA CPIR No. 89-005 was submitted in accordance with 6 CCR 1007-3, 265.56(j).

PAC Investigations

No investigation was deemed necessary because the spill was completely contained and cleaned up. There was no release to the environment.

No Further Accelerated Action Recommendation

The spill was completely contained and the spilled liquid and washwater associated with the cleanup were returned to the Building 374 waste treatment system. Solids associated with cleanup were bagged and managed as LLW. PAC 300-706 was recommended for NFA based on the RFCA Attachment 6 criteria for NFA decisions (DOE et al. 1996).

After a regulatory agency review of PAC 300-706 information presented in the 1992 HRR, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-706 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-707

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Sanitizer Spill

This Final Update to the HRR for PAC 300-707 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-707 is summarized in this update. The following HRR volumes contain PAC 300-707 information:

Original Report – 1992 (DOE 1992): and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 31, 1985

Historical Summary

A tank on a truck owned by an off-site vendor leaked sanitizer on the shoulder of the road at Sixth Street and Sage Avenue. Figure 16 shows the location of PAC 300-707. Approximately 3 gallons of sanitizer were spilled. The sanitizer consisted of a water and formaldehyde mixture. The truck's tank was drained into buckets. The truck subsequently left the site and was ordered to have the tank fixed before returning to the Plant (DOE 1992).

According to the Agency for Toxic Substances and Disease Registry (ATSDR) online toxicological profile for formaldehyde, formaldehyde in water degrades to low levels in a few days when released to the environment (www.atsdr.cdc.gov/toxprofiles/).

PAC Investigations

No investigation was required because the sanitizer solution was dilute and the quantity spilled was small, resulting in no threat to the environment.

No Further Accelerated Action Recommendation

PAC 300-707 was recommended for NFA consistent with the RFCA Attachment 6 criteria for NFA decisions (DOE et al. 1996).

After a regulatory agency review of PAC 300-707 information presented in the 1992 HRR, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-707 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-708

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformers North of Building 371

This Final Update to the HRR for PAC 300-708 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-708 is summarized in this update. The following HRR volumes contain PAC 300-708 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to August 1991

Historical Summary

PAC 300-708 is located at the northwestern corner of Building 371, as shown on Figure 16. Six transformers were located north of Building 371 within a rock-filled berm: 371-1, 371-2, 371-3, 371-4, 371-5, and 371-6. Transformers 371-7 and 371-8, located in Room 3581 of Building 371, were also included in this PAC for purposes of providing information, not to imply that they leaked. It was noted in one reference that the area outside Room 3581 had the potential to be contaminated with PCBs because of a transformer spill or fire. At Transformer 371-1, staining was observed on the pad beneath the drain valve, indicating leaks (DOE 1992).

In the 1980s, Rocky Flats initiated a program to comply with EPA regulations controlling electrical transformers that contained PCBs. The RFP Environmental Hazard Elimination Program included transformer fluid replacement. The program was finalized in 1986 (DOE 1992). The following table presents 1985 and 1992 total PCB results for the oil in the transformers before and after replacement (DOE 1996):

Transformer No.	1985 Results	1992 Results
371-1	2,244 ppm	20 ppm
371-2	20 ppm	19 ppm
371-3	58 ppm	4 ppm
371-4	1,799 ppm	18 ppm
371-5	952 ppm	12 ppm
371-6	1,026 ppm	13 ppm

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, surface soil samples were collected at PAC 300-708 and analyzed in accordance with approved EPA protocols (DOE 1995). In 1995, under the approved Final PAM for Remediation of PCBs (DOE 1995), approximately 300 screening samples were collected to determine the presence (or absence) of PCB contamination in the soil and determine the lateral and vertical extent of PCB migration. Soil samples were analyzed using EPA Method 4020 and concrete samples were analyzed using EPA Method 8080 (DOE 1996). Based on the results, approximately 1.08 cy of soil were excavated on the northern side of Transformer 371-2, containerized, and shipped offsite for disposal. Confirmation sampling indicated residual PCB concentrations in soil were less than 10 ppm (DOE 1997).

Recently there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW AL of 12.4 ppm, adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper supports the following conclusions:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

No Further Accelerated Action Recommendation

Based on the confirmation sampling results, PCB concentrations in the soil were detected at less than 10 ppm in soil. PCB results for the concrete samples were less than 1.3 ppm. Based on the site data and White Paper findings noted above, NFA was recommended for PAC 300-708 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 300-708 on May 6, 2004 (CDPHE 2004).

Comments

The boundaries of this PAC location were originally estimated. The boundaries were revised for the 2004 Annual Update to the HRR (DOE 2004) based on sampling location surveys and field reconnaissance.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification for PCB Potential Areas of Concern (dated April 15, 2004), May 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, White Paper, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

PAC REFERENCE NUMBER: 300-709

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer Leak - 334-1

This Final Update to the HRR for PAC 300-709 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-709 is summarized in this update. The following HRR volumes contain PAC 300-709 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1975 to 1986

Historical Summary

Figure 16 shows the location of PAC 300-709, a transformer leak. Transformer 334-1 was located on a concrete pad and surrounded by a concrete berm adjacent to the northwestern side of Building 334. Plant utility records indicate the transformer had been used previously at several other locations. This 500 KVA transformer was manufactured in 1975 and contained 285 gallons of dielectric fluid. Prior to being flushed and retrofilled in 1986 as part of the Sitewide Environmental Hazard Elimination Program, the transformer contained mineral oil with 772 ppm PCBs (DOE 1992).

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected at this location in accordance with approved EPA sampling protocols, and analyzed for PCBs using EPA Method 8080 (DOE 1995). All 1991 analytical results for PCBs were below 0.2 ppm (DOE 1996).

Recently there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW AL of 12.4 ppm, adequately protects human

health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper supports the following conclusions:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

No Further Accelerated Action Recommendation

Based on the site data and White Paper findings noted above, NFA was recommended for this PCB site in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 300-709 on May 6, 2004 (CDPHE 2004).

Comment

The boundaries of this PAC location were originally estimated. The boundaries were revised for the 2004 Annual Update to the HRR (DOE 2004a) based on sampling location surveys and field reconnaissance.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification for PCB Potential Areas of Concern (dated April 15, 2004), Rocky Flats Environmental Technology Site, Golden, Colorado, May 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, White Paper, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

PAC REFERENCE NUMBER: 300-710

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Gasoline Spill North of Building 331

This Final Update to the HRR for PAC 300-710 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-710 is summarized in this update. The following HRR volumes contain PAC 300-710 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 30, 1991

Historical Summary

As shown on Figure 16, PAC 300-710 is located immediately north of Building 331. On August 30, 1991, approximately 2 gallons of unleaded gasoline spilled from the vent on a contractor's supply truck. The spill occurred on a paved surface and was immediately contained. The resulting waste, approximately 5 ft^3, was packaged and transported to the Building 331 90-day accumulation area. It was managed as a RCRA-regulated hazardous waste because of its benzene content. This material was disposed of in accordance with the Site's waste disposal program. RCRA CPIR Report No. 91-018 was submitted to CDH in response to the incident (DOE 1992).

PAC Investigations

No investigations were required because the spill was on a paved surface.

No Further Accelerated Action Recommendation

No further action was recommended for this PAC because the spill occurred on a manmade surface and was contained and cleaned up. There was no release to soil. The recommendation for NFA was consistent with the criteria for recommending NFA decisions presented in RFCA Attachment 6 (DOE et al. 1996).

After a review of PAC 300-710 information presented in the Original 1992 HRR by the regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-710 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 300-711

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Nickel-Cadmium Battery Spill Outside of Building 373

This Final Update to the HRR for PAC 300-711 consolidates the information in the First Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-711 is summarized in this update. The following HRR volumes contain PAC 300-711 information:

Original Report – First Quarterly (DOE 1993);
Update Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

January 30, 1992

Historical Summary

On January 29, 1992, maintenance personnel placed 20 used Ni-Cd rechargeable batteries in two wood boxes on a pallet outside of Building 373. During routine surveillance of the boxes on January 30, 1992, it was noted that one corner of the box and surrounding ground were wet because of a release of less than 1 quart of potassium hydroxide solution from the used batteries. The location of PAC 300-711 is shown on Figure 16. The solution contained cadmium, nickel, and lithium. The measured pH range was 10 to 14. The solution likely contained cadmium in excess of the TCLP limit of 1 mg/L (DOE 1994).

The HAZMAT team responded to the release and identified low fluid levels in two of the batteries. One-third of the pallet, two wood boxes, and approximately 2 ft of contaminated soil were collected in plastic bags and placed in drums, which were moved to a 90-day accumulation area. All of the batteries were triple-wrapped in plastic and put on a new pallet, which was also placed in a 90-day accumulation area. The material was ultimately disposed of in accordance with the Site's waste disposal program.

A RCRA CPIR (92-002) was submitted to CDH in response to the incident (DOE 1994).

PAC Investigations

No further investigation was required because the contaminated materials were removed.

No Further Accelerated Action Recommendation

No further action was recommended based on the removal of the contaminated materials and implementation of the RCRA Contingency Plan.

After a review of PAC 300-711 information presented in the HRR Seventh Quarterly Update (DOE 1994) by regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-711 (CDPHE and EPA 2002).

Comments

This release was listed in the First Quarterly Update to the HRR; however, no formal write-up was made at that time.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1993, Historical Release Report First Quarterly Update 1992, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1994, Historical Release Report Seventh Quarterly Update – January 1, 1994, to March 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-712

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Antifreeze Spill North of Building 373

This Final Update to the HRR for PAC 300-712 consolidates the information in the 1994 Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-712 is summarized in this update. The following HRR volumes contain PAC 300-712 information:

Original Report – Seventh Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 25, 1992

Historical Summary

PAC 300-712 is an antifreeze spill area immediately north of Building 373 (Figure 16). One-half gallon of antifreeze was spilled on the pavement at this location by a street sweeper. The antifreeze consisted of approximately 50 percent ethylene glycol and 50 percent water (DOE 1994).

The RCRA Contingency Plan was implemented and the spill was absorbed by absorbent material and packaged. A hazardous waste characterization was made that indicated the material did not need to be managed as RCRA hazardous waste (DOE 1994).

RCRA CPIR No. 91-031 was submitted to CDH in response to the incident.

PAC Investigations

Due to the nature of the spill and the prompt cleanup, no investigations were required.

No Further Accelerated Action Recommendation

No further action was recommended for this PAC because the spill occurred on a manmade surface and was contained and cleaned up. There was no release to soil.

After a review of PAC 300-712 information presented in the HRR Seventh Quarterly Update (DOE 1994) by regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-712 (CDPHE and EPA 2002).

Comments

The RCRA CPIR was cross-referenced as being included in the 1992 HRR (DOE 1992); however, upon further examination, it was determined that this spill had not actually been discussed in the original HRR. Thus, it was included in the Seventh Quarterly Update.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Historical Release Report Seventh Quarterly Update – January 1, 1994, to March 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-713

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Caustic Spill North of Building 331

This Final Update to the HRR for PAC 300-713 consolidates the information in the Eighth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-713 is summarized in this update. The following HRR volumes contain PAC 300-713 information:

Original Report – Eighth Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 17, 1994

Historical Summary

The location of PAC 300-713, a caustic spill site, is shown on Figure 16. At approximately 3:45 P.M. on May 17, 1994, 1 to 2 cups of a corrosive liquid leaked from a trash compactor truck onto pavement north of Building 331. The spill was identified when a green liquid was observed leaking from the parked truck onto the asphalt outside of the Garage (DOE 1994).

The green liquid was identified by its color and smell as Mariko®, a caustic detergent that was classified at the scene as being a corrosive hazardous waste (D002) because of a pH greater than 12.5. The quantity of material spilled was 1 to 2 cups. A bucket was placed under the truck to capture the remaining liquid leaking from the truck, estimated at 3 to 4 cups. Because it was first reported that 1 quart had been released, the RCRA Contingency Plan was implemented as required for releases greater than 1 pint/1 pound of Mariko®. The route taken by the truck from the dumpster that originally contained the Mariko® to the spill site was inspected; however, no area other than the garage parking area appeared to have been affected by the release. Oil-Dri® was used to absorb the Mariko® from the pavement. The used Oil-Dri® was placed into a drum pending disposal as nonhazardous waste because the Mariko® no longer exhibited the characteristic of corrosivity when absorbed by the Oil-Dri®. The remaining Mariko® collected in the bucket was used as product, and was not considered a waste (DOE 1994).

On Wednesday, May 18, 1994, the trash compactor truck was taken to the landfill and the trash was emptied onto plastic sheeting while waste technicians searched for the leaking container. The empty container was recovered and identified as a 5-gallon bucket of Mariko®. It was later determined that this 5-gallon bucket had been used at Tent 1 for cleaning several months earlier. The bucket had approximately 4 to 6 cups of solution remaining in it when it had been transferred to a storage cargo near Building 554. The bucket was stored in a plastic bag inside the storage cargo. During the winter, the Mariko® had built up residue on the bag and had been set

outside the cargo on a pallet so that the bag and container could be cleaned up. The Mariko® was still considered to be product rather than waste at that time. It was not determined how the container was placed in the trash. The dumpster in the area of Building 554 was replaced with a locking dumpster with the responsible shift foreman controlling the key (DOE 1994).

RCRA CPIR No. 94-006 was submitted to CDPHE in response to the incident.

PAC Investigations

Because of prompt cleanup of the spill, no investigation was required.

No Further Accelerated Action Recommendation

No further action was recommended for this incident based on the small quantity of Mariko® released onto pavement and its recovery by absorption with Oil-Dri®. There was no release to soil.

After a review of PAC 300-713 information presented in the Eighth Quarterly Update to the HRR (DOE 1994) by the regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-713 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Historical Release Report Eighth Quarterly Update – April 1, 1994, to June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-714

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Laundry Wastewater Spill from Tank T-803, North of Building 374

This Final Update to the HRR for PAC 300-714 consolidates the information in the Tenth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-714 is summarized in this update. The following HRR volumes contain PAC 300-714 information:

Original Report – Tenth Quarterly (DOE 1995); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November 17, 1994

Historical Summary

PAC 300-714 is a laundry tank spill area located north of Building 374. As indicated on Figure 16, PAC 300-714 overlaps a previous evaporator tank spill area identified as PAC 300-706.

The incident occurred on November 17, 1994, while performing restart operations of the Building 374 evaporator system. The evaporator system had been shut down to perform maintenance on another tank connected in-series (acid tank D-845). A release of a hazardous waste was reported from Tank T-803 when the level controller failed, allowing liquids to accumulate until the pressure disk ruptured (as designed). The release occurred from the second effect vapor body (Tank T-803) of the quadruple effect steam-heated evaporator system located north of Building 374. Approximately 50 gallons of laundry wastewater was released to the secondary containment berm, and approximately 5 gallons was sprayed on the dirt road immediately north of the bermed area. The wetted area on the road was estimated to be approximately 10 by 12 ft; however, the majority of the liquid was observed within a 4-ft^2 area (DOE 1995).

The material released was a mixture of the evaporator process aqueous waste feeds. The EPA waste codes assigned to the waste treated in the evaporator system include D004, D005, D006, D007, D008, D009, D010, D011, F001, F002, F003, F005, F006, F007, F009, and F039. This characterization was based on the constituents that could be present in the waste streams to the evaporator system, as well as characterization of the remaining brine solutions when the process was complete (DOE 1995).

The evaporator system was immediately shut down and actions were taken on November 17, 1994, to remove the liquid and contaminated soil. Approximately 80 to 90 lbs of soil was

removed and managed as LLMW in RCRA Unit No. 374-380 in Building 374. On November 18, 1994, two sets of composite soil samples were collected in accordance with the RCRA Permit, Section VI(D)(4)(b)-Sampling. One set of samples were collected from the soil remaining after the wetted soil had been removed. Another set of samples were collected adjacent to the wetted area, along the western side, to determine whether pre-existing contamination was present from past releases in this area, specifically PAC 300-706. The evaporator system was repaired and placed back into service on November 19, 1994 (DOE 1995).

Because of the weather conditions at the time of the incident, the surface of the soil was frozen and the likelihood of vertical or lateral contaminant migration was minimal. Significant effort was required using shovels and a rock bar to loosen and remove the frozen soil that had been wetted by the spill. Validated analytical results from samples collected on November 18, 1994, indicated soil concentrations from both the cleanup area and adjacent area were below or equal to the analytical detection limits (DOE 1995).

A RCRA CPIR Report (No. 94-012) for this incident was submitted to CDPHE.

PAC Investigations

No further investigations of this PAC were necessary.

No Further Accelerated Action Recommendation

Sampling conducted immediately following the removal of soil affected by the spill confirmed that the cleanup was effective and no further removal was required. Therefore, no further action was recommended for PAC 300-714.

After a review of PAC 300-714 information presented in the Tenth Quarterly Update to the HRR (DOE 1995) by regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-714 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995, Historical Release Report Tenth Quarterly Update – September 30, 1994 to December 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 300-715

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Battery Acid Spill

This Final Update to the HRR for PAC 300-715 consolidates the information in the 1997 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 300-715 is summarized in this update. The following HRR volumes contain PAC 300-715 information:

Original Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

June 11, 1997

Historical Summary

The location of PAC 300-715 is shown on Figure 16. On June 11, 1997, a forklift operator was moving a wooden pallet loaded with lead-acid batteries north of Building 371. Eight of the batteries shifted and fell, resulting in a spill of sulfuric acid. Five of the eight batteries cracked, releasing their contents, while the other three leaked from their portholes (DOE 1997).

Initial radiological screening was performed and soil/liquid pH samples were collected confirming the presence of dilute levels of sulfuric acid. Sodium bicarbonate was used to neutralize the acid prior to containerization. An estimated 3 gallons of acid were neutralized (DOE 1997).

The damaged batteries were placed in secondary containment for further neutralization. Gravel and soil from the spill site were containerized and soil samples were collected and analyzed for metals. The soil analysis revealed no metal contamination. Lead levels were typical of background and the only elevated results were for sodium (due to the use of sodium bicarbonate). The batteries were transported to their original destination for recycling (DOE 1997).

All areas affected by the sulfuric acid were remediated. During the cleanup, an asphalt pad was discovered at approximately a 6-inch soil depth, which prevented further downward migration of the spill. No other contaminants were associated with the release and sampling verified the effectiveness of remediation (DOE 1997).

PAC Investigations

Results for soil samples collected after the cleanup indicated the cleanup was effective and no further investigations were necessary.

No Further Accelerated Action Recommendation

No further action was recommended based on the small quantity spilled and the thoroughness of the neutralization and containerization procedures followed. Subsequent soil sampling confirmed that the site was remediated.

After a review of PAC 300-715 information presented in the HRR 1997 Annual Update (DOE 1997) by regulatory agencies, DOE received approval from EPA and CDPHE (the LRA) of the NFAA status for PAC 300-715 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

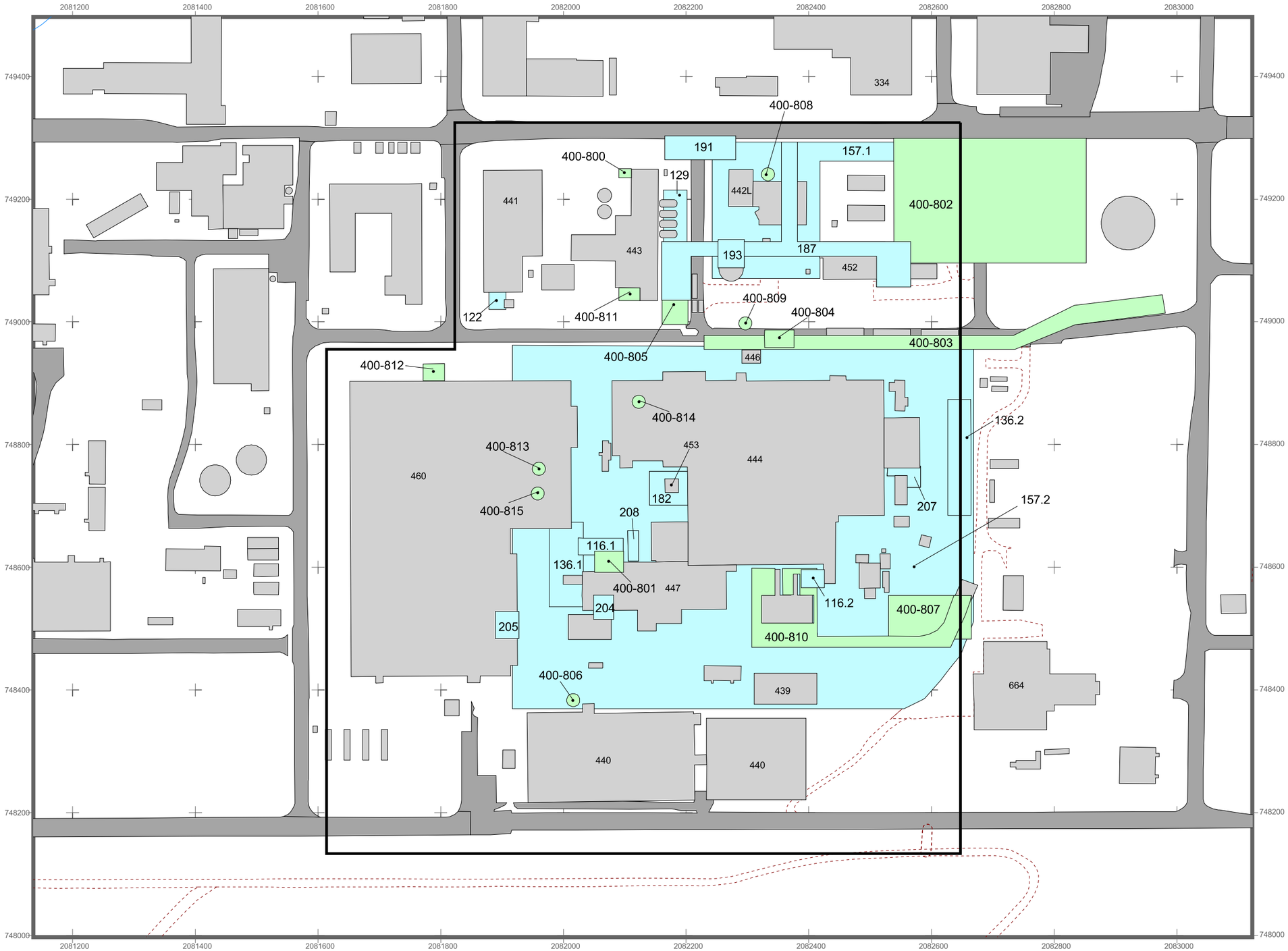

Figure 18
HRR 400 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

150 0 150 Feet

Scale = 1: 2100

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_400.apr

PAC REFERENCE NUMBER: 400-116.1

IHSS Number: 116.1

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: 400-3

Unit Name: West Loading Dock – Building 447

The Final Update to the HRR for PAC 400-116.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 116.1 is summarized in this update. The following HRR volumes contain IHSS 116.1 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1956 to December 2003

Historical Summary

The west loading dock was located on the northern side of Building 447 and west of Building 444. The location of IHSS 116.1 with respect to Building 447 and the rest of the 400 Area is shown on Figure 18. Manufacturing operations conducted in both buildings dealt mainly with beryllium and depleted and enriched uranium. Drums containing nonradioactive solvents may have been stored on the dock. Building 453, located in the alcove formed by Buildings 447 and 444, was known to have stored oil (PAC 400-182), and it is not known if these oils were contaminated. Spills and leaks could have impacted the soil and groundwater beneath the dock (DOE 1992).

No documentation was found detailing releases on the west loading dock itself; however, records indicated that oil was applied around Building 453, located just north of the dock, to suppress dust. A possibility existed that solvents were stored at this site as well as the south loading dock. Because of the nature of operations in Buildings 447 and 444, infiltration of radioactive materials into the surrounding soil could have occurred.

A radiological survey was conducted around Buildings 444 and 447 during April and May 1984 to determine if surface areas were contaminated with plutonium. Areas south and west of Building 447, and north of Building 453 were identified as areas that could not be surveyed because of high background radioactivity (DOE 1992).

As a part of closure, Building 447, including the West Loading Dock, was demolished in December 2004 (DOE 2005a).

IHSS Investigations

During 1993, four surface soil samples were collected around IHSS 116.1 in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). All contaminant activities and concentrations were less

than the proposed RFCA WRW soil ALs (DOE et al. 2003). Only radionuclides were detected above background means plus two standard deviations.

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), accelerated action soil samples were collected at five surface and subsurface locations in 2003. COCs include radionuclides, metals, VOCs, and PCBs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003b). Radionuclides and metals were detected above background means plus two standard deviations. The highest radionuclide activities were uranium-234 and uranium-238 detected in surface soil at 4.41 pCi/g. RFCA WRW soil ALs for uranium-234 and uranium-238 are 300 and 351 pCi/g, respectively. Beryllium was detected at four of the five surface soil locations with a maximum concentration of 1.5 mg/kg. The WRW soil AL for beryllium is 921 mg/kg.

No Further Accelerated Action Recommendation

Based on analytical results and the SSRS, action was not required and an NFAA determination was justified for IHSS 116.1, because of the following:

- All COC concentrations in soil were less than the WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the area is not prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS 116.1. Groundwater contamination beneath this IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).

After review of the Data Summary Report by the regulatory agencies, the DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 116.1 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, Rocky Flats Plant 400/800 Areas, Operable Unit 12, September.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-116.2

IHSS Number: 116.2

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: 400-3

Unit Name: South Loading Dock, Building 444

The Final Update to the HRR for PAC 400-116.2 consolidates the information in the initial 1992 HRR and subsequent update with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 116.2 is summarized in this update. The following HRR volumes contain IHSS 116.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1953 to April 2005

Historical Summary

The south loading dock was located on the southern side of Building 444 and east of Building 447. The location of IHSS 116.2 with respect to Building 444 is shown on Figure 18. Many incidents contributed to possible contamination in this area. In 1953, high winds blew the lids off drums stored there releasing uranium to the dock, sidewalks, and driveways. This incident resulted in direct uranium activity readings as high as 7,500 dpm/100 cm^2 and smear readings with a maximum of 350 dpm. In 1953, the dock and sidewalks were cleaned and the driveway was seal-coated.

On August 30, 1954, while vacuuming in a centrifuge, the motor of the portable vacuum cleaner short-circuited, and the metal chips in the vacuum cleaner bag ignited. The vacuum cleaner was taken to the dock (known then as Dock No. 2). To extinguish the fire, the bag's contents were transferred to a steel drum, and metal powder was added. This addition of metal caused an exothermic reaction and the release of metal oxide to the outside atmosphere. The release covered the dock and adjacent areaway with the metal oxide. The areaway was the entrance to the basement. Radiological air monitoring results on the dock during extinguishing operations were as high as 33,000 percent of the maximum permissible limit (MPL). Direct radiological contamination in the dock area was measured as high as 1,372 dpm. After the vacuum cleaner incident, the dock was cleaned; however, the basement was not decontaminated (DOE 1992).

In October 1955, a 55-gallon drum of perclene still bottoms and nitric acid stored on the dock leaked and sprayed its contents onto two workers who were in the areaway adjacent to the dock. There is no discussion of cleanup in the reference pertaining to the perclene drum leak in 1955; however, the leaks were plugged and the drum was moved. The contents of the drum were transferred to a stainless steel drum and treated with caustic.

Until 1970, chlorinated hydrocarbon solvents used to rinse beryllium parts were dumped on the ground outside Room 106, which opened to the dock. Constituents that may have contaminated

soil around the south dock included enriched and depleted uranium, beryllium, and chlorinated hydrocarbon solvents (DOE 1992).

Building 444, and subsequently the South Loading Dock, was demolished in April of 2005 (DOE 2005a).

IHSS Investigations

During 1993, four surface soil samples were collected around IHSS 116.2 in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). All contaminant activities and concentrations were less than the proposed RFCA WRW soil ALs (DOE et al. 2003). Only radionuclides were detected above background means plus two standard deviations (DOE 2003a).

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), accelerated action soil samples were collected at five surface and subsurface locations in IHSS 116.2. COCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003b). Radionuclides, metals, and VOCs were detected above background means plus two standard deviations or RLs. In one location, uranium-234 was detected at 10.75 pCi/g and the WRW soil AL is 300 pCi/g. Beryllium was detected at a maximum of 4.4 mg/kg in the surface soil. The WRW soil AL for beryllium is 921 mg/kg.

No Further Accelerated Action Recommendation

Based on analytical results and the SSRS, action was not required and a NFAA determination was justified for IHSS Group 400-3, which includes IHSS 116.2, because of the following:

- COC concentrations in soil were less than RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the area is not prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS 116.2. Groundwater contamination beneath this IHSS was considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).

After review of the IHSS Group 400-3 Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 116.2 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, 400/800 Areas, Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-122

IHSS Number: 122

Current Operable Unit: IA

Former Operable Unit: 9

IHSS Group: 400-8

Unit Name: Underground Concrete Tanks

The Final Update to the HRR for PAC 400-122 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 122 is summarized in this update. The following HRR volumes contain IHSS 122 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to June 1982

Historical Summary

IHSS 122 is part of the OPWL network of tanks and pipelines (PAC 000-121) located throughout the RFETS IA. The tanks and the OPWL associated with IHSS Group 400-8, were used to handle waste from Buildings 122, 123, and 441. The location of IHSS 122 with respect to Building 441 and the 400 Area is shown on Figure 18.

IHSS 122 partially underlies Building 441 and extends south of the building, encompassing Tanks T-2 and T-3 which were installed in 1952. Originally, the tanks were located approximately 60 ft south of Building 441, but in 1966 an addition was constructed over approximately 7.5 ft of the northern part of the tank system (DOE 2001a). Tanks T-2 and T-3 were two interconnected underground concrete tanks. Their combined capacities were approximately 12,000 gallons (DOE 1996).

Tank T-2, the northern tank, was a two-chambered tank with a 3,000-gallon capacity. The two chambers consisted of a wet well for settling and a chamber containing a limestone bed for pH control. Tank T-3 was located underground directly outside the modern Building 441 footprint. Its capacity was 9,000 gallons. Flow was from the wet well (Tank T-2) to the limestone bed (Tank T-2) and then to the holding tank (Tank T-3).

These tanks reportedly received waste streams that included acids, bases, solvents, radionuclides, metals, thiocyanate, ethylene glycol, trace PCBs, bleach, soap, blood, and hydrogen peroxide. Tank T-3 reportedly last stored ammonia after storing several other wastes. At times the tanks were known to have filled with groundwater, which was pumped out and sent to waste treatment. Documentation was found for only one surface release from these tanks. On June 1, 1953, the tanks overflowed by approximately 1,200 gallons. The spill consisted of process waste from Building 123. In 1953, the system was modified to allow liquid wastes to be released directly to

the sanitary system therefore reducing the amount of waste passing through these tanks (DOE 1992a).

The concrete tanks were abandoned in June 1982 after reportedly being decontaminated, filled with gravel, and covered with concrete. However, no gravel was present in or around the tanks during their final removal in November and December 2003. Both tanks had concrete covers and Tank T-3 had been previously pumped, cleaned of sludge, rinsed, and filled with polyurethane foam (DOE 1996). Tank T-2 contained residual liquid, sludge, and limestone and had not been foamed.

IHSS Investigations

HPGe surveys were conducted in accordance with the OU 9 RFI/RI Work Plan (DOE 1994), and results indicated thorium-232 activity was slightly greater than background levels. Sodium iodide surveys indicated six locations had activities greater than background levels. Surface soil samples were also collected and analyzed, and americium-241 and plutonium-239/240 activities were greater than background levels (DOE 2002).

Surface and subsurface soil samples collected in 1995 from 14 locations adjacent to Tanks T-2 and T-3 indicated americium-241, plutonium-239/240, metals, VOCs, SVOCs, pesticides, and PCBs were present at concentrations greater than background means plus two standard deviations (DOE 2001b). Lead concentrations were 1,410 and 7,810 mg/kg, and the WRW soil AL is 1,000 mg/kg (DOE et al. 2003). Uranium-233/234, uranium-235, and uranium-238 were detected in liquid samples collected from the Tank T-2 vault (DOE 2001a).

In accordance with IASAP Addendum #IA-03-01 for IHSS Group 400-8 (DOE 2002), accelerated action characterization samples were collected from three subsurface locations and analyzed for metals, nitrate, VOCs, and SVOCs in 2003. One of the samples was also analyzed for radionuclides and PCBs. All contaminant activities and concentrations were less than RFCA WRW soil ALs, with one exception (DOE 2004b). Sampling Location BV38-002 at 10 to 11 ft bgs had a benzo(a)pyrene concentration of 3,700 µg/kg, and the WRW soil AL is 3,490 µg/kg.

In accordance with ER RSOP Notification #03-06 (DOE 2003), Tanks T-2 and T-3, associated OPWL, and the lead-contaminated soil identified during 1995 were removed. Prior to removal of Tank T-2, residual liquid, sludge, and other material were sampled, removed, and packaged as LLMW. OPWL were tapped and drained prior to removal. The excavation to remove the lead-contaminated soil was 4 ft by 4 ft by 2 ft deep. Four confirmation samples were collected from two locations within the excavation (two intervals were sampled from each location). Analytical results indicated all residual contaminant activities and concentrations were less than WRW soil ALs. Residual contaminants included uranium isotopes (uranium-234 and uranium-238 at 3.282 pCi/g), metals (lead at 39.00 mg/kg), VOCs, and SVOCs (benzo(a)anthracene at 390 µg/kg) (DOE 2004b).

No Further Accelerated Action Recommendation

A RFCA (DOE et al. 1996) accelerated action was implemented in accordance with ER RSOP Notification #03-06 (DOE 2003). Based on the removal of the tanks, OPWL, and lead-contaminated soil; residual soil concentrations; and the SSRS, further action was not required and a NFAA determination was justified for IHSS 122.

After review of the Closeout Report by the regulatory agencies, the DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 122 on March 19, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-8 (B441) - Approval, March 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1994, Technical Memorandum No. 1 Addendum to Phase I RFI/RI Work Plan Field Sampling Plan Original Process Waste Lines Volume I- Tanks Part A - Outside Tanks (Operable Unit No. 9), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1996, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001a, Industrial Area Sampling and Analysis Plan, Appendix C, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001b, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004a, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 400-8, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-129

IHSS Number: 129

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 400-7

Unit Name: Oil Leak

The Final Update to the HRR for PAC 400-129 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 129 is summarized in this update. The following HRR volumes contain IHSS 129 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 1997 Annual (DOE 1997).

Date(s) of Operation or Occurrence

1952 to 1997 (Tanks 1 - 3)

1967 to 1986 (Tank 4)

Historical Summary

Four No. 6 fuel oil supply tanks were located east of Building 443, two of which were installed in 1952 and two in 1967. They measured approximately 11 ft by 20 ft and were buried under 2 ft of soil. The tanks were used as local supply tanks to Building 443 (Steam Plant) when natural gas was unavailable. Releases of No. 6 fuel oil were known to have occurred from filling operations and related maintenance since the tanks were first installed (DOE 1992a). The location of IHSS 129 with respect to Building 443 and the 400 Area is shown on Figure 18.

From 1952 to 1967, fuel was transferred from the larger tanks south of Building 551 to tanker trucks which in turn transferred the fuel to the supply tanks. Small spills were noted during this process. This practice ceased when underground transfer lines were installed in 1967. In November 1977, a leak in the underground transfer line was discovered. No documentation was found that detailed the quantity of oil released to the environment or a response to the cracked pipe; however, the STP was able to recover 600 gallons of oil. Since 1983, above ground transfer lines have been used (DOE 1992a).

Contamination in the area became evident on March 6, 1986, when compressor oil was found at the bottom of a 4 1/2-ft deep excavation located in the vicinity of the tanks. Three days later, No. 6 fuel oil was discovered in another excavation. Samples of the oil found in the excavations were analyzed. The primary constituent was No. 6 fuel oil with traces of No. 2 diesel oil. Results also showed trace amounts of 1,1,1-trichloroethane (DOE 1992a).

On February 6, 1989, the level indicator in one of the tanks failed while it was being filled, allowing approximately 500 gallons of No. 6 fuel oil to be released to the immediate area and onto Fifth Street. The spill did not reach a drainage or watercourse. The oil was left on the

ground until the next day to let it solidify in the cold. Four days later, 50 more gallons were spilled because the valves were left open. On July 29 and 30, 1989, 1,700 gallons were again released to the environment. No documentation could be found which detailed the cause of the spill (DOE 1992a).

During 1996 Tank 4 was emptied, cleaned, and filled with foam resulting in RCRA stable status (DOE 1996, 1997).

IHSS Investigations

During 1993, 13 surface soil samples were collected and analyzed in accordance with the OU 10 RFI/RI Work Plan (DOE 1992b) to characterize IHSS 129. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003, DOE 2004).

In accordance with IASAP Addendum #IA-02-05 for IHSS Group 400-7 (DOE 2002a), accelerated action characterization samples were collected and analyzed in 2002. Notification of planned accelerated action activities was provided in the ER RSOP Notification #02-06 (DOE 2002b).

Radionuclides, metals, TPH, and VOCs were considered PCOCs for IHSS 129. Surface and subsurface samples were collected from 21 sampling locations to characterize IHSS 129. The RFCA Attachment 13 (DOE et al. 1996) TPH standard (5,000 µg/kg) was exceeded at nine subsurface locations. The highest TPH concentration detected was 467,000 µg/kg (DOE 2004).

The four tanks were removed and disposed as sanitary waste during the IHSS Group 400-7 accelerated action. Prior to removal, remaining oil and water in Tanks 1 – 3 (8,000 gallons from Tank 1, 10,000 gallons from Tank 2, and 12,000 gallons from Tank 3) were pumped and transported to an off-site sanitary landfill. The sludge (consisting of aged No. 6 fuel oil) that remained in the bottom of the three tanks was extracted, characterized and then disposed of off-site as sanitary waste. Tank 4, was removed, size-reduced, and disposed of as sanitary waste. The tank concrete supports were left in place, 12 to 15 ft bgs (DOE 2004).

Oil-contaminated soil (approximately 13,000 cy) was removed, as well as NPWL, valve vaults, steam and water lines, sanitary and storm drains, two underground emergency generator diesel storage tanks and associated fuel lines, asbestos insulation, small concrete structures, and asphalt in the vicinity. The excavation around the tanks was approximately 4,000 ft^2 and as deep as 22.5 ft bgs, and the excavation along the steam line extended east approximately 130 ft (Figure 8, DOE 2004). Sixteen confirmation samples were collected, indicating all contaminant activities and concentrations were less than the WRW soil ALs and TPH soil standard.

No Further Accelerated Action Recommendation

A RFCA (DOE et al. 1996) accelerated action was implemented in accordance with ER RSOP Notification #02-06 (DO 2002b). Further action was not required and a NFAA determination was justified for IHSS 129, because of the following (DOE 2004):

- All ER RSOP (DOE 2002b) and accelerated action goals established for IHSS 129 soil were achieved.
- Potential sources of contamination that existed in IHSS 129 were removed, including all four fuel oil tanks and the oil-contaminated soil.

- Residual surface and subsurface COC concentrations were less than RFCA WRW soil ALs and TPH soil standard.
- Excavations were backfilled with clean fill to current grade.

After review of the Closeout Report by the regulatory agencies, the DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 129 on January 10, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO; from S. Gunderson, CDPHE; Re: Closeout Report for IHSS Group 400-7 (B442 & 443) – Approval, January 10.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan Other Outside Closures, Operable Unit 10, Rocky Flats Plan, Golden, Colorado, May.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002a, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY02 Notification #02-06 IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Closeout Report for IHSS Group 400-7, UBC 442, IHSS 400-129, IHSS 400-157.1, and IHSS 400-187, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBERS: 400-136.1 and 400-136.2

IHSS Number:	136.1 and 136.2
Current Operable Unit:	IA
Former Operable Unit:	12
IHSS Group:	400-3
Unit Name:	400-136.1 – Cooling Tower Pond West of Building 444
	400-136.2 – Cooling Tower Pond East of Building 444

The Final Update to the HRR for PACs 400-136.1 and 400-136.2 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 136.1 and 136.2 is summarized in this update. The following HRR volumes contain IHSS 136.1 and 136.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1956 to 1969

Historical Summary

Historical documentation stated that there were three cooling water ponds located in the vicinity of Building 444; however, documentation was found during the HRR research that supported the location and existence of only two ponds (DOE 1992a). Figure 18 shows the location of IHSSs 136.1 and 136.2 with respect to Buildings 444 and 447.

One pond west of Building 444 (IHSS 136.1) can be clearly seen in an aerial photograph taken in 1964. Another pond was excavated east of the Building 444 (IHSS 136.2) exclusion area fence and railroad spur. It was used May 25, 26, and 27, 1956, by an outside contractor (Dowell) to collect the various solutions used during cleaning of the cooling tower. In September 1956, when the liquid had evaporated and percolated away, the pond was backfilled (DOE 1992a).

On December 2, 1958 cooling water from Building 447 was pumped to a surface ditch and allowed to flow across Plant site. The reference for this release indicates the pond east of Building 444 should have been used in this instance because it had been used in the past for drainages and flushing of the cooling tower. It is possible that this reference was to the pond used by Dowell in 1956 (DOE 1992a).

The main purpose of these ponds was to hold cooling tower blowdown from Buildings 444 and 447. This liquid probably contained chromates because hexavalent chromium was commonly used in cooling towers as a corrosion inhibitor until the early 1970s. Lithium and small amounts of depleted uranium may have been placed in these sites (DOE 1992a).

IHSS Investigations

During 1993, five surface soil samples were collected around IHSS 136.1 and 24 surface soil samples were collected around IHSS 136.2 in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). All contaminant activities and concentrations were less than the proposed RFCA WRW soil ALs (DOE et al. 2003, DOE 2003a). Only radionuclides were detected above background means plus two standard deviations.

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which includes IHSSs 136.1 and 136.2, accelerated action soil samples were collected at 13 surface and subsurface locations in 2003. COCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003b). Uranium isotopes were detected in surface and subsurface soil at IHSS 136.1 (maximum concentrations were uranium-234 and uranium-238 at 8.92 pCi/g); chromium (36 mg/kg) and lithium (38 mg/kg) were detected in surface soil at IHSS 136.1. Uranium isotopes (uranium-234 and uranium-238 at 9.74 pCi/g), chromium and lithium (130 and 50 mg/kg, respectively) were detected in surface soil at IHSS 136.2, and uranium isotopes and lithium (uranium-234 and uranium-238 at 9.57 pCi/g and lithium at 59 mg/kg) were detected in subsurface soil at IHSS 136.2.

No Further Accelerated Action Recommendation

Action was not required and a NFAA determination was justified for IHSSs 136.1 and 136.2, because of the following:

- COC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the area is not prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSSs 136.1 and 136.2. The groundwater contamination beneath this IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005).

After review of the Data Summary Report by the regulatory agencies, the DOE received approval from CDPHE (the LRA) of the NFAA status for IHSSs 136.1 and 136.2 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, 400/800 Areas, Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-157.1

IHSS Number: 157.1

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: 400-7

Unit Name: Radioactive Site North Area

The Final Update to the HRR for PAC 400-157.1 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 157.1 is summarized in this update. The following HRR volume contains IHSS 157.1 information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

1953 to approximately 1972

Historical Summary

Building 442 functioned as a laundry facility for contaminated clothing. It was in use from 1953 until approximately 1972 when it was converted to a filter-testing laboratory. As early as September 1953, contamination associated with the handling and steaming of contaminated rags was detected in the soil around the building. A survey conducted on October 14, 1953, in the ditches north and west of Building 442 encountered 500,000 dpm/kg in soil (DOE 1992a). Figure 18 illustrates the location of IHSS 157.1 with respect to the rest of the 400 Area. The Site Survey Annual Report for 1954 stated that soil contamination in the ditches near Building 442 was 10 times greater than background. In September 1959, a high count was detected on a smear sample from the Building 442 dock. Subsequently, the area was decontaminated. In December 1963, a barrel of cleaning rags containing solvents and radioactive metal shavings either leaked or spilled, and liquid drained east into the ditch on the northwestern side of the building. Radioactivity was detected as far as the eastern end of Building 555. Surface radioactivity in the affected areas and around Building 442 was removed to background levels.

IHSS Investigations

During 1993 seven surface soil samples were collected within the IHSS and analyzed for radionuclides, metals, VOCs, and SVOCs in accordance with the OU 13 RFI/RI Work Plan (DOE 1992b). All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2004).

In accordance with IASAP Addendum #IA-02-05 for IHSS Group 400-7 (DOE 2002a), accelerated action characterization samples were collected and analyzed in 2002. Notification of planned accelerated action activities was provided in ER RSOP Notification #02-06 (DOE 2002b).

Radionuclides, metals, VOCs, and SVOCs were considered PCOCs for IHSS 157.1. Surface and subsurface soil samples were collected from 45 sampling locations to characterize IHSS 157.1.

All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with three exceptions. At one location the benzo(a)pyrene concentrations at the surface and subsurface intervals exceeded the WRW soil AL (3,490 µg/kg). Concentrations were 10,000 and 14,000 µg/kg, respectively. At the same location, the dibenz(a,h)anthracene concentration at the subsurface interval (0.5-0.8 ft bgs) was 3,900 µg/kg, and the AL is 3,400 µg/kg. At another location, the benzo(a)pyrene concentration at the subsurface interval (0.5-2.5 ft bgs) was 3,500 µg/kg (DOE 2004).

Based on the detected WRW soil AL exceedances, soil was removed from the two locations. Approximately 18 to 24 inches of soil in a 3-ft-diameter circle were removed from each location (Figure 8, DOE 2004). Confirmation sampling results indicate that all contaminant activities and concentrations were less than WRW soil ALs. Figure 8 of the IHSS Group 400-7 Closeout Report illustrates the areas of excavation (DOE 2004).

No Further Accelerated Action Recommendation

A RFCA (DOE et al. 1996) accelerated action was implemented in accordance with ER RSOP Notification #02-06 (DOE 2002b). Further action was not required and a NFAA determination was justified for IHSS 157.1, because of the following (DOE 2004):

- All ER RSOP (DOE 2002b) and accelerated action goals for IHSS 157.1 soil were achieved.
- Potential sources of contamination that existed greater than RFCA WRW soil ALs in IHSS 157.1 were removed.
- Residual surface and subsurface COC concentrations were less than RFCA WRW soil ALs.
- Excavations were backfilled to current grade.

Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in the IHSS. Groundwater contamination beneath this IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005).

After review of the Closeout Report by the regulatory agencies, the DOE received approval from the CDPHE (the LRA) of the NFAA status for IHSS 157.1 on January 10, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO; from S. Gunderson, CDPHE; Re: Closeout Report for IHSS Group 400-7 (B442 & 443) – Approval, January 10.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, Rocky Flats Plant 100 Area, Operable Unit 13, Rocky Flats Plant, Golden, Colorado, October.

DOE, 2002a, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY02 Notification #02-06 IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Closeout Report for IHSS Group 400-7, UBC 442, IHSS 400-129, IHSS 400-157.1, and IHSS 400-187, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-157.2

IHSS Number: 157.2

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: 400-6

Unit Name: Radioactive Site South Area

The Final Update to the HRR for PAC 400-157.2 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 157.2 is summarized in this update. The following HRR volumes contain IHSS 157.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1953 to 2004

Historical Summary

The Radioactive Site South Area (IHSS 157.2) includes the soil and paved area surrounding Buildings 444, 447, 440, and 439. IHSS 157.2 site boundaries were expanded to include the area adjacent to and surrounding the buildings to include other activities that took place in the general area (DOE 1992a). Figure 18 illustrates the location of IHSS 157.2 with respect to Buildings 444 and 447 and the rest of the 400 Area. IHSS 157.2 is the only site in IHSS Group 400-6.

Operations in Building 444 mainly included a depleted uranium foundry, a carbon machining shop, and beryllium fabrication. Prior to 1973, the soil surrounding Buildings 444, 447, 440, and 439 was known to contain low levels of uranium and chemical contamination. VOCs and hydrocarbons originating from the uranium machine tool storage area may have been present in Buildings 439 and 440 soil.

Several operations associated with Building 444 contributed to contamination in the area. Probably the most significant contamination occurred near the south dock where solvents, used to rinse beryllium parts, were dumped onto the ground. Additional details regarding the activities that took place on the dock are described in PAC 400-116.2. In March 1954, soil samples, from a ditch south of Building 444, indicated contamination, caused by washing the dock and apron, at levels twice that of background. Another reference states that sampling conducted in 1954 indicated soil activity levels three times that of background in a ditch south of Building 444 (DOE 1992a).

Material storage in an open ingot storage area east of Building 444, a metal storage area to the south of the building, and a uranium machine tool storage area to the west may have resulted in low-level radionuclide contamination of the soil. There were also cooling tower ponds in the area that are described in PAC 400-136 (DOE 1992a).

Numerous incidents are mentioned in documents found during the 1992 HRR (DOE 1992a) search that indicated contamination releases to the area; however, the documentation provides few details. The documented incidents include the following:

- In May 1960, a vacuum collector fire in Building 447 resulted in the release of approximately 44 µCi of depleted uranium that was deposited on the roof of the Building.
- In December 1962, a uranium and beryllium release from Building 444 occurred through an unfiltered hood.
- In June 1966, a process waste line north of Building 444 broke.
- On November 11, 1974, 170 ft^2 of road south of Building 444 (probably Cedar Avenue) was contaminated when a barrel containing uranium chips was dropped during transfer.
- Rocky Flats photographs taken in 1978 show poor housekeeping in the area north of Building 440. The area was littered with miscellaneous materials such as pallets, open paint cans, machinery, and cargo containers.
- On February 23, 1978, a fire in the air plenum south of Building 444 that serviced the beryllium machining operations in Room 107 resulted in the release of an estimated 14.5 grams of beryllium. Details of this fire and the associated cleanup are described in PAC 400-810.
- An incident occurred on November 4, 1985 involving pressurization of a process line in Building 447. The pressure forced liquid through a floor drain and up the vent pipe onto the roof where it ran into the gutter and onto the ground below. Contamination levels were as high as 10,000 cpm beta activity. Contaminated surfaces were decontaminated to less than 250 cpm or painted to contain the radioactivity. The drain that was involved was to have been relocated and a ball check valve installed on the vent pipe (DOE 1992a).
- On November 30, 1990, during the transfer of three drums across Plant site, personnel detected radioactivity on one drum containing beryllium ingots. Staging areas along the transfer route were smeared for radioactivity. One high result (greater than 25 counts per minute per square foot [cpm/ft^2]) was detected just outside the beryllium machine shop (Building 444) at the exit/entrance door.

The principle materials that contributed to contamination in the area around Building 444 are depleted and enriched uranium, beryllium, chlorinated solvents, and hydraulic oil. Lithium and chromium were also detected under the cooling tower ponds (PAC 400-136.1 and 400-136.2). No documentation was found that indicated cleanup of any of the minor incidents.

Demolition of Building 447 was complete in December 2004 and demolition of Building 444 was complete in April 2005 (DOE 2005).

IHSS Investigations

During 1993 and 1994, surface and subsurface soil and sediment samples were collected within IHSS 157.2 in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. All contaminant activities and concentrations in surface soil and sediment were less than RFCA WRW soil ALs (DOE et al. 2003). One subsurface sample (at 0.0-6.0 ft bgs) had a chromium concentration greater than the WRW soil AL (408 vs. 268 mg/kg).

Accelerated action characterization activities were conducted at IHSS 157.2, in accordance with the IASAP Addendum #IA-03-14 (DOE 2003). Based on IHSS 157.2, site histories and historical soil sampling results, radionuclides, metals, pesticides, PCBs, SVOCs, and VOCs were identified as PCOCs. Surface and subsurface soil samples (449 samples from 202 sampling locations) were analyzed for PCOCs during characterization activities. Three COCs (arsenic, benzo[a]pyrene, and dibenzo[a,h]anthracene) were detected in subsurface soil at concentrations greater than RFCA WRW soil ALs at 24 mg/kg, 15,000 µg/kg, and 3,600 µg/kg, respectively. The accelerated action characterization activities conducted at IHSS Group 400-6 and the complete rationale for a NFAA decision at IHSS 157.2 are discussed in detail in the Data Summary Report for IHSS Group 400-6 (DOE 2004b).

No Further Accelerated Action Recommendation

NFAA was recommended for IHSS 157.2 based on the following:

- Concentrations of COCs were not detected at concentrations or activities greater than RFCA WRW soil ALs except for arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene. The concentrations of arsenic and dibenz(a,h)anthracene were only slightly greater than the WRW soil ALs. Benzo(a)pyrene was detected at approximately 4 times the WRW soil AL, but this was an isolated detection in the subsurface.
- Based on the SSRS (DOE et. al. 2003), migration of soil contaminants to surface water through erosion is unlikely.

After review of the Data Summary Report by the regulatory agencies, the DOE received approval from the CDPHE (the LRA) of the NFAA status for IHSS 157.2 on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-6, IHSS 205 Radioactive Site South Area, dated September 2004, September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, 400/800 Areas, Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004a, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 400-6, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-182

IHSS Number: 182

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 400-3

Unit Name: Building 444/453 Drum Storage Area

The Final Update to the HRR for PAC 400-182 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 182 is summarized in this update. The following HRR volumes contain IHSS 182 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

Before 1957 to Unknown

Historical Summary

In May 1957 it was noted that numerous barrels of depleted uranium oxide waste were being stored in the "backyard" of Building 444. The storage was not on a concrete slab and there was concern that the barrels would be subject to corrosion (DOE 1992). Figure 18 illustrates the location of IHSS 182 within the 400 Area.

For many years Building 453 was used as an oil storage area. In July 1983, high groundwater forced some of the residual oil that had been spilled over the years out of the ground. Several pools of oil formed adjacent to the building. At that time, 25 barrels of used oil awaiting disposal were being stored outside the building. Low-level oblique photographs taken in 1982 reveal heavy, dark staining around Building 453 and along the western side of Building 444. No documentation was found that detailed what the oil had been used for or whether it was contaminated. As of July 22, 1983, the oil had not been cleaned up.

IHSS Investigations

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which included IHSS 182, characterization soil samples were collected at seven surface and subsurface locations in 2003. PCOCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003b, DOE et al. 2003). Uranium isotopes, metals, and VOCs were detected in surface soil. The maximum radionuclide detections were uranium-234 and uranium-238 at 5.38 pCi/g. Maximum relevant metal detections were beryllium and chromium at 1.8 and 28 mg/kg, respectively. The maximum relevant VOC detection was tetrachloroethene at 3.3 μg/kg,

Uranium isotopes and VOCs were also detected in subsurface soil. Radionuclide detections were uranium-234 and uranium-238 at 4.49 pCi/g and tetrachloroethene at 7.21 μg/kg.

No Further Accelerated Action Recommendation

Action was not required and a NFAA determination was justified for IHSS 182, because of the following:

- COC concentrations in soil were less than the WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the IHSS was not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low contaminant concentrations and activities found in IHSS 182. Groundwater contamination is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005).

After review of the Data Summary Report by the regulatory agencies, the DOE received approval from the CDPHE, the LRA, of the NFAA status for IHSS 182 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-187

IHSS Number: 187

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: 400-7

Unit Name: Sulfuric Acid Spill

The Final Update to the HRR for PAC 400-187 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 187 is summarized in this update. The following HRR volume contains IHSS 187 information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

September 11 to 12, 1970

Historical Summary

A 3,000-gallon aboveground tank, approximately 30 ft east of Building 443, was used to store sulfuric acid. The tank did not have secondary containment. At the time of installation, the drain line was equipped with a nonstandard valve and flange. The piping system was hydrostatically tested on July 2, 1970. The tank was filled with water and left for 3 weeks and was determined to have no leaks. After the water was drained from the tank, the valves and gaskets were changed (DOE 1992a). Figure 18 illustrates the location of IHSS 187 with respect to Building 442 and the 400 Area.

On September 11, 1970, a stream, approximately 1/4 inch in diameter was found spraying out about 4 ft from the flange above the drain valve. Approximately 1,500 gallons of sulfuric acid spilled from the tank and drained eastward through a culvert under Fifth Street and along a ditch south of Building 442, where the acid was captured in an earthen pit and neutralized with approximately 32,000 lbs of lime. Some of the acid also flowed northward along a north-south ditch east of Building 442. A dike was installed to stop the northward flow and lime was used to neutralize the acid (DOE 1992a).

No documentation was found which detailed the removal of contaminated soil. However, photographs indicate excavation and possible removal of soil immediately adjacent to the tank (DOE 1992a).

IHSS Investigations

During 1993, surface soil samples were collected from eight locations in IHSS 187 and analyzed for radionuclides, metals, VOCs, and SVOCs in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003, DOE 2004).

In accordance with IASAP Addendum #IA-02-05 for IHSS Group 400-7 (DOE 2002), characterization samples were collected and analyzed in 2002. Surface soil samples were

collected from five sampling locations to characterize IHSS 187. Radionuclides and metals were analyzed. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2004). A uranium-235 activity of 0.4 pCi/g and a strontium concentration of 250 mg/kg were representative of the analytical results. Based on all of the analytical results, IHSS 187 did not require any action.

No Further Accelerated Action Recommendation

No further action was necessary and a NFAA determination was justified for IHSS Group 400-7, which included IHSS 187, because surface and subsurface COC concentrations were less than WRW soil ALs (DOE 2004).

After review of the Closeout Report by the regulatory agencies, the DOE received approval from the CDPHE (the LRA) of the NFAA status for IHSS 187 on January 10, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO; from S. Gunderson, CDPHE; Re: Closeout Report for IHSS Group 400-7 (B442 & 443) – Approval, January 10.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Environmental Restoration Final Phase I RFI/RI Work Plan, 400/800 Areas, Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004, Closeout Report for IHSS Group 400-7, UBC 442, IHSS 400-129, IHSS 400-187, and IHSS 400-187, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-191

IHSS Number: 191

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: Not Applicable

Unit Name: Hydrogen Peroxide Spill

The Final Update to the HRR for PAC 400-191 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 191 is summarized in this update. The following HRR volumes contain IHSS 191 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and.
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

April 1981

Historical Summary

In April 1981, two 55-gallon drums of 35-percent hydrogen peroxide solution that were being transported by warehouse personnel fell off a pallet. One of the drums burst open and the hydrogen peroxide flowed into a culvert at the corner of Fifth Street and Central Avenue (DOE 1992). Figure 18 illustrates the location of IHSS 191 with respect to the rest of the 400 Area.

A hole was dug in the Central Avenue ditch east of Fifth Avenue and the area was hosed down allowing the diluted hydrogen peroxide to drain into the hole. The hole was refilled on April 23, 1981. The area has since been paved.

IHSS Investigations

No further investigation was necessary because the hydrogen peroxide would neutralize quickly.

No Further Action Recommendation

Because of the relatively small amount of hydrogen peroxide spilled and the neutralization effect over time, no threat of adverse health effects existed under the exposure conditions evaluated.

The recommendation for NFA at that site was consistent with the criteria for recommending no further action decisions presented in RFCA (DOE et al. 1996). Subsequently, an NFA justification was submitted with the 1997 Annual Update to the HRR (DOE 1997).

After reviewing the NFA justification by the regulatory agencies, CDPHE (the LRA) and EPA approved the NFA for IHSS 191 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 400-193

IHSS Number:	193
Current Operable Unit:	IA
Former Operable Unit:	16
IHSS Group:	Not Applicable
Unit Name:	Steam Condensate Leak

The Final Update to the HRR for PAC 400-193 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 193 is summarized in this update. The following HRR volumes contain IHSS 193 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Date(s) of Operation or Occurrence

During the week ending November 30, 1979

Historical Summary

An above ground steam condensate line located between Building 443 and a valve pit north of a fuel storage tank was found leaking. The area between Building 443 and the valve pit was paved at the time of the leak (DOE 1992a, 1992b). Figure 18 illustrates the location of IHSS 193 relative to Building 443 and the rest of the 400 Area.

The line was abandoned in place, and the condensate was rerouted through a different system by November 30, 1979 (DOE 1992a, 1992b). All above ground steam condensate lines were removed as part of RFETS closure efforts.

IHSS Investigations

This IHSS was studied as a part of OU 16 (DOE 1992b). The steam condensate was found to contain 0.135 ppm amines; sampling locations were not identified (DOE 1992a, 1992b).

Although no direct documentation was found that detailed the fate of the amines, it is highly unlikely that any of this chemical remains in the environment from this release. As described in the Final NFA Justification Documentation for OU 16, Low-Priority Sites (DOE 1992b), the amine compound, used as a corrosion inhibitor in steam condensate lines, was diethylaminoethanol. This alcohol-based compound is highly soluble and readily transported in solution by water. At the time, diethylaminoethanol had a permissible exposure limit (PEL) of 10 mg/L, which was one and a half orders of magnitude greater than the concentration found in the steam condensate.

Conclusions were drawn that the initial concentration would have been diluted even further by years of rainfall and runoff, leaving no source present. Without a source, there was no risk to human health or the environment (DOE 1994).

No Further Action Recommendation

Based on the information and conclusions presented in the Final NFA Justification Document for OU 16, Low-Priority Sites (DOE 1992b, 1994), a CAD/ROD recommending no action under CERCLA for IHSS 193 was signed by CDPHE (the LRA) on October 28, 1994.

Comments

CERCLA Five-Year Review: The CAD/ROD for OU 16 (DOE 1994) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Final No Further Action Justification Document for Operable Unit 16 Low-Priority Sites, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Corrective Action Decision/Record of Decision for OU 16: Low-Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 400-204

IHSS Number:	204
Current Operable Unit:	IA
Former Operable Unit:	15
IHSS Group:	Not Applicable
Unit Name:	Original Uranium Chip Roaster (RCRA Unit 45)

The Final Update to the HRR for PAC 400-204 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 204 is summarized in this update. The following HRR volumes contain IHSS 204 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1996 Annual (DOE 1996)
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1956 through 1988

Historical Summary

IHSS 204, the Original Uranium Chip Roaster located in Building 447, was used to oxidize uranium chips coated with small amounts of oils and coolants, converting the elemental uranium to uranium oxide. Oils and coolants with organic solvents may have contained hazardous constituents. The unit was cylindrical with a diameter of 5 ft 6 inches and a height of 7 ft 4 inches. The inlet for the unit was located in Room 502 of Building 447, and the outlet was located directly downstairs in Room 32. The location of IHSS 204 is shown on Figure 18. No hazardous constituents were treated in this unit since January 1988, when the uranium chips processed in the unit were no longer coated with oils and coolants. The Original Uranium Chip Roaster was RCRA Unit 45.

An incident involving the roaster occurred in Room 32 of Building 447 on June 28, 1985, when an operator filled a barrel with hot oxide and, in replacing it with a new barrel, placed the thermally hot barrel next to some cardboard. Approximately 3 hours later, the cardboard burst into flames and set off the sprinklers and fire alarm. Subsequently, the basement of the building flooded (DOE 1996).

IHSS Investigations

IHSS 204 was studied as a part of OU 15, Inside Building Closures (DOE 1995). A total of 77 radiological smear samples were collected from the IHSS, and seven hot-water rinsate samples were also obtained (DOE 1996).

No RCRA-regulated constituents of regulatory concern were identified in the IHSS sampling. No radionuclides detected in the hot-water rinsate samples from IHSS 204 had activities exceeding the permissible radionuclide levels. The pre-rinsate smear samples from the floor surfaces in Rooms 32 and 502 and the outside surfaces of the Chip Roaster inlet and outlet confirmed the

presence of radiological contamination at IHSS 204. Rooms 32 and 502 were posted and managed as radiological controlled areas in accordance with the RFETS Radiological Control Program requirements.

No Further Action Recommendation

The roaster was cleaned and closed in accordance with RCRA in 1995, and radiologically contaminated surfaces were managed as LLW during building demolition (DOE 2005). Building 447 was demolished during FY2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP, and as documented in the D&D Closeout Report (DOE 2005).

In accordance with a February 14, 2002 approval letter from CDPHE (the LRA) and EPA, IHSS 204 was approved for NFA (CDPHE and EPA 2002).

Comments

CERCLA Five Year Review: The CAD/ROD for OU 15 (DOE 1995) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1995, Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 400-205

IHSS Number: 205

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 400-5

Unit Name: Building 460 Sump No. 3 Acid Site

The Final Update to the HRR for PAC 400-205 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 205 is summarized in this update. The following HRR volume contains IHSS 205 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1984 to 1996

Historical Summary

Sump No. 3 was designated as RCRA Unit No. 8, which operated as a 90-day waste accumulation area and was withdrawn from the RCRA permit in 1995 (DOE 2003). This fiberglass tank was located in the wall of Room 156B in Building 460 and was used as a staging area for acid wastes generated inside the building before the wastes were transferred to the two acid tanks located along the southeastern corner of Building 460. In this same locale were two solvent tanks that operated in the same manner as the acid tanks (DOE 1992). Figure 18 illustrates the location of IHSS 400-205 with respect to Buildings 460 and the rest of the 400 Area.

As wastes were generated inside Building 460, they were transferred to the sump and into one of the tanks by a permanent and dedicated piping system for acid only. When one tank became full, a quick disconnect was switched to the other tank. The waste was moved by forklift to Building 374 or Building 774 for treatment or to an adjacent bermed area where the acid was transferred to steel drums with poly-liners. These drums were then stored at the Building 460 Drum Storage Area (DOE 1992).

The capacity of each acid tank was 250 gallons with additional storage available in the acid sump. However, the two tanks were never used at the same time so the total acid stored at any time was less than 250 gallons. Acids contained within this tank were a combination of nitric acid and nitrad (hydrofluoric acid and ammonium salts). The tanks were constructed of 3/16-inch-thick stainless steel and were checked weekly to see if they needed emptying. They were contained within a concrete bermed area that measured 4 ft wide by 6 ft long and 12 inches deep. The bermed area had a capacity of 286 gallons. The acid side was adjacent to the solvent side, but they were distinct and separated by a dividing berm that prohibited mixing. Each bermed area could be drained by removing a drain-hole plug located 1-1/2 inches from the bermed floor (DOE 1992).

On April 10, 1989, one of the tanks was overfilled, releasing 5 to 7 gallons of dilute nitric acid and nitrad waste to a storm drain. When it was discovered that the acid was running to the storm drain, the HAZMAT Team used containment logs to slow the flow in the storm drain and neutralize the area with a chemical buffer. The acid was allowed to flow through the storm drain and on to Pond C-2 (PAC SE-142.11). The acid was diluted by the natural mixing with snow on the ground; therefore, it was anticipated that there would be no environmental impact (DOE 1992).

After the spill in 1989, pH values at the Pond C-2 inlet and at the SID were 6.9. Puddles outside Building 460 had a pH of 2 (DOE 1992).

IHSS Investigations

Accelerated action characterization activities were conducted at IHSS 205 in accordance with IASAP Addendum #IA-03-14 (DOE 2003) in 2003. Based on the IHSS 205 site history, radionuclides, metals, SVOCs, and VOCs were identified as PCOCs. Three surface and subsurface soil samples were collected and analyzed for the PCOCs during characterization activities. Analytical results revealed all PCOCs were less than RFCA WRW soil ALs (DOE et al. 2003). Uranium isotopes (uranium-234 and uranium-238 at 5.346 pCi/g) and metals (beryllium and strontium at 1.1 and 56 mg/kg, respectively) were detected. The accelerated action characterization activities conducted at IHSS Group 400-5 and rationale for an NFAA decision at IHSS 205 are discussed in detail in the Data Summary Report for IHSS Group 400-5 (DOE 2004).

All tanks including Sump No. 3 were closed in accordance with the RCRA Closure Plan for Building 460. Building 460 was demolished in June 2005 (DOE 2005).

No Further Accelerated Action Recommendation

NFAA was recommended for IHSS 205 based on the following (DOE 2004):

- Activities and concentrations of COCs were uniformly below the RFCA WRW soil ALs.
- Migration of soil contaminants to surface water is unlikely because little contamination is present and based on the SSRS (DOE et al. 2003), IHSS 205 is not located in an area of high erosion.
- Contaminants originating in IHSS 205 soil are not likely to impact surface water by transport in groundwater because soil contamination levels in IHSS 205 are very low.

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 205 on December 7, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump No. 3

Acid Site, PAC 400-813 and PAC 400-815 – Tank Leaks in Building 460 & Status of "RCRA Unit 8", December 7.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004, Data Summary Report for IHSS Group 400-5, IHSS 400-205, PAC 400-813, and PAC 400-815, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005, Building 460 Closeout Report, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-207

IHSS Number:	207
Current Operable Unit:	IA
Former Operable Unit:	10
IHSS Group:	400-3
Unit Name:	Inactive 444 Acid Tank

The Final Update to the HRR for PAC 400-207 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 207 is summarized in this update. The following HRR volumes contain IHSS 207 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1980 to 1987

Historical Summary

Two 500-gallon stainless steel acid tanks used to store acid waste (RCRA Unit No. 4) were located east of Building 444. As the waste was generated, it was drained into a small free-standing metal sump tank and then pumped to the tank. Only one tank was filled at a time. The tank receiving waste was placed within a berm with a capacity of 640 gallons. When the tank was full, it was removed with a fork lift and transported to either Building 374 or Building 774. An empty tank was then put within the berm to receive waste (DOE 1992). Site records indicate these tanks were used to support the disposition of OU 15, then removed, cleaned, and retrofitted for use as 90-day accumulation areas for incidental water. Figure 18 shows the location of IHSS 207 within the 400 Area.

The containment berm had interior dimensions of 9 ft by 9.5 ft by 1 ft and was built of asphalt. The types of wastes stored in these containers consisted of acid waste from beryllium machining, electropolishing solution, and wastes from chemical milling. The raw milling acid was a mixture of 75 percent phosphoric acid, 3 percent sulfuric acid, and chromium trioxide. Analytical results indicated the acid waste contained significant amounts of cyanide, cadmium, chromium, lead, silver, and arsenic, and also contained detectable amounts of uranium, americium, and tritium. The tanks and piping were decontaminated and moved to another processing area in 1987 (DOE 1992).

In January, 1981, Rocky Flats Staff encountered uranium contamination in the catch basin. The quick disconnect assembly had been replaced without a gasket allowing liquid to leak into the catch basin. The spill consisted of uranium-contaminated process waste. It was cleaned up and a new gasket was installed. The spill was contained within the catch basin.

IHSS Investigations

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which included IHSS 207, accelerated action soil samples were collected at three surface and subsurface locations in 2003. PCOCs included radionuclides and metals. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003b, DOE et al. 2003). Uranium and metals were detected in surface and subsurface soil. Maximum detections included uranium-234 and uranium-238 which were detected at 4.91 pCi/g. Aluminum and strontium detections were at 26,000 and 65 mg/kg, respectively. Beryllium and chromium were detected in surface soil only (1.1 and 30 mg/kg, respectively). Arsenic, cadmium, lead, and selenium were not detected.

Building 444 was demolished in accordance with the RSOP for Facility Disposition, and the PDSR. RCRA Unit No. 4 was closed in accordance with the Final Closeout of Buildings 444 and 447 (DOE 2005a).

No Further Accelerated Action Recommendation

Accelerated action was not necessary and an NFAA determination was justified for IHSS Group 400-3, which included IHSS 207, because of the following:

- PCOC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the IHSS was not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS 207. Groundwater contamination beneath this IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA decision document (DOE 2005b).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 207 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18, 2004.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June 21.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-208

IHSS Number: 208

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 400-3

Unit Name: Inactive 444/447 Waste Storage Area

The Final Update to the HRR for PAC 400-208 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 208 is summarized in this update. The following HRR volumes contain IHSS 208 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1986 to 1987

Historical Summary

This area, located north of Building 447 and west of Building 444, was used for a short time for hazardous waste storage. Wastes were stored in a 20- ft by 8-ft cargo container with secondary containment. Figure 18 shows the location of IHSS 208 within the 400 Area. This unit was identified as Unit No. 3 in the 1986 RCRA Part B Permit application. The maximum volume of waste stored was 990 gallons. No documentation was found that indicated spills or leaks to the environment in this area (DOE 1992). An Administrative Closure Request was approved on January 21, 2002; the request noted that the cargo container may have been moved to RCRA Unit No. 1 (K-H 2002).

The typical wastes stored in the cargo container included a composite of nitric acid with silver, sodium fluoride solution, plating acids (hydrochloric acid, nitric acid, and hydrofluoric acid) with concentrated chromium plating solution, concentrated cadmium cyanide solution, nickel sulfate, and developer/fixer (DOE 1992).

IHSS Investigations

During 1993, nine surface soil samples were collected within IHSS 208. All contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2003a, DOE et al. 2003). Radionuclides were detected above background means plus two standard deviations at three of the locations. VOCs were detected above detection limits at one of the locations.

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which included IHSS 208, accelerated action soil samples were collected at two surface and subsurface locations in 2003. COCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2003b). Metals, including nickel, were detected at one surface location, and acetone and uranium-235 were detected at the other surface location. Uranium isotopes and VOCs were

detected at the two subsurface locations. Maximum concentrations of uranium-234 and uranium-235 were 4.33 pCi/g and beryllium and chromium were 1.3 and 19 mg/kg, respectively.

At the time of building demolition, the Inactive 444/447 Waste Storage Area was covered with asphalt. As a part of the final demolition of Buildings 444 and 447, the asphalt was removed and the area regraded (DOE 2005a).

No Further Accelerated Action Recommendation

Action was not required and an NFAA determination was justified for IHSS 208, because of the following (DOE 2003b):

- COC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the IHSS was not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS 208. Groundwater contamination beneath this IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE, the LRA, of the NFAA status for IHSS 208 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), Rocky Flats Environmental Technology Site, Golden, Colorado, December 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June 21.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

K-H, 2002, Correspondence to J. Schieffelin, CDPHE; from S. Nesta, K-H, RE: Administrative Closure on Interim Status Unit 3 – At Building 444/447, Rocky Flats Environmental Technology Site, Golden, Colorado, January 21.

PAC REFERENCE NUMBER: 400-800

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer 443-1

The Final Update to the HRR for PAC 400-800 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-800 is summarized in this update. The following HRR volumes contain PAC 400-800 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

Unknown to 1987

Historical Summary

Originally, Transformer 443-1 was located along the northern wall outside of Building 443. It was then relocated to a newly constructed pad several feet south of the older pad. A concrete berm, surrounding both the old and new pad sites, was at ground level. A secondary berm also surrounded the new pad (DOE 1992). Figure 18 shows the location of PAC 400-800 with respect to Building 443 and the rest of the 400 Area.

The original transformer, which was known to have leaked, was replaced in 1987 (Appendix I, DOE 1992). EPA representatives found a small leak of dielectric fluid on the exterior of this transformer on June 30, 1987. Smears taken from leaks around the top and bottom valves, level gauge, and from the bushings compartment revealed 10,964 ppm PCBs (DOE 1992).

PAC Investigations

A Sitewide program was initiated in 1991 to identify known, suspect, and potential PCB-contaminated sites at the Site. The study was documented in the report titled, Assessment of Known, Suspect and Potential Environmental Releases of PCBs Preliminary Assessment/Site Description (DOE 1991). This report consisted of document and record reviews, personnel interviews, and field sampling and analysis. These suspect locations became known as PCB sites 1 through 37. PAC 400-800 corresponds with PCB Site 5. The analytical results for its four samples indicated that the PCB levels in the soil surrounding the pad were less than 25 ppm, total Aroclors, the Toxic Substances Control Act (TSCA) guidance for Restricted Access Areas at outdoor electrical substations (DOE 1992). PCBs were not detected in most samples; however, Aroclor-1260 sample results ranged from 0.9 to 1.9 ppm (DOE 1991).

No Further Action Recommendation

Based on the most recent analytical data from surficial soil in PAC 400-800, PCB concentrations were less than 25 ppm (DOE 1998). Based on the analytical data, PAC 400-800 was proposed as an NFA site in the 1998 Annual Update to the HRR. After review of the Annual HRR Update by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFA for PAC 400-800 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1991, Assessment of Known, Suspect, and Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1998, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 400-801

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-3
Unit Name:	Transformer, Roof of Building 447

The Final Update to the HRR for PAC 400-801 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-801 is summarized in this update. The following HRR volumes contain PAC 400-801 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

Unknown to 1987

Historical Summary

A transformer was located on the roof of Building 447. The pad may have had a berm around it at one time. It is believed to have leaked prior to its replacement in 1987. Downspouts were located north of the transformer's former position that would have allowed PCB-contaminated runoff to infiltrate soil adjacent to Building 447. A storm drain was situated roughly 20 ft from the building and may have also been contaminated (DOE 1992). In 1976, roofing material was removed from under the transformer because of possible leaks. The location of PAC 400-801 is shown on Figure 18.

Originally, the boundaries of the original PAC location were estimated, but were revised based on sample location surveys and field reconnaissance. The boundary change was documented in the 2004 Annual Update to the HRR (DOE 2004).

Smear samples collected in 1987 from the drain valve and adjacent transformer wall indicated 120 and 194 µg/kg of PCBs, respectively (DOE 1992).

PAC Investigations

A Sitewide program was initiated in 1991 to identify known, suspect, and potential PCB-contaminated sites at the Site. The study was documented in the report titled, Assessment of Known, Suspect and Potential Environmental Releases of PCBs Preliminary Assessment/Site Description (DOE 1991). The study consisted of document and record reviews, personnel interviews, and field sampling and analysis. These suspect locations became known as PCB sites 1 through 37. PAC 400-801 corresponds with PCB Site 9. One of the two samples collected from the PCB site was a sediment sample collected from a storm drain sump that was situated roughly 20 ft from Building 447. Analytical results indicated the presence of PCBs at 54,000 µg/kg. This exceeded the WRW soil AL (DOE et al. 2003) of 12,400 µg/kg.

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which included PAC 400-801, accelerated action soil samples were collected at five surface and subsurface locations in 2003. COCs included radionuclides, metals, and PCBs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (2003b). Uranium isotopes were detected at all five surface locations (highest detection was uranium-234 and uranium-238 at 4.86 pCi/g), and metals were detected at one surface location (aluminum, beryllium, chromium, and lithium at 33,000, 1.6, 19, and 17 mg/kg, respectively) (DOE 2003b).

The storm drain sump and associated PCB-contaminated sediment were removed as part of the D&D of Building 447 in 2004. After removal, two soil samples were collected at this location and analyzed for PCBs. Results indicated Aroclor-1254 was detected at an estimated concentration of 38 µg/kg and Aroclor-1260 was detected at a concentration of 52 µg/kg. The manhole was filled with 10 to 15 ft of concrete from the bottom of the manhole upwards. The storm drain pipeline under Building 447 remained in place, but both ends were plugged with concrete at the manholes. Building 447 was demolished in December 2004. Included in the demolition was the roof transformer site (DOE 2005a).

No Further Accelerated Action Recommendation

Accelerated action was not necessary and an NFAA determination was justified for IHSS Group 400-3, which included PAC 400-801, because of the following:

- COC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the IHSS was not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 400-3. Groundwater contamination beneath this PAC was considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).
- The storm drain sump and associated PCB-contaminated sediment were removed as part of the D&D of Building 447 in 2005 (DOE 2005a).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 400-801 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1991, Assessment of Known, Suspect, and Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Data Summary Report IHSS 000-3 PAC 000-505 Storm Drains, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-802

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	600-2
Unit Name:	Storage Shed South of Building 334

The Final Update to the HRR for PAC 400-802 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-802 is summarized in this update. The following HRR volumes contain PAC 400-802 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1955 to 1969

Historical Summary

The storage area south of Building 334 was originally a metal or wooden structure built on a concrete slab. A July 1955 aerial photograph indicated the building had been removed and the remaining slab was not being used for storage. The location of PAC 400-802 is shown on Figure 18.

The first documented usage of the area for storage was reported on October 24, 1955, when 125 barrels of depleted uranium chips immersed in oil were stored there. The drums developed leaks that contaminated the slab. In October 1956, one or two leaking drums contaminated the slab to 537 dpm. As of November 1956, 10 to 20 drums were leaking, and on November 12, 1956, an overturned 30-gallon drum spilled contaminated oil onto the slab (DOE 1992).

Cleanup was attempted in October 1956. The leaking drums were placed in larger drums, and contamination on the concrete slab was reduced from 537 dpm to 108 dpm using perchloroethylene. The drums were moved to the 903 Pad (PAC 900-112), on November 15th and 16th, 1956. The slab where the drums were stored was cleaned on November 28, 1956 (DOE 1992).

It was discovered that contamination had spread to equipment that was also stored in the area. The equipment was moved, but the slab still had smear sample results of up to 10,000 dpm. Additional monitoring conducted in December 1956 revealed that the contamination was spreading because of weather conditions. By January 1957, low-level radioactivity had extended to the fuel storage tank located south of Building 551 (PAC 600-152) (DOE 1992).

Although documentation indicated that the contaminated drums stored south of Building 334 were removed, photographs indicated that the storage of miscellaneous items at this site continued until 1969. No documentation was found that indicated the kinds of materials stored at the site after 1956 or whether the materials were contaminated (DOE 1992).

Although the slab was cleaned where the drums were stored, the area around the contaminated equipment had not been cleaned as of the end of December 1956. The equipment was moved to a production area on Plant site. The loose oxide was removed, and the area covered with plastic to prevent spreading of contamination. Smears up to 9,936 dpm were collected prior to vacuuming. Monitoring conducted on December 20, 1956, showed a maximum of 7,245 dpm on the slab (DOE 1992).

PAC Investigations

Three surface soil samples were collected and analyzed prior to the accelerated action. All contaminant activities and concentrations were below RFCA WRW soil ALs (DOE 2003b, DOE et al. 2003).

Characterization activities were conducted between July 17 and August 21, 2002, in accordance with IASAP Addendum #IA-02-06 (DOE 2002a) and ER RSOP Notification #02-07 (DOE 2002b). The activities involved soil characterization, the removal of the slabs beneath Trailers T452G and T452F and associated asphalt-paved areas. Fifty-four PAC 400-802 characterization samples were collected from surface and subsurface soil and analyzed (DOE 2003b). Radionuclides, metals, PCBs, SVOCs, and VOCs were considered COCs. Analytical results revealed all PCOCs were less than WRW soil ALs. Benzo(a)pyrene was detected in several locations (1,000 and 1,300 µg/kg) at concentrations greater than RFCA surface soil Tier II AL of 614 µg/kg (DOE et al. 1996). Analytical results from the characterization efforts were presented in the Final Closeout Report for IHSS Group 600-2 (DOE 2003b).

Activities involved the removal of the slabs beneath Trailers T452G and T452F and associated asphalt-paved areas. NPWL, OPWL, tanks and sanitary lines were not associated with these trailers or slabs and none were removed (DOE 2003b).

No Further Accelerated Action Recommendation

As shown in the Final Closeout Report (DOE 2003b), analytical results indicated all COCs were less than RFCA WRW soil ALs.

The DOE received approval from CDPHE (the LRA) of NFAA for PAC 400-802 on June 19, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO; from S. Gunderson; CDPHE, RE: Final Data Summary Report [IHSS Group 600-2], June 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-06, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol Notification #02-07, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2003a, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 600-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-803

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-4
Unit Name:	Miscellaneous Dumping, Building 446 Storm Drain

The Final Update to the HRR for PAC 400-803 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-803 is summarized in this update. The following HRR volumes contain PAC 400-803 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

July 1972

Historical Summary

PAC 400-803 consisted of a reported release to the storm drain west of Building 446. A roofing contractor at Building 444 had reportedly dumped miscellaneous materials into the storm drain, which consisted of silver paint, aluminum paint, and possibly other materials including oil. The material flowed along a historic open ditch south of Cottonwood Avenue to a point south of the former fuel oil storage tanks, passed beneath the street, and ran northeast to the extent of Seventh Avenue. The contractor was to have cleaned up the ditch and taken the residue to the landfill (DOE 1992). The location of PAC 400-803 is shown on Figure 18.

PAC Investigations

In accordance with IASAP Addendum #IA-04-14 for IHSS Group 400-4 (DOE 2004b), which included PAC 400-803, six surface and subsurface soil characterization samples were collected and analyzed for radionuclides, metals, and SVOCs. COC concentrations in soil were less than the RFCA WRW soil ALs (DOE et al. 2003) except for benzo(a)pyrene and dibenz(a,h)anthracene. The benzo(a)pyrene concentration in surface soil at sampling location BX37-024 was 9,200 µg/kg, and the AL is 3,490 µg/kg. The benzo(a)pyrene concentration in subsurface soil at sampling location BY37-030 (0.5-2.5 ft bgs) was 3,500 µg/kg, and the dibenz(a,h)anthracene concentration at the same location was 10,000 µg/kg, and the AL is 3,490 µg/kg (DOE 2004c). This storm drain was removed. Its removal is documented in the Data Summary Report for IHSS Group 000-3, PAC 000-505 (Storm Drains) (DOE 2005a).

No Further Accelerated Action Recommendation

Action was not required and an NFAA determination was justified for PAC 400-803, because of the following (DOE 2004c):

- COC concentrations in soil were less than the RFCA WRW soil ALs except for benzo(a)pyrene, at 0 to 0.5 ft and 0.5 to 2.5 ft, and dibenz(a,h)anthracene at 0.5 to 2.5 ft. No action was taken to remove the soil with elevated benzo(a)pyrene and dibenz(a,h)anthracene concentrations because these COCs were not located within an area prone to landslides or erosion. Their concentrations were 9,200, 35,000, and 10,000 µg/kg, respectively. Additionally, these COCs were not detected in surface water or groundwater monitoring stations near the IHSS Group. These COC exceedances appeared to be most likely due to asphaltic materials mixed in with the soil throughout the area. The surface soil benzo(a)pyrene exceedance was less than three times the AL (DOE 2004c).
- Migration of contaminants to surface water through erosion is unlikely because the exceedances are not in an area prone to landslides or erosion.
- Migration of contaminants to groundwater with subsequent impact to surface water is not likely because of the low levels of soil contamination found at PAC 400-803. Any existing contaminated groundwater in the area is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA for PAC 400-803 on August 23, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, Re: Approval, Data Summary Report for IHSS Group 400-4, PAC 400-803 – Miscellaneous Dumping, Building 446 Storm Drain, and PAC 400-804 – Road North of Building 460, August 23.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Industrial Area Sampling and Analysis Plan Fiscal Year 2004 Addendum #IA-04-14, IHSS Group 400-4, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, Data Summary Report for IHSS Group 400-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Data Summary Report for IHSS Group 000-3 and PAC 000-505, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June 21.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-804

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-4
Unit Name:	Road North of Building 460

The Final Update to the HRR for PAC 400-804 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-804 is summarized in this update. The following HRR volumes contain PAC 400-804 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

June 11, 1957

Historical Summary

On June 11, 1957, a pallet box with four ingots of unknown composition fell from a truck. The road, which was north of Building 446, was damaged. After removal of the ingots, the area was dry-vacuumed and monitored; however, monitoring was discontinued because of rain. Photographs that document the event were located and used to pinpoint the location of the incident (DOE 1992). The location of PAC 400-804 is shown on Figure 18.

The day after the incident, direct counts up to 500 cpm and smears up to 104 dpm were obtained from the damaged area. These areas were covered with asphalt patching material (DOE 1992).

PAC Investigations

In accordance with IASAP Addendum #IA-04-14 for IHSS Group 400-4 (DOE 2004b), which included PAC 400-804, two surface soil characterization samples were collected and analyzed for radionuclides in 2004. PAC 400-804 COC concentrations in soil were less than the RFCA WRW soil ALs (DOE et al. 2003). Uranium-234 and uranium-238 were the highest detected radionuclides at 10.57 pCi/g. Analytical results from the characterization were presented in the Data Summary Report for IHSS Group 400-4 (DOE 2004c).

No Further Accelerated Action Recommendation

Based on the analytical results and the SSRS, action was not required and an NFAA determination was justified for PAC 400-804, because of the following (DOE 2004c):

- PAC 400-804 COC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the exceedances are not in an area prone to landslides or erosion.

- Migration of contaminants to groundwater with subsequent impact to surface water is not likely because of the low levels of soil contamination found at PAC 400-804. Any existing contaminated groundwater in the area is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA for PAC 400-804 on August 23, 2004 (CDPHE 2004).

Comments

Although PAC 400-804 remains titled, "Road North of Building 460," the incident took place north of Building 446 and not Building 460.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, Re: Approval, Data Summary Report for IHSS Group 400-4, PAC 400-804 – Miscellaneous Dumping, Building 446 Storm Drain, and PAC 400-804 – Road North of Building 460, August 23.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2004a, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Industrial Area Sampling and Analysis Plan Fiscal Year 2004 Addendum #IA-04-14, IHSS Group 400-4, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, Data Summary Report for IHSS Group 400-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-805

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 443 Tank 9 Leak

The Final Update to the HRR for PAC 400-805 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-805 is summarized in this update. The following HRR volumes contain PAC 400-805 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1990

Historical Summary

While conducting tightness tests on tanks within Rocky Flats, a leak around a filler pipe of Tank 9, a fuel oil tank located near the Steam Plant (Building 443), was detected. Fuel was found around the filler pipe area. Maintenance personnel were to repair the leak by tightening, repairing or replacing the filler pipe. No documentation was found that detailed the fate of constituents to the environment (DOE 1992). The location of PAC 400-805 is shown on Figure 18.

PAC Investigations

During the IHSS Group 400-7 accelerated action, Tank 9, which had previously been foamed, was removed and disposed of as sanitary waste. The soil around the tank and the associated spill area was also removed as a function of the IHSS Group 400-7 action. The removal is documented in the Closeout Report for IHSS Group 400-7 (DOE 2004).

No Further Action Recommendation

On December 5, 2001, DOE provided the FY2002 HRR Working Group a Site location map showing the diesel fuel tank (Tank 9) as being completely separated from the No. 6 fuel oil tanks (Tanks 1-4) (DOE 2002). As determined by the FY2002 HRR Working Group and in accordance with a February 14, 2002 approval letter from CDPHE (the LRA) PAC 400-805 was approved for NFA (CDPHE and EPA 2002) (DOE 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Closeout Report for IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

PAC REFERENCE NUMBER: 400-806

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Catalyst Spill, Building 440

The Final Update to the HRR for PAC 400-806 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-806 is summarized in this update. The following HRR volumes contain PAC 400-806 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 21, 1989

Historical Summary

Approximately five gallons of a catalyst leaked from a foam production tank located north of Building 440. The liquid flowed onto the pavement but was stopped before it could enter the storm drain. The location of PAC 400-806 is shown on Figure 18.

The leak was due to a small crack in the tygon tubing and consisted of polymethylene polyphenylisocyanate which was determined not to be a hazardous material. The liquid was cleaned up with "Oil-Dri®" to absorb the spill and the residue was placed in hazardous material waste drums. It was determined that the event was not reportable and precautions were taken to prevent further spills until the leak was repaired (DOE 1992).

PAC Investigations

No further investigation was deemed necessary because the spill was on to pavement (EPA 1992).

No Further Action Recommendation

In accordance with a February 14, 2002 approval letter from CDPHE (CDPHE and EPA 2002), the LRA, and EPA, PAC 400-806 was approved for NFA, citing that PAC 400-806 met the criteria for such status as defined in RFCA Attachment 6 (DOE et al. 1996).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

EPA, 1992, Correspondence to R. Schassburger, DOE RFO; from M. Hestmark, EPA Region VIII; RE: Potential Area of Concern Needing Further Investigation, December 23.

PAC REFERENCE NUMBER: 400-807

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-10
Unit Name:	Sandblasting Area

The Final Update to the HRR for PAC 400-807 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-807 is summarized in this update. The following HRR volumes contain PAC 400-807 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

May to September 1976

Historical Summary

No documentation could be found that detailed the exact date that sandblasting began in the 400 Area; however, May 1976 references stated that sandblasting of ATMX railcars took place "north of Building 664," "inside the fence east of 444," and "east of Building 439." Figure 18 shows the location of PAC 400-807 within the 400 Area. The PAC location is southeast of Building 444, opposed to "east of 444" as commented in the May 1976 reference. In September 1976, Rocky Flats personnel initiated the substitution of alumina grit for flint sand because of its lower toxicity (DOE 1992).

PAC Investigations

In accordance with IASAP Addendum #IA-02-01 for IHSS Group 400-10 (DOE 2001), which included PAC 400-807, accelerated action characterization samples were collected and analyzed in 2002. Seven surface soil characterization samples were collected and analyzed. Radionuclides, SVOCs, and metals, specifically aluminum, were considered the PCOCs for PAC 400-807. The analytical results showed no sample results greater than the RFCA WRW soil ALs (DOE et al. 2003), and were documented in the Data Summary Report for IHSS Group 400-10 (DOE 2003b). Uranium isotopes were detected at four locations and metals were detected at five locations. The maximum radionuclide detection was uranium-235 at 0.26 pCi/g and beryllium and chromium were detected at 1.1 and 21.3 mg/kg, respectively.

No Further Accelerated Action Recommendation

Based upon the results of the soil samples collected, no current or potential contaminant source was identified. As shown in the Data Summary Report (DOE 2003b), analytical results from the sampling event indicated that all PCOCs were less than RFCA WRW soil ALs.

DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 400-807 on July 15, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO; from S. Gunderson; CDPHE, RE: Final Data Summary Report for IHSS Group 400-10, July 15.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Characterization Data Summary Report for IHSS Group 400-10, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-808

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Vacuum Pump Leak – Building 442

The Final Update to the HRR for PAC 400-808 consolidates the information in the initial 1992 HRR information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-808 is summarized in this update. The following HRR volumes contain PAC 400-808 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

March 6, 1991

Historical Summary

A release occurred from a vacuum pump system along the northern side of Building 442 (DOE 1992). The location of PAC 400-808 is shown on Figure 18.

About one quart of oil contaminated an area roughly 18- by 24-inches beneath the pump. The pump was used to test filter adequacy, a process that involved the use of Di-n-octylphthalate. Initially, it was not known if the oil contained any Di-n-octylphthalate; therefore, soil samples were collected. TCLP analytical results indicated quantities of 1,1-dichloroethane, trichloroethane, toluene, benzene, and chlorobenzene that were greater than the detection limit but were below the regulatory standard. Total analysis indicated the presence of hydrocarbons and a high concentration of bis(2-ethylhexyl)phthalate, which is commonly used in vacuum pump oil. Hydrocarbons were found in trace amounts (DOE 1992).

Repair of the pump was completed on March 6, 1991, and further investigation indicated the vacuum pump may have been pulling Di-n-octylphthalate through the process line. The information was discovered on March 8, 1991 at which time Filter Test Personnel were instructed to cover the area to prevent contaminant migration due to precipitation. Soil samples were collected on March 11, 1991, and cleanup was completed on March 13. Confirmation samples were collected on March 14, 1991 to ensure the complete removal of contamination, and a work order was issued to provide a containment system. The material generated during the cleanup was stored in a RCRA-regulated satellite collection area while waiting analytical results (DOE 1992).

PAC Investigations

No further investigation was deemed necessary (EPA 1992).

No Further Action Recommendation

In accordance with a February 14, 2002 approval letter from CDPHE (the LRA) and EPA (CDPHE and EPA 2002), PAC 400-808 was approved for NFA, citing that PAC 400-808 met the criteria for such status as defined in RFCA Attachment 6 (DOE et al. 1996).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July 19.

EPA, 1992, Correspondence to R. Schassburger, DOE RFO; from M. Hestmark, EPA Region VIII; RE: Potential Area of Concern Needing Further Investigation, December 23.

PAC REFERENCE NUMBER: 400-809

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Oil Leak – 446 Guard Post

The Final Update to the HRR for PAC 400-809 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-809 is summarized in this update. The following HRR volumes contain PAC 400-809 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 26, 1991

Historical Summary

A release of motor oil occurred in the motorcycle parking lot north of the 446 Guard Post. No motorcycles were present in the parking lot when the spill was discovered. Figure 18 shows the location of PAC 400-809 with respect to the 446 Guard Post and within the 400 Area.

The HAZMAT team responded to the spill. The spill consisted of 1 quart of motor oil and the contaminated soil was cleaned up with absorbent material. Approximately 1 ft^3 of contaminated material was generated during the cleanup (DOE 1992).

RCRA CPIR No. 91-015 was submitted to the CDH as required (DOE 1992). The RCRA CPIR states that there did not appear to be any threat to the environment. Material was packaged and marked according to RCRA regulatory requirements and transferred to a 90-day accumulation area (DOE 1992).

PAC Investigations

No further investigation was required because the spill was small and the spill was cleaned up.

No Further Action Recommendation

CDPHE (the LRA) and EPA formally approved the PAC 400-809 NFA determination (CDPHE and EPA 2002), citing that PAC 400-809 met the criteria for such status as defined in RFCA Attachment 6 (DOE et al. 1996).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO; from S. Gunderson, CDPHE; T. Rehder, EPA Region VIII; RE: Approval of NFA Designation for IHSSs & PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2002, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 400-810

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-3
Unit Name:	Beryllium Fire – Building 444

The Final Update to the HRR for PAC 400-810 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-810 is summarized in this update. The following HRR volumes contain PAC 400-810 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

February 23, 1978

Historical Summary

While welding on a small inlet duct of the beryllium air plenum that served Building 444, an employee noticed a fire on the face of the prefilters. The Fire Department responded to the automatic filter alarm, and in approximately 15 minutes, the fire was extinguished. A third alarm was activated by a worker when smoke backed up into Room 107, which was cancelled when filter fire detection equipment was activated resulting in a negative pressure inside the building (DOE 1992). Figure 18 shows the location of PAC 400-810 within the 400 Area.

Firemen responded to the fire by initially spraying the outside of the plenum where the paint had blistered. One team was able to extinguish the fire from inside the plenum. A fog nozzle was used, which was thought to have "washed" any airborne particulate from the air. Other areas around Building 444 were also sprayed down to control contamination. The roadway south of Building 444, where the fire water had flowed, was vacuumed and monitored for beryllium. All smears were determined to have background levels (DOE 1992).

Beryllium levels in the fire water collected from the impounded ditches east and south of Building 444 were 1.6 and 4.3 mg/L, respectively. Analytical results from samples collected from Ponds A-3, B-3, and C-1, and the shower water impounded at Building 881, where employees were bussed to take showers, indicated concentrations of beryllium less than 0.5 mg/L (DOE 1992). Water from the ditches adjacent to Building 444 was transferred to Building 774 for processing, and shower water from Building 881 was impounded at the building's southern holding basin (PAC SE-1601) (DOE 1992).

Analytical results indicated 14.5 g of beryllium were released to the atmosphere. At the time, this exceeded the EPA limit of 10 g. Air sampling stations indicated beryllium concentrations ranging from 0.009 to 0.021 micrograms per cubic meter ($\mu g/m^3$). At the time of this incident, the Occupational Safety and Health Administration (OSHA) standard 8-hour time-weighted average was 2.0 $\mu g/m^3$. Because of prevailing wind conditions at the time of the fire, samples

collected along Highway 93 contained concentrations of 0.006 to 0.015 µg/m^3, which was compared to the EPA standard of 0.01 µg/m^3 continuous exposure to the general public. Exposure time would have been only one half hour (DOE 1992).

Stack emissions were monitored for uranium during the fire. Total long-lived alpha was found to be 0.08 pCi/L and total uranium was 0.092 pCi/L. Total Rocky Flats stack emissions for February 1977 were 2.3 µCi (DOE 1992).

PAC Investigations

During 1993, nine surface soil samples were collected within the PAC. All contaminant activities and concentrations were less than the proposed RFCA WRW soil ALs (DOE et al. 2003, DOE 2003a). Radionuclides were detected at activities greater than background means plus two standard deviations.

In accordance with IASAP Addendum #IA-03-06 for IHSS Group 400-3 (DOE 2003a), which included PAC 400-810, accelerated action soil samples were collected at 14 surface and subsurface locations in 2003. PCOCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2003b, DOE et al. 2003). Uranium isotopes, metals, and VOCs were detected above background means plus two standard deviations or RLs at both surface and subsurface locations. Beryllium was detected at seven surface locations and five subsurface locations (maximum concentration detected was 3.3 mg/kg) (DOE 2003b).

Building 444 was demolished in April 2005 including the beryllium air plenum (DOE 2005a).

No Further Accelerated Action Recommendation

Action was not required and a NFAA determination was justified for PAC 400-810, because of the following:

- PCOC concentrations in soil were less than the RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because the IHSS was not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 400-3. The groundwater contamination beneath this area is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005b).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA for PAC 400-810 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO; from S. Gunderson; CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Building 444, 447 et al.), December 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June 21.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-811

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformer 443-2, Building 443

The Final Update to the HRR for PAC 400-811 consolidates the information in the Second Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-811 is summarized in this update. The following HRR volumes contain PAC 400-811 information:

Original Report – Second Quarterly (DOE 1993);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

Unknown

Historical Summary

Transformer 443-2 was located near the southwestern corner of Building 443. The area was surrounded by a concrete berm and restricted by a fence. The transformer was observed leaking small quantities of oil during a routine inspection in April of 1992. Figure 18 shows the location of PAC 400-811 with respect to Building 443 and the rest of the 400 Area.

This site was not originally sampled as part of the sitewide screening effort to categorize the 35 suspected PCB sites in August of 1991 (DOE 1991). However, the surrounding soil was sampled in the same manner as the other sites in September of 1991 (DOE 1993).

Analytical data showed PCB concentrations present in soil surrounding the transformer as high as 230 ppm. Radiological samples collected at the same time were analyzed and indicated background levels for plutonium-239/240, uranium-233/234, uranium-235, uranium-238, and americium-241. Wipe samples collected from the outside of the transformer in April 1992 indicated the dielectric oil contained 2,000 micrograms per 100 square centimeters ($\mu g/100\ cm^2$) PCBs. Oil samples analyzed in April 1992 showed that the oil contained 12,000 ppm PCBs (DOE 1993).

The transformer was taken out of service in April 1992. The transformer, oil, and concrete pad cleanup actions were conducted in accordance with TSCA regulations (DOE 1993).

PAC Investigations

Five samples were collected to verify a successful cleanup. The results indicated the PCB levels in the soil were less than the 25 ppm (total) TSCA guidance for Restricted Access Areas at outdoor electrical substations. Most analytes were not detected. Aroclor-1248 was detected

between 0.029 and 3.6 ppm. The transformer, oil, concrete berm, and concrete pad had all been removed before Building 443's demolition (June 20, 2004).

No Further Action Recommendation

Because the analytical data for the soil in PAC 400-811 indicated the PCB concentrations were less than 25 ppm; this site was proposed as NFA in the 1998 Annual Update to the HRR (DOE 1998). After review of the Annual HRR Update by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFA for PAC 400-811 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1991, Assessment of Known, Suspect, and Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1993, Second Quarterly Update, October 1, 1992 to January 1, 1993, Historical Release Report, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1998, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 400-812

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Tank T-2 Spill in Building 460

The Final Update to the HRR for PAC 400-812 consolidates the information in the Sixth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-812 is summarized in this update. The following HRR volumes contain PAC 400-812 information:

Original Report – Sixth Quarterly (DOE 1994a);
Update Report – Seventh Quarterly (DOE 1994b);
Update Report – Eighth Quarterly (DOE 1994c);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November 10, 1993

Historical Summary

A release of process water occurred on November 10, 1993, when personnel were transferring 3,500 gallons of process waste water from Tank T-2 (RCRA Unit 40.09) located inside Building 460 to a tanker truck. Approximately 90 minutes into the transfer operation, an employee observed liquid escaping from an air vent on top of the tanker (DOE 1994a). Employees involved in the transfer operation immediately shut down the pumps from Building 460 and secured the discharge valves from Tank T-2 to prevent additional waste from entering the tanker truck. Figure 18 shows the location of PAC 400-812 with respect to Building 460 and the rest of the 400 Area.

Approximately 25 gallons of liquid were released onto the soil and concrete dock area (northwestern corner of Building 460). The dock area consisted of approximately 3 inches of soil covering a concrete subslab (DOE 2001). The 25 gallons of material released to the soil and underlying concrete were characterized as potentially containing a characteristic chromium hazardous waste. Based on a field pH test, the released liquid had a pH range of 6.0 to 6.5. Analytical results indicated RCRA waste characteristics for toxicity were not exceeded.

The RCRA Contingency Plan was implemented, and CDPHE and EPA were notified of the event. Samples of the spilled liquid and wetted soil were collected from under the tanker. Absorbent socks and a wet vacuum were used to remove standing liquids. Approximately 12 gallons of the spilled liquid were recovered and returned to Tank T-2. The used absorbent socks and PPE were placed in the Building 460 RCRA 90-day accumulation area. On November

11, 1993, the soil overlying the concrete subslab was removed (eight 55-gallon drums) and transferred to a RCRA permitted storage area.

It was determined that a release of potentially hazardous constituents to the environment was unlikely due to the response action and concrete subslab design (DOE 2001).

PAC Investigations

On November 3, 2000, eight 1-ft composite soil samples were collected at PAC 400-812. PCOCs were identified as VOCs, total metals, pH, and gross alpha-beta. VOCs were collected by grab methods, and all sampled locations were surveyed. Analytical results indicated no PCOC detections for PAC 400-812 (DOE 2001).

RCRA Unit 40.09, including the tank, was closed in accordance with the RCRA Closure Plan for the B460 Process Waste System (10/19/95), and the Closure Certification was signed on September 16, 1996 (DOE 2005).

No Further Action Recommendation

Based upon the analytical results and the spill cleanup, no current or potential contaminant source could be identified. PCOCs for PAC 400-812 were not detected and this PAC was proposed for NFA in the Eighth Quarterly Update (DOE 1994c) and 2001 Annual Update to the HRR (DOE 2001).

After review of the HRR Updates and the data by the regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA, of the NFA status for PAC 400-812 on February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1994a, Sixth Quarterly Update to the Historical Release Report, October 1, 1993 through January 1, 1994, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1994b, Seventh Quarterly Update to the Historical Release Report, January 1, 1994 through March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994c, Eighth Quarterly Update to the Historical Release Report, April 1, 1994 through June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2001, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Rocky Flats Environmental Technology Site Type 1 Reconnaissance Level Characterization Report (RLCR) – Building 460 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, April 20.

PAC REFERENCE NUMBER: 400-813

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-5
Unit Name:	RCRA Tank Leak in Building 460

The Final Update to the HRR for PAC 400-813 consolidates the information in the Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-813 is summarized in this update. The following HRR volume contains PAC 400-813 information:

Original Report – Seventh Quarterly (DOE 1994).

Date(s) of Operation or Occurrence

January 12, 1994

Historical Summary

During a routine daily inspection, approximately 2 gallons of liquid was found in the secondary containment piping associated with a RCRA-regulated process aqueous waste collection tank (RCRA Unit 40.12) in Building 460. The release originated from the gravity drain piping between a process sink and sump tank ST-2 (the ancillary equipment associated with the RCRA Unit). The affected piping was located under the concrete floor in Room 151 in the approximate center of Building 460, near the Non-Destructive Testing Lab. The secondary containment system for the affected area consisted of a pipe within a pipe (DOE 1994). Figure 18 illustrates the location of PAC 400-813.

The RCRA Contingency Plan was implemented and the liquid in the secondary containment was removed and placed into the process waste system on January 12, 1994. An engineering evaluation was conducted to identify the leaks in primary and secondary containment. The piping was taken out of service on January 12, 1994, and a decision was made not to repair the piping until further evaluation was completed. The pipes were temporarily capped to prevent inadvertent use of the system and alternate means of collection were used for the processes that relied on the capped lines. Waste was collected in drums with secondary containment and then transferred to the Building 460 hazardous waste collection system for disposition (DOE 1994).

An engineering evaluation of the integrity of the secondary containment system was conducted to determine whether there may have been a pathway for contaminants to spread to the environment. Based on the results of the preliminary testing conducted on January 17, 1994, it was determined that there was a possibility that some of the waste may have been released to the environment underneath the floor of Building 460 by passing through the concrete floor and into the soil. Further evaluation on February 1 and 9, 1994, identified a breach in the secondary containment approximately 2.5 ft from the end of the pipe (DOE 1994).

The breach was approximately ¼ inch by ½ inch in area and was located in the vicinity of a sleeve that joined two sections of pipe. The released liquid contained levels of cadmium and silver that made the material a characteristic hazardous waste. No previous record of leaks from the primary piping is known and very little material was believed to have been released to the environment. The waste was presumed to be confined in the soil in the immediate area of the breach in the secondary containment piping (DOE 1994).

It is unlikely that the release leached into the groundwater because the area of the release was protected against rain and snowmelt and was located approximately 13.7 ft above the highest recorded level of groundwater in that area of the Plant (DOE 1994).

PAC Investigations

Accelerated action characterization activities were conducted at IHSS Group 400-5, which included PAC 400-813, in accordance with IASAP Addendum #IA-03-14 (DOE 2003).

Based on PAC 400-813 site history and historical soil sampling results, radionuclides, metals, SVOCs, and VOCs were identified as COCs. One surface and subsurface soil sample was collected and analyzed for the COCs during PAC 400-813 characterization activities in 2003. Analytical results revealed all COCs were less than RFCA WRW soil ALs (DOE et al. 2003). Uranium-235 (0.121 pCi/g), metals (copper and strontium at 65 and 96 mg/kg, respectively), VOCs, and SVOCs were detected. The accelerated action characterization activities conducted at IHSS Group 400-5 and the complete rationale for a NFAA decision at PAC 400-813 are discussed in detail in the Data Summary Report for IHSS Group 400-5 (DOE 2004).

RCRA Unit 40.12, including the tank, was closed in accordance with the RCRA Closure Plan for the B460 Process Waste System (10/19/95), and the Closure Certification was signed on September 16, 1996 (DOE 2005).

No Further Accelerated Action Recommendation

NFAA was recommended for PAC 400-813 based on the following (DOE 2004):

- Activities and concentrations of COCs were all less than the RFCA WRW soil ALs.
- Migration of soil contaminants to surface water is unlikely because COC concentrations are low and PAC 400-813 is not located in an area of high erosion, based on RFCA Attachment 5, Figure 1 (DOE et al. 2003).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA for PAC 400-813 on December 7, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump #3 Acid Site, PAC 400-813 and PAC 400-815 – Tank Leaks in Building 460 & Status of RCRA Unit 8, December 7.

DOE, 1994, Seventh Quarterly Update to the Historical Release Report, January 1, 1994 through March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004, Data Summary Report for IHSS Group 400-5, IHSS 400-205, PAC 400-813, and PAC 400-815, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005, Rocky Flats Environmental Technology Site Type 1 Reconnaissance Level Characterization Report (RLCR) – Building 460 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-814

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Air Conditioner Compressor Release, Building 444 Roof

The Final Update to the HRR for PAC 400-814 consolidates the information in the Eighth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-814 is summarized in this update. The following HRR volumes contain PAC 400-814 information:

Original Report – Eighth Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 17, 1994

Historical Summary

At approximately 12:00 p.m. on May 17, 1994, a Rocky Flats Stationary Operating Engineer (SOE) noticed the presence of oil under an air conditioning unit on the roof of Building 444. Upon further investigation of the compressor cabinet unit, the SOE found additional oil. The total volume detected totaled approximately 2 gallons. Based on results from laboratory samples previously taken from other air conditioning equipment, this oil was suspected to be contaminated with levels of cadmium and lead above TCLP regulatory limits (DOE 1994). Figure 18 illustrates the location of PAC 400-814.

The source of the leak was determined to be a hole in a copper line to a pressure control device. The hole was at a point where another copper line crossed at a 90 degree angle directly on top of the lower line. The hole apparently was due to abrasion from vibration between the two lines. Repairs to the unit were made. Approximately 2 gallons of compressor oil and an undetermined amount of Freon 22 were released to the roof of Building 444. Analytical results from a sample of the refrigerant compressor oil released to the roof indicated that the released material was not a hazardous waste (DOE 1994).

The RCRA Contingency Plan was implemented as a precaution. The released oil was cleaned up by removing loose gravel, applying 200 lbs of Oil-Dri® absorbent material to the area of release (twice), and sweeping up the absorbent material. The cleanup material was placed in 55-gallon drums and then placed in RCRA 90-day Accumulation Area No. 442414. The drums were managed as hazardous waste until it was determined that the waste was nonhazardous. The roof was periodically inspected after the cleanup to verify the adequacy of the repairs (DOE 1994).

Building 444 was dispositioned and demolished in April 2005. As a result of the building demolition, the air conditioner compressor site on the roof of Building 444 was also demolished (DOE 2005).

PAC Investigations

No other investigation was required because the release was not to soil.

No Further Action Recommendation

Based upon the analytical results and knowledge of the spill cleanup, no current or potential contaminant source could be identified. PAC 400-814 was declared nonhazardous and this PAC was proposed for NFA in the Eighth Quarterly Update to the HRR (DOE 1994).

After review of the Eighth Quarterly Update to the HRR and the data by the regulatory agencies, DOE received approval from CDPHE (the LRA) and EPA, of the NFA status for PAC 400-814 on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Eighth Quarterly Update to the Historical Release Report, April 1, 1994 through June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 400-815

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-5
Unit Name:	RCRA Tank Leak in Building 460

The Final Update to the HRR for PAC 400-815 consolidates the information in the Eighth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-815 is summarized in this update. The following HRR volumes contain PAC 400-815 information:

Original Report – Eighth Quarterly (DOE 1994): and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

June 29, 1994

Historical Summary

At 3:05 p.m. on June 29, 1994, a maintenance person discovered a release of approximately 1,800 gallons of process waste water into the secondary containment pit of Sump Tank ST-5 (RCRA Unit 40.15) located in Room 140 of Building 460. Initial surveillance indicated the Hypalon liner in the pit leaked, filling the associated leak-detection sight tube 3/4 full of hazardous process waste water. In addition, approximately 1/2 to 3/4 inches of water was present in the surrounding berm. No leaking had been observed during the RCRA custodian's inspection on the previous day, June 28, at 9:30 a.m. (DOE 1994). Figure 18 shows the location of PAC 400-815 with respect to Building 460 and the rest of the 400 Area.

The RCRA Contingency Plan was implemented as a precautionary measure due to the possibility of a release of hazardous waste from secondary containment to the soil beneath the building. Measurements of the pit were taken which indicated that the total quantity released was approximately 1,800 gallons (DOE 1994).

In response to the spill, cessation of all process waste activities in Building 460 occurred by 4:00 p.m. on June 29, 1994, approximately 1 hour after the leak was detected. Building 460 Maintenance pumped the tank, pit and bermed area of as much water as possible and then vacuumed the remaining waste. This water was collected in RCRA collection Tanks T-1 and T-2 in Building 460. The final removal of all liquid from under the liner was completed by noon on June 30, 1994 (DOE 1994).

Sump Tank ST-5 collected Building 460 process waste water which was initially collected in Tank T-3 and then pumped to a roll filter table that filtered the process waste water prior to collection in Sump Tank ST-5. Sump Tank ST-5 waters were then pumped to collection Tank T-1. These tanks, as well as collection Tank T-2, were all contained within a concrete berm. The concrete was coated with epoxy with the exception of Pit No. 5 surrounding Sump

Tank ST-5, which was lined with a two-ply continuous 0.036 ml thick Hypalon liner with glued seams. The sight tube associated with this pit was a 12-inch-diameter piece of plastic pipe located in the northwestern corner of the pit. It was slightly offset from the concrete floor to allow collection of any liquid beneath the liner and to serve as a leak detection device for a breach of secondary containment. On June 30, 1994, maintenance tested the hypalon liner in the pit for leakage. Three small areas in the liner indicated leakage paths. The liner was also visually inspected and two additional small areas were found near the top of the pit where the liner had separated (DOE 1994).

Initially, the released material was believed to be nonhazardous based on process knowledge of the production cleaning area activities ongoing at the time and analytical information on the cleaning processes. However, based on analytical sample results, it was later determined that the spilled material was hazardous waste. Samples of the waste water inside and outside the pit liner were collected at 5:00 p.m. on June 29, 1994. Additional samples were collected from the roll filter tank and Tank 3 on the following morning (DOE 1994).

The analytical data indicated cadmium exceeded the TCLP limit in both the pit and the sight tube. Based on the analytical data, no other RCRA metals exceeded TCLP limits or exhibited the characteristic of corrosivity. The source of the cadmium was believed to be from residual Non-Destructive Testing film developer process waste which was last placed into the process waste system on June, 28, 1994. The developer waste water drained to the tank in Pit No. 2. Because Sump Tank ST-2 pumping was automatic, it is unknown when the solution from this tank was transferred to Tank T-3 (DOE 1994).

It was unknown whether pathways to the environment existed such as cracks or gaps in the containment pit. RCRA Unit 40.15, including the tank, was closed in accordance with the RCRA Closure Plan for the B460 Process Waste System (10/19/95), and the Closure Certification was signed on September 16, 1996 (DOE 2005).

PAC Investigations

Accelerated action characterization activities were conducted at IHSS Group 400-5, which included PAC 400-815, in accordance with IASAP Addendum #IA-03-14 (DOE 2003).

Based on PAC 400-815 site history, radionuclides, metals, SVOCs, and VOCs were identified as PCOCs. One surface and subsurface soil sample was collected and analyzed for the COCs during PAC 400-815 characterization activities. Analytical results revealed no detections of PCOCs. The accelerated action characterization activities conducted at PAC 400-815 are discussed in detail in the Data Summary Report for IHSS Group 400-5 (DOE 2004).

No Further Accelerated Action Recommendation

NFAA was recommended for PAC 400-815 based on the following (DOE 2004):

- Activities and concentrations of PCOCs were not detected; therefore they were uniformly below the RFCA WRW soil ALs (DOE et al. 2003).
- Migration of soil contaminants to surface water is unlikely because little contamination is present and PAC 400-815 is not located in an area of high erosion, based on RFCA Attachment 5, Figure 1 (DOE et al. 2003).

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA for PAC 400-815 on December 7, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump #3 Acid Site, PAC 400-815 and PAC 400-815 – Tank Leaks in Building 460 & Status of RCRA Unit 8, December 7.

DOE, 1994, Eighth Quarterly Update to the Historical Release Report, April 1, 1994 through June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004, Data Summary Report for IHSS Group 400-5, IHSS 400-205, PAC 400-815, and PAC 400-815, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005, Rocky Flats Environmental Technology Site Type 1 Reconnaissance Level Characterization Report (RLCR) – Building 460 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, April 20.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 400-820

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Central Avenue Ditch Soil Spreading

The Final Update to the HRR for PAC 400-820 can be found under PAC 600-1004. This PAC was re-numbered as PAC 600-1004 in the Seventh Quarterly HRR Update to better reflect its mapped location in the 600 Area (DOE 1994b). PAC 600-1004 consolidates the information in the Sixth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 400-820 is not summarized in this update.

Original Report – Sixth Quarterly (DOE 1994a);
Update Report – Seventh Quarterly (DOE 1994b).

Date(s) of Operation or Occurrence

Not Applicable

Historical Summary

Not Applicable

PAC Investigations

Not Applicable

No Further Accelerated Action Recommendation

Not Applicable

Comments

This PAC was renumbered as PAC 600-1004 in the Seventh Quarterly Update to the HRR (DOE 1994b).

References

DOE, 1994a, Sixth Quarterly Update to the Historical Release Report, October 1, 1993 through January 1, 1994, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1994b, Seventh Quarterly Update to the Historical Release Report, January 1, 1994 through March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

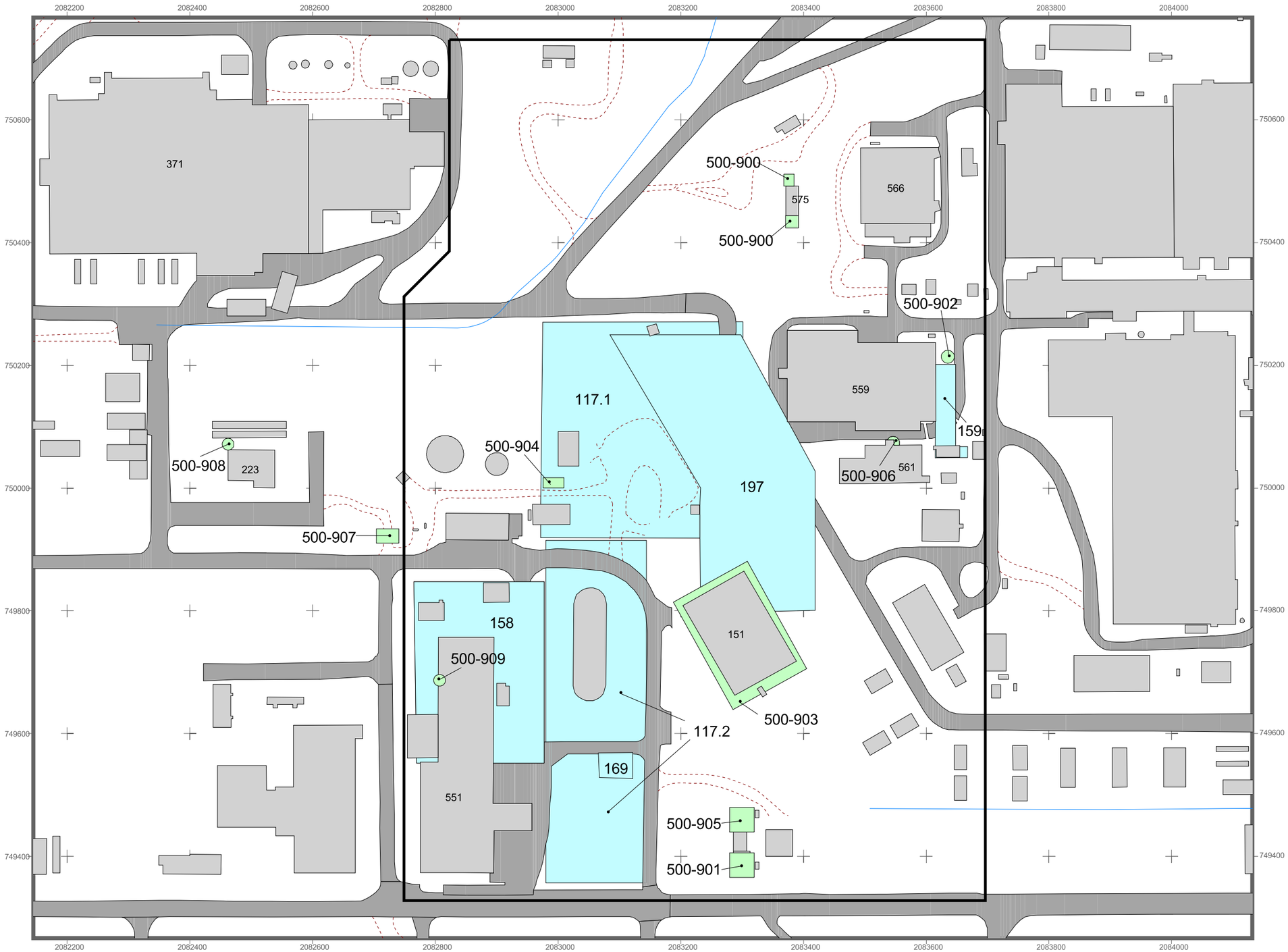

Figure 19
HRR 500 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

100 0 100 200 Feet

Scale = 1: 2350

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_500.apr

PAC REFERENCE NUMBER: 500-117.1

IHSS Number: 117.1

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: 500-1

Unit Name: North Site Chemical Storage

This Final Update to the HRR for PAC 500-117.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 117.1 is summarized in this update. The following HRR volumes contain IHSS 117.1 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to September 1959 to Early 1970s

Historical Summary

As shown on Figure 19, IHSS 117.1 was an approximately 2.6-acre storage area located northeast of Building 551 and west of Building 559. The area was used as a general warehouse storage yard beginning prior to September 1959 and continuing until the early 1970s. A number of incidents are reported in the 1992 HRR (DOE 1992a):

- In September 1959, 20 mrem/hr was measured in a 1-ft^2 area during routine monitoring of the aluminum scrap pile near Building 551; records do not specify the type of radiation detected or the suspected source.
- In May 1963, uranium chips and turnings were discovered in an aluminum scrap pile located at IHSS 117.1.
- In May 1964, 40 drums of aluminum scrap contaminated with uranium chips and turnings were discovered in the storage yard. The material was dumped into the acid waste in SEP Pond 207A (PAC 000-101) (DOE 1992a).

In the early 1970s, the material in the general warehouse storage yard was transferred to the PU&D storage yard southwest of the Present Landfill (PAC NW-170) (DOE 1992a).

IHSS Investigations

IHSS 117.1 was investigated as part of OU 13 in accordance with the Phase I RFI/RI Work Plan for OU 13 100 Area (DOE 1992b). PAC 500-197, originally considered part of OU 16, was transferred to OU 13 and was investigated in conjunction with IHSS 117.1. There is significant overlap in the areas of these two IHSSs and both have histories of scrap metal storage.

OU 13 RFI/RI (DOE 1995) characterization activities at IHSS 117.1 included surface soil sampling, soil gas sampling, and an in-situ HPGe detection survey.

Surface soil samples were collected at 14 locations in IHSS 117.1 and were analyzed for metals, radionuclides, and VOCs. A total of 31 analytes were detected in the samples including five metals (copper, lead, selenium, silver, and zinc) that were detected at concentrations exceeding background levels. Maximum detected uranium activities in IHSS 117.1 were 0.55 pCi/g for uranium-233/234 and 0.5 pCi/g for uranium-238. These values are below the background mean plus two standard deviations. Uranium-235 was not detected. None of the sample results for metals, radionuclides, or VOCs exceeded the applicable PPRGs (DOE 1994).

OU 13 RFI/RI soil gas sampling in IHSS 117.1 included 99 initial screening samples and 5 follow-up samples. Chlorinated solvents were detected in the central portion of IHSS 117.1. Maximum detected concentrations in IHSS 117.1 soil gas include tetrachloroethene at 2,200 μg/L, carbon tetrachloride at 930 μg/L, trichlorofluoromethane at 47 μg/L, and trichloroethene at 19 μg/L. This may be associated with the storage of scrap metal and machine turnings in this area, as chlorinated solvents are commonly used as degreasers. BTEX (fuel-related aromatic hydrocarbon) compounds were detected along the southern boundary of the IHSS, which is expected because this area borders a major street. Maximum detected concentrations included toluene at 10 μg/L, benzene at 3.4 μg/L, and xylenes at 3.43 μg/L. Ethylbenzene was not detected at a concentration greater than 1 μg/L.

The in-situ HPGe survey was conducted using a truck-mounted HPGe gamma radiation detector with a nominal detection radius of 147.5 ft. Using this system, survey results may be elevated due to the presence of buildings that process or store radionuclides within the radius of detection, a phenomenon known as “shine.” In-situ HPGe survey data were considered as qualitative and were intended to be used in conjunction with other data, particularly laboratory analyses of soil samples, for characterizing the nature and extent of radionuclide contamination in soil.

HPGe results from IHSS 117.1 and the surrounding area indicated an area of elevated americium-241 specific activity occurring east of IHSS 117.1 and west of Building 707, centered north of Building 569. Approximate activities decrease from over 100 pCi/g in this area to less than 1 pCi/g in the northwestern portion of IHSS 117.1. Specific activities within IHSS 117.1 were in the 0.1 to 10 pCi/g range (DOE 1995). The elevated readings detected east of IHSS 117.1 were attributed to shine from Building 569. IHSSs 123.2, 150.5, and 162 overlap the area where elevated americium-241 activities were recorded. These areas were characterized in accordance with IASAP Addendum #IA-03-11 (DOE 2003a) and no remediation was required under RFCA.

RFCA (DOE et al. 1996) accelerated action activities were conducted at IHSS 117.1 as part of IHSS Group 500-1 in accordance with IASAP Addendum #IA-04-03 (DOE 2003b). A total of 33 surface soil and 272 subsurface soil samples were collected from 103 statistical and 2 biased sampling locations in 2003. Radionuclides, metals, PCBs, dioxins, furans, and VOCs were identified as COCs. None of the COCs were detected at levels exceeding the RFCA WRW soil ALs (DOE et al. 2003) in either surface (0 to 0.5 ft bgs) or subsurface (0.5 to14.5 ft bgs) soil samples (DOE 2004b). Uranium-234, uranium-235, and uranium-238 were detected in surface (0 to 0.5 ft bgs) soil at activities slightly exceeding background but well below RFCA WRW soil ALs. In subsurface soil, uranium isotopes were present within background levels. Based on the results of accelerated action sampling, no remediation was required under RFCA (DOE 2004b).

No Further Accelerated Action Recommendation

NFAA was recommended for IHSS 117.1 based on the following:

- Contaminant concentrations and activities in surface and subsurface soil were less than RFCA WRW soil ALs (DOE 2004b).
- The SSRS as presented in the IHSS Group 500-1 Data Summary (DOE 2004b)

After a review of the IHSS Group 500-1 Data Summary Report (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of NFAA status for IHSS 117.1 on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-1, IHSS 300-186, IHSS 500-117.1, and IHSS 500-197, September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 13 100 Area, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1994, Programmatic Risk-Based Preliminary Remediation Goals for the Rocky Flats Environmental Technology Site, Final, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 500-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-117.2

IHSS Number:	117.2
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	500-4
Unit Name:	Middle Site Chemical Storage

This Final Update to the HRR for PAC 500-117.2 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 117.2 is summarized in this update. The following HRR volumes contain IHSS 117.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to 1971 to Prior to September 1988

Historical Summary

IHSS 117.2 was an approximately 2.1-acre chemical storage area east of Building 551. Minor leaks and spills occurred at IHSS 117.2, including acids, oils, soaps, solvents, and beryllium scrap metal. The location of IHSS 117.2 is shown on Figure 19. An inspection, in approximately 1971, revealed several drums which were leaking an oily substance. On October 20, 1986, a 55-gallon drum of aluminum nitrate ($Al[NO_3]_3$)was punctured by a forklift east of Building 551. Most of the 55 gallons flowed out and across the roadway to the east (Seventh Street). The October 20, 1986, incident was reportedly controlled with no environmental damage (DOE 1992a).

In the early 1970s, there was a recommendation made for the repacking of leaking drums in the storage area. IHSS 117.2 was paved with asphalt sometime during the 1970s (DOE 1992a).

IHSS Investigations

IHSS 117.2 was investigated as part of the OU13 RFI/RI in accordance with the Phase I RFI/RI Work Plan for OU 13 100 Area (DOE 1992b). Investigative activities took place between 1992 and 1995 and included vertical soil profiling, surface soil sampling, basefill sampling, a soil gas survey, asphalt sampling, and an HPGe survey.

Vertical soil profiling at IHSS 117.2 showed that americium-241, plutonium-239/240, and uranium-235 activities were not elevated above minimum detectable activities at any depth. Eleven surface soil samples were collected in IHSS 117.2 and analyzed for metals, radionuclides, and organics. Of the 38 analytes detected in these surface soil samples, 25 were metals and 13 were radionuclides. Analytes exceeding background included chromium up to 34.2 mg/kg, cobalt up to 13 mg/kg, lead up to 62.8 mg/kg, nickel up to 28 mg/kg, zinc up to 1,497 mg/kg, americium-241 up to 0.169 pCi/g, plutonium 239/240 up to 0.225 pCi/g, and radium-226 up to 1.775 pCi/g (DOE 1995).

Basefill was sampled at two surface soil sampling locations in IHSS 117.2 where basefill was observed overlying native surface soil. Basefill samples were analyzed for metals and radionuclides, none of which were detected above background levels (DOE 1995).

Soil gas sampling was conducted on a grid with 20-ft spacing, resulting in 144 soil gas samples collected in IHSS 117.2. BTEX (fuel-related aromatic hydrocarbon) compounds were detected in the northern and south-central portions of IHSS 117.2, and chlorinated solvents were detected in the northern and southern portions of the IHSS. Based on the history of the IHSS and the geographical distribution of the detections, both the BTEX and the chlorinated solvents in the southern area appeared to be associated with the storage of machining waste. Asphalt was sampled at two locations in the northern half of IHSS 117.2, and was analyzed for metals and radionuclides. No analytes were detected above background (DOE 1995).

The in-situ HPGe survey was conducted using a truck-mounted HPGe gamma radiation detector with a nominal detection radius of 147.5 ft. Using this system, survey results may be elevated due to the presence of buildings that process or store radionuclides within the radius of detection, a phenomenon known as "shine." In-situ HPGe survey data were considered as qualitative and were intended to be used in conjunction with other data, particularly laboratory analyses of soil samples, for characterizing the nature and extent of radionuclide contamination in soil.

HPGe results from IHSS 117.2 and the surrounding area indicated an area of elevated americium-241 specific activity occurring east of IHSS 117.2 and west of Building 707, centered north of Building 569. Approximate activities decrease from over 100 pCi/g in this area to less than 1 pCi/g in IHSS 117.2 (DOE 1995). The elevated readings detected east of IHSS 117.2 were attributed to shine from Building 569. PACs 700-123.2, 700-150.5, and 000-162 overlap the area where elevated americium-241 activities were recorded. These areas were characterized in accordance with IASAP Addendum #IA-03-11 (DOE 2003a) and no remediation was required under RFCA.

IHSS 117.2 was investigated as part of IHSS Group 500-4 in accordance with IASAP Addendum #IA-03-05 (DOE 2003b). Radionuclides, metals, and VOCs were targeted as COCs. A total of 209 samples were collected from 85 locations. Eighty-five of the samples were surface soil samples and the remainder were subsurface soil samples ranging up to 11 ft in depth. The only result exceeding the applicable WRW soil AL (DOE et al. 2003) was for arsenic (28 mg/kg) in subsurface soil at one sampling location. This exceedance did not require remediation under RFCA (DOE et al. 1996). Analytical results are presented in the Data Summary Report for IHSS Group 500-4 (DOE 2004b).

No Further Accelerated Action Recommendation

Based on the analytical results and the SSRS presented in the IHSS Group 500-4 Data Summary Report (DOE 2004b), further action is not required at IHSS 117.2. An NFAA determination was justified based on the following:

- Contaminant concentrations were below WRW soil ALs (DOE et al. 2003) with the exception of arsenic in subsurface soil at one location.
- Migration of contaminants to surface water through erosion is unlikely because IHSS 117.2 is not located in an erosion-prone area.

- Migration of contaminants in groundwater will not likely impact surface water because an insufficient quantity of COCs is present in soil at IHSS 117.2. Contaminated groundwater in the vicinity of the IHSS is considered part of the IA Plume, which was evaluated in the Groundwater IM/IRA (DOE 2005) for possible inclusion in the alternatives analysis. It was determined that an analysis of accelerated action alternatives was not necessary for this plume area. The Final Groundwater IM/IRA document provides a detailed explanation of the screening process (DOE 2005).

After review of the IHSS Group 500-4 Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 117.2, on June 18, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-4, IHSS 500-117.2, Middle Site Chemical Storage, June 18.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 13 100 Area, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 500-4, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005, Final IM/IRA for Groundwater at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-158

IHSS Number:	158
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	500-2
Unit Name:	Radioactive Site – Building 551

This Final Update to the HRR for PAC 500-158 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 158 is summarized in this update. The following HRR volumes contain IHSS 158 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

September 1959 to 1970

Historical Summary

There are several documented incidents in which uranium contamination may have been released to the environment in IHSS 158, around the northern portion of Building 551 and around Building 553. The location of IHSS 158 is shown on Figure 19.

Waste boxes were loaded into railroad container cars in the area north of Building 551. Residual contamination may have been present as a result of leaks from the boxes. In September 1959, three containers measuring 6,000 to 40,000 cpm were held back from off-site shipment. On June 7, 1961, isolated spots of contamination up to 8,000 cpm were found on the dock and in the helium storage area of Building 553. The contamination was cleaned as a result of the discovery (DOE 1992a).

In October 1962, routine spot checks of one load of about 220 drums delivered to the Plant from an offsite vendor indicated uranium contamination up to 1,200 cpm on drum exteriors and up to 7,000 cpm on the drums' interior surfaces. In July 1963 and again in 1970, the Plant received equipment and drums from offsite which contained uranium above the acceptable level. The shipments were returned to the vendor (DOE 1992a).

IHSS Investigations

In accordance with the Phase I RFI/RI Work Plan for OU 13 100 Area (DOE 1992b), OU 13 RFI/RI activities at IHSS 158 included vertical soil profiling, surface soil sampling, a soil gas survey, and an HPGe survey.

Vertical soil profiling in IHSS 158 indicated that americium-241, plutonium-239/240, and uranium-235 were not elevated above minimum detectable activities at any depth. Eleven surface soil samples were collected in IHSS 158 and analyzed for metals, radionuclides, and organics. Of the 38 analytes detected, 25 were metals and 13 were radionuclides. Analytes exceeding background levels included chromium up to 102 mg/kg, cobalt up to 29.9 mg/kg, lead up to

78.8 mg/kg, nickel up to 97.6 mg/kg, zinc up to 1,080 mg/kg, americium-241 up to 0.254 mg/kg, plutonium-239/240 up to 0.642 mg/kg, uranium-233/234 up to 1.846 pCi/g, uranium-235 up to 0.372 pCi/g, and uranium-238 up to 4.132 pCi/g. Beryllium, detected up to 1.7 mg/kg, was the only analyte detected above its applicable PPRG (DOE 1995).

Soil gas sampling was conducted on a grid with 20-ft spacing, resulting in 83 soil gas samples in IHSS 158. BTEX (fuel-related aromatic hydrocarbon) compounds were detected along the eastern boundary of IHSS 158, and chlorinated solvents were elevated in the northern, northeastern, and southeastern parts of the IHSS. Based on the history of the IHSS and the geographical distribution of the detections, the BTEX occurrences were apparently associated with Building 551 warehouse operations and the storage of machining wastes. Chlorinated solvent detections were associated with the storage of machining waste and also with the leaking waste boxes discussed above (DOE 1995).

An in-situ HPGe survey was conducted using a truck-mounted HPGe detector with a nominal detection radius of 147.5 ft. Using this system, survey results may be elevated because of the presence of buildings that process or store radionuclides within the radius of detection, a phenomenon known as “shine.” In-situ HPGe survey data were considered as qualitative and were intended to be used in conjunction with other data, particularly laboratory analyses of soil samples, for characterizing the nature and extent of radionuclide contamination in soil.

HPGe results from IHSS 158 and the surrounding area indicated an area of elevated americium-241 specific activity occurring east of IHSS 158 and west of Building 707, centered north of Building 569. Approximate activities decrease from over 100 pCi/g in this area to less than 1 pCi/g in IHSS 158 (DOE 1995). The elevated readings detected east of PAC 500-117.1 were attributed to shine from Building 569. PACs 700-123.2, 700-150.5, and 000-162 overlap the area where elevated americium-241 activities were recorded. These areas were characterized in accordance with IASAP Addendum #IA-03-11 (DOE 2003a) and, in accordance with RFCA (DOE et al. 1996) no remediation was required.

IHSS 158 was investigated in 2003 as part of IHSS Group 500-2 in accordance with IASAP Addendum #IA-03-07 (DOE 2003b). A total of 116 samples were collected from 49 locations. The COCs were radionuclides, metals, and VOCs.

All results were less than the applicable RFCA WRW soil ALs (DOE et al. 2003) with the exception of chromium in surface soil at one sampling location, which was detected at 2,600 mg/kg, exceeding the RFCA WRW soil AL of 268 by approximately one order of magnitude. In accordance with ER RSOP Notification #04-14 (DOE 2004b), a RFCA (DOE et al. 1996) accelerated action resulted in the removal of chromium-contaminated soil from an area measuring approximately 4.5 ft by 5 ft by 0.5 ft. Analyses of four confirmation samples indicated the hot spot had been removed and that residual chromium levels were well below the RFCA WRW soil AL (DOE et al. 2003). All characterization and confirmation sampling results are presented in the Closeout Report for IHSS Group 500-2 (DOE 2004c).

No Further Accelerated Action Recommendation

Based on the analytical results and the SSRS presented in the Closeout Report for IHSS Group 500-2 (DOE 2004b), further action was not required at IHSS 158. An NFAA determination was justified based on the following:

- Chromium-contaminated soil surrounding sampling location CA41-025 was removed. Confirmation sampling indicated residual chromium levels were well below the RFCA WRW soil AL (DOE et al. 2003).
- Accelerated action characterization and confirmation sampling results indicated no other contaminant concentrations exceeding RFCA WRW soil ALs (DOE et al. 2003) exist in surface or subsurface soil.

After review of the Closeout Report for IHSS Group 500-2 by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 158 on June 18, 2004 (CDPHE 2004).

Comments

IHSS 158 includes PIC 9.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 500-2, IHSS 158, Radioactive Site – Building 551, June 18.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, IHSS Group 500-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification #04-14, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004c, Closeout Report for IHSS Group 500-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-159

IHSS Number:	159
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	500-3
Unit Name:	Radioactive Site – Building 559

This Final Update to the HRR for PAC 500-159 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 159 is summarized in this update. The following HRR volume contains IHSS 159 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

March 1968 to May 1977

Historical Summary

When Building 559 was built in 1967, the process waste lines installed beneath the building and the adjacent Building 528 were made of Pyrex glass. The glass lines proved to be too brittle to withstand the strain imposed by the normal settling and shifting of the new building, and broken lines led to releases of process waste to the surrounding soil. As shown on Figure 19, IHSS 500-159 is a 5,400-ft^2 area east of Building 559 where radioactive soil associated with OPWL breaks was excavated and removed.

In 1968, less than a year after Building 559 began operation, a break was discovered in the process waste line from Building 559 to Building 528. In response to the 1968 incident, an area of several hundred square feet was excavated and contaminated soil was removed and disposed of offsite (DOE 1992).

In May 1972, a process waste line beneath Building 559 was discovered leaking, and the rupture of the process waste line from Building 559 to the "process waste tank valve pit" (a manway structure between Buildings 528 and 559) caused soil contamination with a gross activity of 4,500 pCi/g. The specific radionuclides associated with this activity were not reported. The contamination decreased from the pit to the concrete pad along the southern side of Building 559. As a result, PVC pipe was installed to bypass the Pyrex line beneath the southern half of Building 559, and the remaining lines were static leak tested. In addition, 82 drums of contaminated soil were removed from above and horizontally adjacent to the process waste line from Building 559 to Building 528, and Building 528 was decontaminated. The soil beneath the process waste line was not removed. Building 559 suspended generation of process waste water, and groundwater was pumped from the footing manhole (located west of the tunnel connecting Buildings 559 and 561) to the process waste tanks in Building 528. No documentation was found that indicated the duration for which process waste generation was suspended (DOE 1992).

In May 1977, "contaminated" groundwater was discovered in the storm drain manhole located approximately 60 ft southwest of the southwestern corner of Building 559. The contamination

was believed to be the residue of contamination released in 1972. Also in May 1977, 4,600 gallons of contaminated water leaked into a process waste collection tank in Building 528. The water leaked through a drip leg of the double-contained process waste lines and was fed by a broken 3-inch PVC process water supply line running from Building 559 to Building 561. Gross alpha radiation in the water from the drip leg was measured at 160,000 pCi/L. It was concluded that the process water supply line, process waste line, and shell of the process waste line were probably broken. The primary material of concern was process waste generated at Building 559 (DOE 1992).

IHSS Investigations

Although IHSS 159 was originally identified as part of OU 8, IHSS 159 is not included in any of the OU 8 RFI/RI work plans or reports. The 1992 HRR (DOE 1992) indicated IHSS 159 belonged to OU 9, OPWL. OU 9 includes Tank 7, which is contained within IHSS 159 and was associated with the process waste leaks that contaminated IHSS 159. Thus OU 9 characterization data for Tank 7 are also relevant to IHSS 159. These data include a sodium iodide (FIDLER) survey, surface and subsurface soil sampling, groundwater sampling, and an HPGe survey as described in the addendum to the OU 9 RFI/RI Work Plan (DOE 1994).

The sodium iodide survey results indicated activities in the vicinity of Tank T-7 were at or near background (DOE 1995).

Boreholes drilled around Tank T-7 were sampled at the surface, immediately above groundwater, and either 1 ft below tank depth or just above bedrock, whichever was encountered first. The COCs for these samples were radionuclides, metals, VOCs, SVOCs, pesticides, PCBs, herbicides, and hexavalent chromium. No analytes were detected above the applicable PPRG in either surface or subsurface soil, but plutonium-239/240 and cadmium were each detected once in surface soil at levels exceeding background. The maximum detected plutonium-239/240 activity was 0.346 pCi/g, and the maximum detected cadmium concentration was 7,560 mg/kg. At one location, carbon tetrachloride was detected at levels below the applicable PPRG in both surface and subsurface soil (DOE 1995). The maximum detected carbon tetrachloride concentration was 4 μg/kg. No other organics were detected.

An in-situ HPGe survey was conducted using a truck-mounted HPGe gamma radiation detector with a nominal detection radius of 147.5 ft. Using this system, survey results may be elevated due to the presence of buildings that process or store radionuclides within the radius of detection, a phenomenon known as “shine.” In-situ HPGe survey data were considered as qualitative and were intended to be used in conjunction with other data, particularly laboratory analyses of soil samples, for characterizing the nature and extent of radionuclide contamination in soil.

HPGe results from IHSS 159 and the surrounding area indicated an area of elevated americium-241 specific activity occurring south of IHSS 159 and west of Building 707, centered north of Building 569. Approximate activities decrease from more than100 pCi/g in this area to less than 1 pCi/g in most of IHSS 159 (DOE 1995). The elevated readings detected south of IHSS 159 were attributed to shine from Building 569. PACs 700-123.2, 700-150.5, and 000-162 overlap the area where elevated americium-241 activities were recorded. These areas were characterized in accordance with IASAP Addendum #IA-03-11 (DOE 2003a) and no remediation was required under RFCA.

IHSS 159 was investigated as part of IHSS Group 500-3 in accordance with IASAP Addendum #IA-03-12 (DOE 2003b). Sampling in IHSS 159 included 5 surface soil samples and 39 subsurface soil samples collected from a total of 19 sampling locations. Many of the subsurface soil samples from IHSS 159 were collected during and after the D&D removal of Building 528 and an associated manway, located in the southern portion of IHSS 159. The samples associated with D&D were generally analyzed for radionuclides only, while those samples collected earlier (pursuant to IASAP Addendum #IA-03-12) were analyzed for radionuclides, metals, and VOCs. A minority of samples collected at Building 528 were also analyzed for pesticides, herbicides, and PCBs.

The only sampling location in IHSS 159 where results exceeded RFCA WRW soil ALs (DOE et al. 2003) was directly beneath a manway that was removed in the southern portion of IHSS 159. The sample, collected at 7.5 to 7.8 ft bgs, yielded americium-241 at 317.5 pCi/g and plutonium-239/240 at 1,809.75 pCi/g. Because of their depth, these WRW soil AL exceedances did not require remediation under RFCA (DOE et al. 2003). However, soil at the location was remediated as a BMP because the effort required to remove the soil had been minimized by the uncovering of this soil in the D&D excavation. Remediation was conducted in accordance with ER RSOP Notification #05-02 (DOE 2005a). A confirmation sample was collected after removal, verifying that the hot spot had been completely removed. All accelerated action characterization and confirmation sampling results are presented in the Closeout Report for IHSS Group 500-3 (DOE 2005b).

In addition to the removal of soil, the accelerated action implemented under ER RSOP Notification #05-02 also included the removal of OPWL and associated features throughout IHSS 159. OPWL P-17, which runs north and south through the western portion of IHSS 159, was completely removed. An OPWL manway north of Building 528 was completely removed. Building 528 and OPWL Tank 7, which was housed in Building 528, were completely removed (DOE 2005c, 2005d)

No Further Accelerated Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was justified for IHSS 159 based on the following:

- Plutonium-239/240 and americium-241 contaminated soil in the subsurface was removed and confirmation sampling data verified that remediation was complete. No other exceedances were identified in this IHSS and there is no residual contamination in IHSS 159 exceeding the RFCA WRW soil ALs (DOE et al. 2003).
- The SSRS for IHSS 159, presented in the Closeout Report for IHSS Group 500-3 (DOE 2005b), supported an NFAA recommendation.

Following a review of the Closeout Report for IHSS Group 500-3 by the regulatory agencies, DOE received approval of the NFAA status of IHSS 159 from CDPHE (the LRA) on June 24, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 500-3 (B559) – NFAA Approval, June 24.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Technical Memorandum No. 1, Addendum to Phase I RFI/RI Work Plan, Field Sampling Plan, Original Process Waste Lines, Volume I-Tanks, Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Draft Data Summary Report No. 2, Operable Unit No. 9, Outside Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003a, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-03-12, IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-02, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005b, Final Closeout Report for IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005c, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005d, Closeout Report for IHSS Group 000-4 New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-169

IHSS Number: 169

Current Operable Unit: IA

Former Operable Unit: 13

IHSS Group: None

Unit Name: Waste Drum Peroxide Burial

This Final Update to the HRR for PAC 500-169 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 169 is summarized in this update. The following HRR volumes contain IHSS 169 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998);
Update Report – 2000 Annual (DOE 2000); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

April 1981

Historical Summary

The location of IHSS 169 is shown on Figure 19. During the week ending April 24, 1981, warehouse personnel were transporting three 55-gallon drums of hydrogen peroxide when two of the drums fell off a pallet. One of the drums burst open and the peroxide drained into a culvert at the corner of Fifth and Central Avenues. A second source states that in April 1981, a 55-gallon drum of 35 percent hydrogen peroxide (H_2O_2) solution spilled at the warehouse (no associated building number is given). The content of the drum leaked out and was flushed into a hole with water. According to the RCRA 3004(u) Report (DOE 1987), a 55-gallon drum of hydrogen peroxide was buried in the chemical storage area east of Building 551. The location of this event is thought to be the same as that described in PAC 400-191 (see Comments) (DOE 1992a).

A hole was dug east of Fifth Avenue, and the Central Avenue Ditch hosed down allowing the diluted peroxide to drain into the hole. The hole was refilled on April 23, 1981 (DOE 1992a).

Hydrogen peroxide is a strong oxidizer supplied in an aqueous solution. It is an unstable liquid that decomposes rapidly in the environment.

IHSS Investigations

IHSS 169 was included in the OU 13 RFI/RI, but because hydrogen peroxide degrades in the near-surface environment to nonhazardous end products, no PCOCs were identified and no samples were collected (DOE 1992b, 1995).

Consistent with the findings presented in the HRR and OU 13 documents (DOE 1992, 1994, 1995), IHSS 169 was proposed for NFA in the 1998 Annual Update to the HRR (DOE 1998). However, based on comments received from the regulatory agencies on July 9, 1999 (EPA and

CDPHE 1999), GPR techniques were used on June 29, 2000, to determine whether a buried drum existed in the area. An area approximately 60 ft by 40 ft was surveyed at a 2-ft grid spacing using GPR.

Four anomalies appeared on the GPR strip charts as dense shallow objects. Three of the locations were believed to be remnant concrete pieces associated with a former fence at this location, or rocks. Based upon density readings, the fourth location was considered to be a large, dense metallic object, not likely a drum (K-H 2000).

No Further Accelerated Action Recommendation

IHSS 169 was proposed for NFAA for several reasons. First, it is unclear whether a drum of hydrogen peroxide was actually disposed in the chemical storage area. Second, the results of the GPR survey did not indicate the presence of a buried drum. Third, hydrogen peroxide readily breaks down into water and oxygen, a process that would have certainly run its course in the more than 20 years since the reported release. Accordingly a historic 55-gallon hydrogen peroxide release to soil does not constitute an ongoing threat to human health or the environment. Lastly the chemical storage yard lies within PAC 500-117.2, which was investigated in accordance with IASAP Addendum #IA-03-05 for IHSS Group 500-4 (DOE 2003). More than 200 statistical samples were collected to characterize IHSS 117.2 and the only RFCA WRW soil AL (DOE et al. 2003) exceedance was of arsenic in subsurface soil, and no remediation was required under RFCA (DOE 2004b).

After a review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 169 on February 20, 2004 (CDPHE 2004).

Comments

The description of PAC 400-191 (IHSS 191) in the 1997 Update to the HRR (DOE 1997) is identical to the description of IHSS 169 and is based on the same two sources. The NFA determination for IHSS 191 was approved by regulatory agencies in 1999 (EPA and CDPHE 1999). Accordingly the focus for IHSS 169 was the hydrogen peroxide release based on the RCRA 3004(u) Report (DOE 1987).

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, No Further Accelerated Action (NFAA), PAC 500-169 Waste Drum Peroxide Burial, February 20.

DOE, 1987, Appendix 1, Resource Conservation and Recovery Act 3004 (u) Waste Management Units, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I Work Plan for OU 13, 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1994, Technical Memorandum 1, Addendum to the Field Sampling Plan, OU 13, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1995, Data Summary 2, Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Final Data Summary Report for IHSS Group 500-4, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA and CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Region VIII and S. Gunderson, CDPHE, RE: 1997 Annual HRR Review, July 9.

Kaiser-Hill, 2000, Building 551 Ground Penetrating Radar Report, Conducted June 19, 2000, Rocky Flats Environmental Technology Site, Golden, Colorado.

PAC REFERENCE NUMBER: 500-197

IHSS Number:	197
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	500-1
Unit Name:	Scrap Metal Sites – 500 Area

This Final Update to the HRR for PAC 500-197 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 197 is summarized in this update. The following HRR volumes contain IHSS 197 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Approximately 1958 to Early 1960s

Historical Summary

The location of IHSS 197, a scrap metal storage area, is shown on Figure 19. In approximately 1958 or possibly in the early 1960s, scrap metal components, primarily from the original Plant construction program, were buried in trenches in the central portion of the Plant site, west or southwest of Building 559. A second scrap metal burial site was located northwest of the first site. It contained building construction debris from early Plant construction, most likely from the Austin Company. Early records do not document replacement of any transformers at Rocky Flats, therefore, there is only a slight possibility that transformers containing PCBs were disposed at the construction debris site (DOE 1992a).

The scrap metal burial trenches appear to be associated with Rocky Flats PU&D Yards (PACs NW-170, NW-174a, and NW-174b) located east and northeast of the Warehouse (Building 551). The PU&D yards near Building 551 were used for storage of such materials from 1955 onward. Rocky Flats photographs from 1959 and 1960 show storage of aluminum turnings and other scrap metal in these yards. The transfer of property to PU&D was highly proceduralized to ensure that radioactively contaminated materials were not received. Scrap metal typically was stored at the PU&D Yards until sufficient quantity had accumulated for sale to private sources (DOE 1992a).

Periodically during the history of the Building 551 PU&D Yards, trenches were excavated at or near the yards to bury unusable scrap metal. It is believed that the metals excavated from trenches at PAC 500-197 in 1981 are at least in part, if not entirely, related to this practice. Former Rocky Flats employees identified an area north of Building 552 where aluminum and steel scrap were buried in a large hole (DOE 1992b).

During the week ending September 4, 1981, excavation related to construction of the PA (former PSZ) unearthed an old scrap metal burial site immediately west of Building 559. A second scrap metal burial site located west of Building 559 and northwest of the first site, was also unearthed.

On September 9, 1981, work began to remove buried material from the trenches, and excavation and disposal were completed by October 2, 1981. The material unearthed consisted of moist, but not oily, scrap metal consisting of machine turnings, rings, shapes, overlays, and other metal parts. Although some of the buried material originated from process areas and could have been radioactively contaminated, monitoring of the materials using a FIDLER indicated no detectable radioactivity. In addition, total long-lived alpha concentrations from three portable air samplers at the Building 559 cleanup area showed zero count. Transformers or related material were not present in the material excavated from the scrap metal trenches. According to an internal letter, the material was disposed in the Present Landfill (PAC NW-114) (DOE 1992a).

IHSS Investigations

IHSS 197 was originally part of OU 16, a group of sites that were expected not to require further action. However, upon reviewing historical information available for IHSS 197, it was determined that it did require further investigation and that the investigation would be combined with PAC 500-117.1 (DOE 1992b). Therefore IHSS 197 was transferred to OU 13 and investigated along with IHSS 117.1 (DOE 1995).

OU 13 RFI/RI activities in IHSS 197 included vertical soil profiling, surface soil sampling, a soil gas survey, asphalt sampling, and an HPGe survey as described in the OU 13 Phase I RFI/RI Work Plan (DOE 1992c).

The results of vertical soil profiling in IHSS 197 indicated americium-241 and plutonium-239/240 were not elevated above minimum detectable activities, while uranium-235 was slightly elevated (but well below Site background) in one sample (DOE 1995).

Surface soil samples were collected at five locations in IHSS 197 and were analyzed for metals, radionuclides, and VOCs. A total of 31 analytes were detected in the samples including four inorganics (copper, silver, zinc, and plutonium-239/240) that were detected at concentrations exceeding background levels. Maximum observed concentrations included copper at 56.3 mg/kg, silver at 20.8 mg/kg, zinc at 416 mg/kg, and plutonium-239/240 at 0.045 pCi/g. None of the sample results exceeded the applicable PPRGs (DOE 1994).

OU 13 RFI/RI soil gas sampling in IHSS 197 included 40 initial screening samples and 5 follow-up samples. Chlorinated solvents were detected along the northern end of IHSS 197, including carbon tetrachloride at 930 μg/L. This may be associated with the storage of scrap metal and machine turnings in this area, as chlorinated solvents are commonly used as degreasers. BTEX (fuel-related aromatic hydrocarbon) compounds were detected in the southern portion of IHSS 197 between the PA fence and Seventh Street, which is expected because this area borders a major street and also because construction debris was buried in the area. Toluene was detected in this area at up to 22 μg/L (DOE 1995).

Asphalt was sampled at two locations in IHSS 197 and was analyzed for metals. Silver was elevated in one of the samples but did not exceed the PPRG. No other metals were elevated relative to background concentrations (DOE 1995).

An in-situ HPGe survey was conducted using a truck-mounted HPGe gamma radiation detector with a nominal detection radius of 147.5 ft. Using this system, survey results may be elevated due to the presence of buildings that process or store radionuclides within the radius of detection, a phenomenon known as “shine.” In-situ HPGe survey data were considered as qualitative and

were intended to be used in conjunction with other data, particularly laboratory analyses of soil samples, for characterizing the nature and extent of radionuclide contamination in soil.

HPGe results from IHSS 197 and the surrounding area indicated an area of elevated americium-241 specific activity occurring east of IHSS 197 and west of Building 707, centered north of Building 569. Approximate activities decrease from over 100 pCi/g in this area to less than 1 pCi/g in the northern portion of IHSS 197. Specific activities within IHSS 197 were in the 0.1 to 10 pCi/g range (DOE 1995). The elevated readings detected east of IHSS 197 were attributed to shine from Building 569. PACs 700-123.2, 700-150.5, and 000-162 overlap the area where elevated americium-241 activities were recorded. These areas were characterized in accordance with IASAP Addendum #IA-03-11 (DOE 2003a) and no remediation was required under RFCA.

Based on IHSS 197 site history and historical soil sampling results, radionuclides, metals, PCBs, and VOCs were identified as COCs. Surface (0 to 0.5 ft bgs) and subsurface (0.5 to 6.5 ft bgs) soil samples were analyzed in accordance with IASAP Addendum #IA-04-03 (DOE 2003b). Arsenic was detected at a concentration of 25.9 mg/kg in one subsurface soil sample, exceeding the RFCA WRW soil AL of 22.2 mg/kg (DOE et al. 2003). The location did not require remediation under RFCA. No other COCs were detected at levels exceeding applicable RFCA WRW soil ALs (DOE et al. 2003). Analytical results are presented in the Data Summary Report for IHSS Group 500-1 (DOE 2004b).

No Further Accelerated Action Recommendation

NFAA was recommended for IHSS 500-197 based on the following:

- Accelerated action sampling results were less than WRW soil ALs, with the exception of one subsurface arsenic concentration of 25.9 mg/kg. Because this was an isolated detection in the subsurface action was not necessary.
- No further action was recommended based on the SSRS presented in the Data Summary Report for IHSS Group 500-1 (DOE 2004b).

After review of the Data Summary Report for IHSS Group 500-1 by regulatory agencies, DOE received approval from CDPHE (the LRA) of NFAA status for IHSS 197, on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RD: Approval, Draft Data Summary Report for IHSS Group 500-1, IHSS 300-186, IHSS 500-117.1, and IHSS 500-197, September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final No Further Action Justification Document Rocky Flats Plant Low Priority Sites (Operable Unit 16), Rocky Flats Plant, Golden, Colorado, October.

DOE, 1992c, Final Phase I RFI/RI Work Plan, Rocky Flats Plant, Area 100, Operable Unit 13, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1994, Programmatic Risk-Based Preliminary Remediation Goals for the Rocky Flats Environmental Technology Site, Final, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Data Summary 2 Operable Unit No. 13 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 500-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-900

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer Leak – 515/516

This Final Update to the HRR for PAC 500-900 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-900 is summarized in this update. The following HRR volumes contain PAC 500-900 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to January 1986

Historical Summary

As shown on Figure 19, PAC 500-900 (Transformers 515 and 516) were located within the PA west of Building 566 (the new laundry). Transformer 515 rested on the northern side of a switchgear building and Transformer 516 was located on the southern side of the same building. As presented in the HRR (DOE 1992), an EPA inspection in January 1986 identified one of the transformers at the 515/516 Substation in violation of TSCA because of leaking. A leak at the 515/516 Substation was included in the June 1986 penalty calculation for PCB violations. It is believed that the referenced leak occurred on the eastern side of Transformer 516. In September 1986, Transformers 515 and 516 were reported as leaking. A photograph dated September 1986, shows staining visible on the concrete pad beneath the Transformer 516 drain valve (DOE 1992).

In 1985, analytical results indicated the oil in Transformers 515 and 516 contained less than 50 ppm PCBs. In October or November of 1985, and again in June 1986, it was reported that the coolant oil in Transformers 515 and 516 contained 63 ppm and 65 ppm PCBs, respectively. Following a January 1986 inspection, approximately 9 ft^2 of soil beneath a valve at the 515/516 substation was found contaminated with PCB-contaminated oil. In November 1986, smear samples collected from the Transformer 515 drain valve and concrete pad indicated 3.3 ppm and 2.5 ppm PCBs, respectively. In 1986, the fluid in Transformers 515 and 516 was drained and replaced with non-PCB dielectric oil. Additional records indicate samples were collected in 1992 showing PCB contamination levels in the 515 and 516 Transformer dielectric oil were 3 ppm and less than 1 ppm, respectively (DOE 1992).

Oil containing between 50 and 500 ppm PCBs is believed to have been released to the environment at this site; however, differentiation between the two transformers is vague in historical records (DOE 1992).

In January 1987, it was recommended that the concrete pad underlying Transformer 516 be coated with sealant (DOE 1992).

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in 1991, soil samples were collected and analyzed for PCBs using EPA Method 8080 (DOE 1991). The results indicated PCB levels adjacent to the 515 and 516 transformers were less than 120 ppb and less than 26 ppm, respectively (DOE 1996).

In accordance with the approved Final PAM for Remediation of PCBs (DOE 1995), additional sample screening was completed in 1995 to verify the lateral and vertical extent of PCB migration. Soil screening samples were analyzed using EPA Method 4020 and concrete samples were analyzed using EPA Method 8080. Approximately 6 cy of PCB-contaminated soil were excavated from the eastern side of Transformer 516 in July, 1995, containerized, and disposed (DOE 1997).

Based on the 1995 final cleanup analytical results, PCB concentrations in the soil were less than 10 ppm using EPA Method 4020 and less than 934 ppb using EPA Method 8080. PCB concentrations for the concrete samples were less than 860 ppb. Thus the 25 ppm PCB cleanup level was achieved at this PAC and no further action was warranted (DOE 1996).

The 515/516 Substation was demolished in FY2001. The two transformers and switchgear were sold to a local vendor.

No Further Accelerated Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health (DOE et al. 2003). Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Analytical results following the 1995 cleanup confirmed attainment of the 25 ppm PCB cleanup level. Based on site data and White Paper findings noted above, NFAA was proposed for PAC 500-900 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c). After a review of the White Paper

by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status of PAC 500-900 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-901

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformer Leak – 555

This Final Update to the HRR for PAC 500-901 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-901 is summarized in this update. The following HRR volumes contain PAC 500-901 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to June 1986

Historical Summary

Transformer 555 is one of two large transformers that made up the 555/558 electrical substation located near the intersection of Seventh Street and Central Avenue (Figure 19). Transformer 558 was located on the northern side of a switchgear building connecting the two transformers. In June 1986, during routine maintenance, Transformer 555 was reported leaking dielectric coolant oil. The transformer was again reported as leaking in September 1986. Soil contaminated with PCBs was identified in a confined area east of the 558 transformer concrete pad during a sitewide sampling program in August 1991 (DOE 1996).

Historical records indicate that Transformer 555 contained fluid with 55 ppm PCBs. Smear samples collected from the transformer valve and adjacent areas prior to 1986 confirmed that small quantities (up to 6.2 ppm) of PCBs had been released. No documentation was identified for sampling of the dielectric oil or surrounding area at the associated 558 transformer site (PAC 500-905) prior to August 1991. Samples collected from the concrete pads underlying the 555/558 transformers were analyzed for PCBs using EPA Method 8080; the highest result was 0.43 ppm.

In 1986, the 555 transformer was retrofilled with a non-PCB dielectric oil and reenergized. In 1996, the 555/558 Substation was demolished and replaced with a more modern facility. The transformers were shipped by rail to a licensed offsite facility for incineration.

PCB levels remaining in the soil at PAC 500-901 following excavation were less than 10 ppm using EPA Method 4020 and less than 1.3 ppm using EPA Method 8080. Thus the 25 ppm PCB cleanup level (DOE 1995) was achieved for PAC 500-901 (Transformer 555) and no further action was warranted.

PAC Investigations

As part of the Sitewide Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected and analyzed (DOE 1991). The results indicated PCB concentrations in soil adjacent to Transformer 555 were less than 4.0 ppm (DOE 1995).

In accordance with the approved Final PAM for Remediation of PCBs (DOE 1995), follow-up sample screening was completed in July of 1995 using Midwest Research Institute (MRI) methods to verify the lateral and vertical extent of PCB migration. Approximately 5 cy of PCB-contaminated soil was excavated immediately west of the 558 transformer pad. The soil was containerized and disposed (DOE 1997).

The 555/558 Substation was demolished in FY1996.

No Further Accelerated Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health (DOE et al. 2003). Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on White Paper findings and the results of verification samples that followed the removal of contaminated soil, NFAA was proposed for PAC 500-901 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c). After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 500-901 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-902

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer Leak – 559

This Final Update to the HRR for PAC 500-902 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-902 is summarized in this update. The following HRR volumes contain PAC 500-902 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to 1987

Historical Summary

Transformer 559-1 (PAC 500-902) was located on the eastern side of Building 559 (Figure 19). Transformer 559-1 contained 235 gallons of dielectric cooling fluid. In October and November 1985, it was reported that Transformer 559-1 contained PCB fluid exclusively (PCBs greater than 500 ppm). In March 1989, it was reported that Transformer 559-1 contained fluid with 500,000 ppm PCBs. Prior to relocation and retro-filling in 1987, this transformer leaked oil containing PCBs from a faulty valve (DOE 1992).

In October 1986, Transformer 559-1 was scheduled for cleaning at the drain valve and at the case near the drain valve. In 1987, the transformer was retrofilled and relocated on a new concrete pad several feet to the south of its previous location. Concrete material was removed from the previous location of the transformer. In March 1989, it was reported that Transformer 559-1 had been replaced under the Environmental Hazards Elimination Project.

Building 559 and associated structures were demolished in 2005 (DOE 2005).

PAC Investigations

As part of the Sitewide Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected in accordance with approved EPA sampling protocols, and analyzed for PCBs using EPA Method 8080 (DOE 1991). Based on 1991 analytical results, the highest PCB concentration found adjacent to the old concrete transformer pad was 190 ppm (DOE 1995).

Under the approved Final PAM for Remediation of PCBs (DOE 1995), additional sample screening was completed in 1995 to verify the lateral and vertical extent of PCB migration. Soil samples were analyzed using EPA Method 4020 and concrete samples were analyzed using EPA

Method 8080. Based on the results, approximately 25 cy of PCB-contaminated soil was excavated in October, 1995, containerized, and disposed (DOE 1997).

Based on the 1995 final cleanup analytical results, residual concentrations of PCBs in soil were less than 10 ppm using EPA Method 4020 and less than 2.4 ppm using EPA Method 8080. PCB contamination levels on the concrete transformer pad were less than 41 ppb using EPA Method 8080. Thus the 25 ppm PCB cleanup level (DOE 1995) was achieved at this PAC and no further action was warranted.

No Further Accelerated Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health (DOE et al. 2003). Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on residual concentration data and White Paper findings noted above, NFAA was proposed for this PCB site in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c). After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on NFAA status for PAC 500-902 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2005, Final Project Closeout Report for Building 559 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-903

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	RCRA Storage Unit 1

This Final Update to the HRR for PAC 500-903 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-903 is summarized in this update. The following HRR volumes contain PAC 500-903 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1988 to 1991

Historical Summary

PAC 500-903, the location of a container used for RCRA waste storage, was immediately outside the PA between Buildings 551 and 559 (Figure 19).

On June 21, 1988, a leak was discovered from a drum in the hazardous waste storage site cargo container. Less than four fluid ounces of liquid containing between 59 ppm and 63 ppm PCBs was released into the cargo container. In response to the June 1988 incident, the leaking drum was placed into an overpack drum. The cleanup debris was placed into a waste drum.

On December 16, 1991, a release was discovered during a weekly inspection at RCRA Storage Unit 1. The release was completely contained within the secondary containment pan inside the cargo container. In the December 1991 incident, approximately 40 gallons of TRIM-SOL™ lubricant mixed with waste oil was released into the secondary containment pan.

In response to the December 1991 release, the leaking drum was placed into an overpack drum. The liquid in the secondary containment pan and the liquid remaining in the leaking drum were pumped into a new drum. Absorbent was added to the empty drum. The secondary containment pan, rollers, and grating were cleaned. RCRA CPIR 91-035 describes this event.

The December 1991 incident did not release any contaminant to the environment outside the cargo container.

PAC Investigations

No further investigation was required, because there was no release of contaminants to the environment.

No Further Accelerated Action Recommendation

Based on information in the 1992 HRR, the historic spills at PAC 500-903 were fully contained within the cargo container and there was no significant release to the environment. Therefore PAC 500-903 was proposed for NFA. DOE received approval of the NFA status of PAC 500-903 from CDPHE and EPA (the LRA) on February 14, 2002 (CDPHE and EPA 2002).

Comments

RCRA Unit 1 was closed in accordance with the Closure Description Document for RCRA Permitted Container Storage Unit 18.03, Unit 1, Unit 10 (DOE 2003). The closure was accomplished using the "Debris Rule Decontamination" method as described in the Closure Plan, Section X of the RCRA Part B Permit (CDPHE 1997). The secondary containment pans and rollers in the pans were decontaminated by rinsing and the rinse water was removed, characterized, and managed accordingly. The surfaces were then visually inspected and certified clean by a Professional Engineer. CDPHE approved the Closure of this RCRA Unit on October 29, 2004 (CDPHE 2004).

References

CDPHE, 1997, RCRA Part B Permit C0-097-05-03-01.

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, and S. Nesta, K-H, from S. Gunderson, CDPHE, RE: Acceptance, Closure Summary Report for Closure of RCRA Unit Container Storage Units 18.03, 10, and 1, October 29.

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Closure Description Document for RCRA Permitted Container Storage Unit 18.03, Unit 1, Unit10, Rocky Flats Environmental Technology Site, Golden, Colorado, November 16.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-904

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	500-5
Unit Name:	Transformer Leak – 223-1/223-2

This Final Update to the HRR for PAC 500-904 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-904 is summarized in this update. The following HRR volumes contain PAC 500-904 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to 1987 to after 1990

Historical Summary

The location of PAC 500-904 (Transformers 223-1 and 223-2) is shown on Figure 19. Transformers 223-1 and 223-2 leaked small amounts of oil prior to 1987 (DOE 2001). In February 1986, the valve, tap changer, and bushings of Transformer 223-1 were reported leaking, and in January 1987, residual staining was noted on the concrete pad underlying Transformer 223-2. Analytical data from approximately 1985 indicated the oil in Transformer 223-1 contained more than 500 ppm PCBs and that the oil in Transformer 223-2 contained less than 50 ppm PCBs. In October and November 1985, it was reported that the dielectric fluid in Transformers 223-1 and 223-2 contained 19,800 and 296 ppm PCBs, respectively. In November 1986, a smear sample collected from the concrete underlying the drain valve of Transformer 223-1 indicated less than 50 micrograms per square centimeter ($\mu g/cm^2$) of PCBs. Reportedly, the transformers were retrofilled with non-PCB cooling oil in 1987, and Transformer 223-1 was reportedly replaced in March 1989. Sometime during the 1990s, non-PCB oil from the western transformer was released to the environment, probably due to overfilling the oil reservoir, resulting in an oil stain in the soil north of the pad (DOE 2004b).

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs (DOE 1991) conducted in July 1991, surface soil samples were collected and analyzed in accordance with approved EPA protocols (DOE 1995). The samples were analyzed for PCBs using EPA Method 8080 and plutonium-239/240 using alpha spectrometry. The soil data indicated concentrations of Aroclor-1254 exceeded the RFCA WRW soil AL (DOE et al. 2003) at two locations (DOE 2004b).

In 2003, PAC 500-904 was investigated in accordance with IASAP Addendum #IA-04-03 for IHSS Group 500-5 (DOE 2003). Eight locations were sampled, and at each location one surface

soil (0 to 0.5 ft bgs) and one subsurface soil (typically 0.5 to 2.5 ft bgs) samples were collected. All samples were analyzed for PCBs, which were the only COCs. At the request of CDPHE, two samples collected at the sampling locations with the highest historical PCB concentrations were also analyzed for dioxins and furans. Aroclor-1260 was detected in 15 of the 16 samples at concentrations ranging from 9.6 to 2,300 µg/kg. All results were well below the RFCA WRW soil AL of 12,400 µg/kg. Complete analytical results from the characterization are presented in the Data Summary Report for IHSS Group 500-5 (DOE 2004b).

Following accelerated action sampling, the two transformer pads and the oil-stained soil north of the western pad were removed during May 2004 as a BMP. In addition, a third pad in the area, which contained a non-PCB transformer and is not part of this or any PAC, was removed at the same time (DOE 2004b).

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004c) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health (DOE et al. 2003). Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates the following:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on accelerated action data and the SSRS, the Data Summary Report for IHSS Group 500-5 concluded that an NFAA determination for PAC 500-904 was justified for the following reasons:

- All PCB concentrations in surface soil were less than RFCA WRW soil ALs.
- Migration of contaminants to surface water through erosion is unlikely because PAC 500-904 is not in an area prone to landslides.
- Residual PCBs at the site are not likely to affect surface water or groundwater because PCBs are not generally mobile in soil.
- The summed TEQs for both sampling locations where samples were analyzed for dioxins and furans do not exceed the EPA residential cleanup guidance of 1,000 picograms per gram (pg/g). (Because there are no existing RFCA ALs for dioxins and furans, results for dioxins and furans were converted to TEQs using TEFs in accordance with SW8290 [EPA 1994] and a WHO study [1998]. The TEQ values were summed for each sampling location and

compared to the EPA residential cleanup guidance level [EPA 1998] and Front Range background concentration ranges [EPA 2001]).

After review of the Data Summary Report for IHSS Group 500-5 by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 500-904 on May 17, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 500-5, PAC 500-904 (April 2004), May 17.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 500-5, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004c, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 1994, Test Methods for Evaluating Solid Waste, EPA Publication No. SW-846, September.

EPA, 1998, Approach for Addressing Dioxins in Soil at CERCLA and RCRA Sites, OSWER Directive 9200.4-26, Memo from Timothy Fields, Jr., April.

EPA, 2001, Denver Front Range Study Dioxins in Surface Soil, July.

WHO, 1998, Assessment of the Heath Risk of Dioxins: Re-Evaluation of the Tolerable Daily Intake (TDI), WHO European Center for Environment and Health, Geneva, Switzerland, May.

PAC REFERENCE NUMBER: 500-905

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformer Leak – 558-1

This Final Update to the HRR for PAC 500-905 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-905 is summarized in this update. The following HRR volumes contain PAC 500-905 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to June 1986

Historical Summary

Transformer 558-1 was one of two large transformers making up the 555/558 electrical substation once located near the intersection of Seventh Street and Central Avenue (Figure 19). Transformer 558-1 is located on the northern side of the switchgear building connecting the two transformers (DOE 1996). There was evidence of leakage on a valve on the northeastern side of Transformer 558-1. The transformer had been situated on a concrete pad surrounded by rock fill. There was no berm around the transformer (DOE 1992).

No documentation was identified for sampling of the dielectric oil or the surrounding soil at the Transformer 558-1 site prior to August 1991 (DOE 1996). As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs (DOE 1991) conducted in July 1991, soil samples were collected and analyzed. The results indicated PCB contamination existed primarily in one area of the substation immediately west of the Transformer 558-1 pad. PCB levels of 480 ppm were identified at this discrete location (DOE 1992).

No documentation was found that indicated Transformer 558 was retrofilled; however, one reference indicates that a schedule was initiated for cleanup to take place at the substation on August 21, 1989 (DOE 1992). No cleanup was performed at that time (DOE 1996).

PAC Investigations

In accordance with the approved Final PAM for Remediation of PCBs (DOE 1995), follow-up sample screening was completed in July 1995 to verify the lateral and vertical extent of PCB migration. Approximately 5 cy of PCB-contaminated soil were excavated immediately west of the 558 transformer pad. The soil was containerized and disposed (DOE 1997).

PCB levels remaining in the soil following excavation were less than 10 ppm using EPA Method 4020 and less than 1.3 ppm using EPA Method 8080. Thus the 25 ppm PCB cleanup level

(DOE 1995) was achieved for PAC 500-901 (Transformer 555) and no further action was warranted.

On July 10, 1996, under an electrical upgrade construction project, the 558/555 substation was demolished and replaced with a more modern facility. The transformers were shipped offsite (DOE 1996).

No Further Accelerated Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health (DOE et al. 2003). Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on residual concentrations and the White Paper findings noted above, NFAA was proposed for PAC 500-905 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c). After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for the site on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-906

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	500-6
Unit Name:	Asphalt Surface near Building 559

This Final Update to the HRR for PAC 500-906 consolidates the information in the Fourth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-906 is summarized in this update. The following HRR volumes contain PAC 500-906 information:

Original Report – Fourth Quarterly (DOE 1993);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

March 22, 1993

Historical Summary

As shown on Figure 19, PAC 500-906 is located on the northern side of Building 561. On March 22, 1993 at 2:00 P.M., approximately 1 gallon of F001 wastewater spilled onto the pavement from a hose that was used to extract excess water from a tanker. The water was from the P304 sump, which collected groundwater from the exterior of the Building 559/561 tunnel and the Building 561 basement. Normally this water was released into the surface water drainage system through pumping to a footing drain system that flowed by gravity. However, the water in question was found to exceed Segment 5 stream standards for some analytes, and was thus being removed by tanker. The tanker was accidentally filled beyond the level allowed by Rocky Flats Transportation Guidelines, which require that no more than four-fifths of the capacity of the tanker be used. After approximately 1,000 gallons of water had been off-loaded from the tanker into drums, the hose used for the operation leaked some water as it was transferred back to storage (DOE 1993).

The water contained F001 hazardous waste constituents, including carbon tetrachloride, trichloroethene, and 1,1-dichloroethene, based on four sampling events that occurred from July 1992 through March 1993. Analytes covered by TCLP were also identified, but the concentrations were below those of a characteristic RCRA hazardous waste. Contamination levels exceeded Segment 5 stream standards for some constituents (DOE 1993).

Oil-Dri® absorbent was used to absorb the water and was then managed as RCRA-regulated hazardous waste after use in a RCRA permitted storage area. The incident was reported to the regulatory agencies in CPIR No. 93-004, as well as the Fourth Quarterly Update to the HRR (DOE 1993).

Hazardous constituents released to the environment are believed to be minimal, if any, because of the small amount of material spilled on the asphalt surface and the immediate cleanup response. The characterization sampling described above confirms that VOCs did not reach the underlying soil horizon.

Spill pans were subsequently used during transfer operations. These spill pans were effective in providing secondary containment for possible releases.

PAC Investigations

For purposes of accelerated action, PAC 500-906 was identified as IHSS Group 500-6. The soil immediately under the asphalt surface was sampled in April 2002 in accordance with IASAP Addendum #IA-02-01 (DOE 2001). Two soil samples were collected and analyzed for VOCs. All analytical results were less than RFCA Tier II (DOE et al. 1996) and WRW soil ALs (DOE et al. 2003). Of the VOCs detected, the highest concentration was 24 µg/kg for total xylenes. The three other VOCs were all less than 10 µg/kg (DOE 2003b).

No Further Accelerated Action Recommendation

Based upon the characterization results presented in the Data Summary Report for IHSS Group 500-6 (DOE 2003b), concentrations of VOCs in soil were less than RFCA Tier II (DOE et al. 1996) and WRW soil ALs (DOE et al. 2003) and no contaminant source could be identified. PAC 500-906 was therefore proposed for NFAA.

DOE received approval of NFAA status for PAC 500-906 on July 16, 2003 from CDPHE (the LRA) (CDPHE 2003).

Comments

In relation to this incident, the October 2000 renewal of the NPDES Permit contained provisions that allowed for the discharge of this groundwater (with restriction to volume and contaminant concentration) to the sanitary collection system (EPA 2000).

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Final Data Summary Report for IHSS Group 500-6, July 16.

DOE, 1993, Fourth Quarterly Update to the Historical Release Report, Rocky Flats Plant, Golden, Colorado, July.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01 Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 500-6, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2000, Renewal of the National Pollutant Discharge Elimination System (NPDES) Permit, No.#CO0001333, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

PAC REFERENCE NUMBER: 500-907

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	500-7
Unit Name:	Tanker Truck Release of Hazardous Waste from Tank 231B

This Final Update to the HRR for PAC 500-907 consolidates the information in the Ninth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-907 is summarized in this update. The following HRR volumes contain PAC 500-907 information:

Original Report – Ninth Quarterly (DOE 1994); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

July 13 and 20, 1994

Historical Summary

As shown on Figure 19, PAC 500-907 was located northwest of Building 551 and southwest of Tank 231B. At approximately 9:30 A.M. on July 13, 1994, during a RCRA tank inspection, evidence of a release was observed near Building 231. At the time of the discovery, sludge was being transferred from Tank 231B to a tanker truck in an effort to lower the level of sludge in the stationary tank for valve repair. Approximately 0.5 lb of dried sludge was released to the soil. At this same location on July 20, 1994, 4 gallons of liquid from the tanker were released to a secondary containment spill basin because a hose coupling was unlocked. It was estimated that more than 1 lb of liquid was sprayed onto two workers and adjacent soil both east and west of the spill basin (DOE 1994).

The liquid was rinse water used to flush the transfer line and tanker drain hose. The sludge from the tanker contained an F-listed waste; therefore the rinse water was being treated as a hazardous waste under the mixture rule. The EPA waste codes assigned to the waste contained in the 231 tank system include D004, D006, D007, D008, D009, D010, D011, F001, F002, F003, F005, F006, F007, F009, and F039. No residual contamination was detected in preliminary samples (DOE 1994).

Radiological surveys of the surrounding soil and basin area were conducted using a Bicron and SAC-4 instrument. The highest detected level of radioactive contamination was 651 dpm. Contaminated soil was containerized and the basin area was decontaminated (DOE 1994).

The area was cordoned off and posted immediately because of the radiological contamination. A wet vacuum was used to remove the liquid from the spill basin, and radiological control technicians (RCTs) smeared the tanker and the basin area. Approximately 30 lbs of soil was removed on July 13, 1994 from the first release, followed by an additional 40 lbs of soil from the

second release on July 20 and 21, 1994. According to the Ninth Quarterly HRR Update (DOE 1994), "the soil was containerized in a drum and was managed as LLMW in RCRA Unit 200."

The RCRA Contingency Plan was initiated on July 20, 1994, as a conservative measure, because of the release from containment to the environment of approximately 1 lb of hazardous waste. Samples were collected from the wet vacuum, the tanker drain hose, and surrounding soil (prior to and after excavation). RCRA CPIR No. 94-009 was filed in response to the incident.

PAC Investigations

Based on historical information regarding the tanker truck release, soil was sampled for radionuclides, metals, VOCs, SVOCs, PCBs, and pH in November 2002, in accordance with IASAP Addendum #IA-02-01 (DOE 2001). Surface soil samples were collected from five locations within PAC 500-907 and these locations and analytical data are presented in the Data Summary Report for IHSS Group 500-7 (DOE 2003b). There were no analytical results above the RFCA WRW soil ALs (DOE et al. 2003). Aroclor-1260 was detected in all five samples with a maximum concentration of 37 μg/kg. SVOCs were detected at low concentrations. Metals, including lead, arsenic, and chromium at maximum concentrations of 67.2 mg/kg, 13.0 mg/kg, and 58.2 mg/kg respectively, were detected.

No Further Accelerated Action Recommendation

Based upon the results of the soil samples collected, no contaminant source was identified at PAC 500-907. PCOCs for this site were not detected above the RFCA WRW soil ALs (DOE et al. 2003).

DOE received approval of NFAA status for IHSS Group 500-7 on June 9, 2003 from CDPHE (the LRA) (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE, RE: Final Data Summary Report for IHSS Group 500-7, June 9.

DOE, 1994, Ninth Quarterly Update for the Historical Release Report – July 1, 1994 to September 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2001, Industrial Area Sampling and Analysis Plan Fiscal Year 2002, Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 500-7, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 500-908

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Oil Released from Air Compressor

This Final Update to the HRR for PAC 500-908 consolidates the information in the Twelfth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-908 is summarized in this update. The following HRR volumes contain PAC 500-908 information:

Original Report – Twelfth Quarterly (DOE 1995); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 15, 1995

Historical Summary

As shown on Figure 19, PAC 500-908 was located near the Nitrogen Plant (Building 223), and is contained within PAC 300-156.1 (Building 371 Parking Lot).

At approximately 6:00 P.M. on May 15, 1995, a subcontract employee discovered that the air ejector vent associated with an air compressor inside the Nitrogen Plant was plugged, resulting in a release of 15 gallons of used air compressor oil. Approximately 14 gallons of the used oil was released within the building and 1 gallon may have flowed into the building floor drain before the release was identified. In addition, an estimated 1 gallon of oil was sprayed onto a rock area outside of the building near the northwest corner staining approximately a 6 by 30 ft area (DOE 1995).

Immediately after discovering that the air ejector vent was plugged on May 15, 1995 at 6:00 P.M., the subcontract employee unplugged the external vent, which stopped the release of used oil. On the following day at 12:00 P.M., the oil released within Building 223 was cleaned up using absorbent materials and placed into a single drum. The visibly stained rock and soil outside of the building was removed and containerized by 3:45 P.M. that afternoon. Approximately 2,800 lbs of rock and 10 lbs of soil/mud were removed from the site northwest of the building. Four drums were filled for the cleanup outside of the building and managed as nonhazardous waste. RCRA CPIR 95-003 was filed in response to the incident (DOE 1995).

The used oil released from the air compressor was originally handled as a hazardous waste constituent based on process knowledge and analytical data gathered from other similar releases of air compressor equipment. However, the analytical screening data from oil, soil, and rock samples collected on May 16, 1995, for select metals and VOCs indicated the levels of toxic constituents for the material released were well below TCLP regulatory limits and therefore, the used oil and affected soil was not hazardous waste (DOE 1995).

Any used oil that may have entered the Building 223 floor drain was not recoverable and therefore was treated in the Waste Water Treatment Plant process.

PAC Investigations

No further investigation was necessary because no toxic constituents were identified in the oil.

No Further Action Recommendation

PAC 500-908 was recommended for NFA in the Twelfth Quarterly HRR Update on the basis of the small amount of material released to the environment, the immediate cleanup response, and the analytical screening data showing that the spilled material was nonhazardous. There was no evidence of historical contamination found as a result of the release because of the abundance of rock in the area.

Following agency review of the Twelfth Quarterly HRR Update (DOE 1995), DOE received approval of the NFA status for PAC 500-908 from CDPHE (the LRA) and EPA on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from T. Rehder, EPA Region VIII, and S. Gunderson, CDPHE, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995, Historical Release Report Twelfth Quarterly Update – April 1, 1995 to June 30, 1995, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 500-909

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Release of Spent Photographic Fixer Solution

This Final Update to the HRR for PAC 500-909 consolidates the information in the 1996 HRR and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 500-909 is summarized in this update. The following HRR volumes contain PAC 500-909 information:

Original Report – 1996 Annual (DOE 1996); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

April 22, 1996

Historical Summary

As shown on Figure 19, PAC 500-909 is located on the western side of the northern end of Building 551. PAC 500-909 is completely contained within PAC 500-158.

At approximately 3:30 P.M. on April 22, 1996, workers discovered that a secondary containment system for a drum had overturned. The drum was used to accumulate spent photographic fixer solution containing 8.8 ppm TCLP silver (RCRA Code D011). The incident occurred on the western side of Building 551. The containment system and drum were immediately righted and the contents of the drum and containment system examined to determine whether a release to the environment had occurred. It was determined that approximately 5 to 6 gallons of the fixer solution had been released to the soil (DOE 1996).

Efforts were initiated within 24 hours to remove contaminated soil in the immediate area of impact. Approximately one 55-gallon drum of soil was removed and transported to a RCRA Hazardous Waste Management Unit after radiological screening was performed. Two composite soil samples were collected in the area after cleanup. Analytical data confirmed that the contaminated soil had been removed. The excavation was filled with clean fill and the secondary containment system was secured to ensure that the incident would not recur. This incident did not result in any injury or potential hazard to human health or the environment (DOE 1996). RCRA CPIR No. 96-001 was filed in response to this incident.

PAC Investigations

No further investigations were performed based on quick spill response and soil samples.

No Further Accelerated Action Recommendation

PAC 500-909 was recommended for NFAA designation in the 1996 HRR because of the small amount of material released to the environment, the immediate cleanup response, and the

cleanup verification samples showing that the release was adequately remediated. DOE received CDPHE (the LRA) and EPA approval of the NFAA status of PAC 500-909 on February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

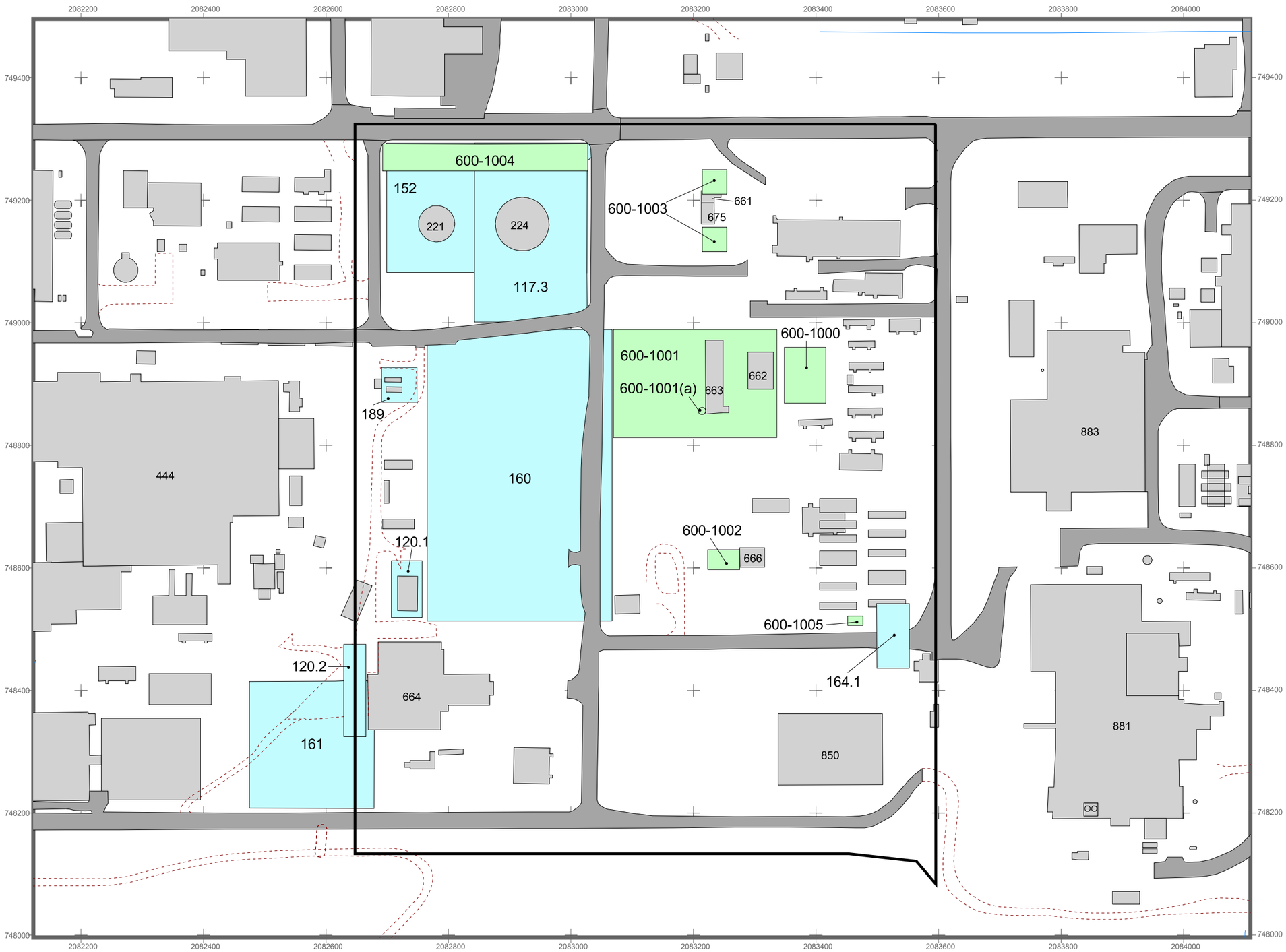

Figure 20
HRR 600 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

150 0 150 Feet

Scale = 1: 2500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_600.apr

PAC REFERENCE NUMBER: 600-117.3

IHSS Number:	117.3
Current Operable Unit:	IA
Former Operable Unit:	13
IHSS Group:	Not Applicable
Unit Name:	Chemical Storage - South Site

This Final Update to the HRR for PAC 600-117.3 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 117.3 is summarized in this update. The following HRR volumes contain IHSS 117.3 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

Prior to 1955 to 1969

Historical Summary

The area southwest of the intersection of Central Avenue and Sage Street was used for miscellaneous storage from approximately 1964 until 1969. The location of IHSS 117.3 is shown on Figure 20. Two large No. 6 fuel oil tanks were located in this area. Tank 224, a 1,800,000-gallon capacity tank built in 1973, was located approximately 130 ft southwest of the intersection of Central Avenue and Sage Street. Tank 221, an 800,000-gallon capacity tank built in 1955, was located approximately 70 ft west of Tank 224. Both tanks were demobilized in 1966.

Low-level oblique aerial photographs show miscellaneous materials being stored around Tank 221 from at least 1965 to 1969. Wooden boxes were present south and east of Tank 221 in 1965 and 1966. Drums were apparently stored east of Tank 221 in 1966. In 1969, wooden boxes, reportedly containing contaminated debris from the May 1969 fire in Buildings 776 and 777, were stored east of Tank 221. Later in 1969, the boxes were no longer present (DOE 1992a).

On May 4, 1965, highly contaminated oil leaked from a glovebox (designated H-22) that was being transferred from Building 776 to IHSS 117.3. The leak occurred within IHSS 117.3, as well as along the last approximately 400 ft of the transport route along Central Avenue. The glovebox, previously used for heat-treating product material, was packaged in a plastic sheet-lined wooden waste box for disposal as excess contaminated property. Approximately 2 to 3 liters escaped from the packaging, contaminating a forklift, a flatbed truck, and a pickup truck, as well as approximately 900 ft^2 of ground surface in an 18-inch-wide strip. Oil spots on the road were monitored at greater than 100,000 cpm by alpha survey instruments. The asphalt was removed, placed in lined barrels, and buried in a sludge pit. The soil affected by the leaking glovebox was also removed and drummed, in preparation for off-site disposal. Removal of the soil under the glovebox was completed on May 7, 1965. It is believed that the referenced “sludge

pit," in which the contaminated asphalt was buried, is one of the East Trenches (PACs NE-111.1 through NE-111.8) (DOE 1992a) .

On June 15, 1965, a leaking waste box was discovered in the waste storage area south of Building 551. The box was returned to Building 881 for investigation and repackaging. It is likely that the area south of Building 551 was IHSS 117.3 (DOE 1992a). No documentation was found regarding the constituents of the material leaking from the waste box.

IHSS Investigations

Investigations were conducted in IHSS 117.3 in accordance with the Phase I RFI/RI Work Plan for OU 13 (DOE 1992b). Because of their overlap, IHSS 117.3 and PAC 600-152 were investigated as a single site. Twenty-six soil gas samples were collected at a depth of 5 ft and analyzed for VOCs. Trichlorofluoromethane was the only VOC detected, and the highest detection was 8.9 µg/L (DOE 1995a). Soil gas survey data are reported in Table 2 of the narrative for IHSSs 117.3 and 152 in the 1997 Annual Update to the HRR (DOE 1997). Nine surface soil samples were collected and analyzed for radionuclides and metals. Plutonium-239/240 was detected at concentrations greater than background at four locations. The highest detection was 0.385 pCi/g. Lead, selenium, or zinc was detected at concentrations greater than background at five locations. Lead concentrations ranged from 78.5 to 90.6 mg/kg, selenium was detected at 1.5 mg/kg at one location, and zinc concentrations ranged from 147 to 1,680 mg/kg (DOE 1995a). All results were less than the OU 13 PPRGs (DOE 1995b) and RFCA Tier II soil ALs (DOE et al. 1996). Results for this investigation are summarized in Table 1 of the 1997 Annual Update to the HRR (DOE 1997).

No Further Action Recommendation

IHSS 117.3 was recommended for NFA status in the 1997 Annual Update to the HRR (DOE 1997) for the following reasons:

- Comparison of IHSS 117.3 sampling results to the RFETS PPRGs (DOE 1995b) and with RFCA soil ALs (DOE et al. 1996) indicated results were less than the applicable PPRGs and RFCA Tier II soil ALs (DOE et al. 1996) (see Table 1 of the narrative for IHSSs 117.3 and 152 in the 1997 Annual Update to the HRR).
- Application of the CDPHE conservative screen in accordance with RFCA (DOE et al. 1996) showed that both the total carcinogenic ratio and the total noncarcinogenic ratio sums were below the level of concern (ratio sum less than 1) (see Tables 3 and 4 of the narrative for IHSSs 117.3 and 152 in the 1997 Annual Update to the HRR).

DOE received approval of NFA status for IHSS 117.3 from CDPHE (the LRA) on July 9, 1999 (CDPHE 1999).

Comments

Materials similar to those stored at IHSS 117.3 were also stored south of Tank 221, in the Building 444 parking lot (PAC 600-160).

References

CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: Annual Update for the Historical Release Report (September 1997), July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan 100 Area OU 13, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995a, Draft Data Summary 2, Operable Unit 13, 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1995b, Programmatic Risk-Based Preliminary Remediation Goals, Final Revision #3, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 600-120.1

IHSS Number:	120.1
Current Operable Unit:	IA
Former Operable Unit:	12
IHSS Group:	600-3
Unit Name:	Fiberglass Area North of Building 664

This Final Update to the HRR for PAC 600-120.1 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 120.1 is summarized in this update. The following HRR volumes contain IHSS 120.1 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1972 to 1979

Historical Summary

The location of IHSS 120.1 is shown on Figure 20. IHSS Group 600-3 (which is comprised solely of IHSS 120.1) consists of the area beneath and around Building 668 where waste packing boxes were coated with fiberglass. Building 668, located north of Building 664, was a wooden-framed structure with deteriorating walls constructed of transite panels over a single concrete slab. Fiberglass activities occurred in the area from 1972 to 1979. The fiberglass process may have resulted in spills of polyester resin, peroxide catalyst materials, and cleaning solvents, even though there is no documentation of spills in this area (DOE 1992a). The Building 668 structure and slab were removed in January 2004 (DOE 2004b).

The Aerial Radiological Measurements System survey, conducted in 1977, detected elevated gamma radiation and americium activities in the vicinity of this site. No documentation was found that provided an explanation for the origin of the elevated readings (DOE 1992a).

Persons interviewed for the CEARP Phase 1 report indicated the area may contain residue from spills of polyester resin, peroxide catalyst materials, and cleaning solvents. Plutonium- and uranium-contaminated liquid and solid wastes staged in Building 664 are the likely source for the elevated radiation readings in 1977 (DOE 1992a).

IHSS Investigations

IHSS 120.1 was investigated in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). OU 12 data are summarized in the IA Data Summary Report (DOE 2000). Sixteen surface soil samples were collected from in and around IHSS 120.1. Plutonium-239/240 was detected at a maximum activity of 0.67 pCi/g and americium-241 was detected at a maximum of 0.135 pCi/g. These values were less than the applicable RFCA WRW soil ALs (DOE et al. 2003). Beryllium was detected at a maximum of 0.61 mg/kg, and cadmium was detected at a maximum of 7.8 mg/kg, both of which are below the RFCA WRW soil ALs (DOE et al. 2003). Copper, iron,

lithium, manganese, and zinc were detected at concentrations greater than background values, but well below RFCA WRW soil ALs (DOE et al. 2003). Based on these data and historical information, radionuclides, metals, VOCs, and SVOCs were considered PCOCs for IHSS 120.1.

In accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-04-05 for IHSS 120.1 (DOE 2003), 16 surface and subsurface soil characterization samples were collected at eight locations between December 10, 2003 and January 20, 2004. Uranium-234, uranium-235, and uranium-238 were detected in surface soil at maximum activities of 4.7, 0.212, and 2.17 pCi/g, which are greater than background values but less than the RFCA WRW soil ALs (DOE et al. 2003). Copper, iron, manganese, and zinc were the only metals detected in surface soil, again at concentrations less than the RFCA WRW soil ALs. The maximum detection of copper in surface soil was 19 mg/kg, and the maximum concentration of zinc was 80 mg/kg. All concentrations of metals in soil were significantly below the RFCA WRW soil ALs. SVOCs were detected in surface soil, but at concentrations significantly less than the RFCA WRW soil ALs. Plutonium-239/240 was detected in subsurface soil at a maximum activity of 0.126 pCi/g, which is less than the RFCA WRW soil AL of 50 pCi/g. Uranium-234, uranium-235, and uranium-238 were detected in subsurface soil at activities greater than background values, but much less than the RFCA WRW soil ALs. No metals were detected in subsurface soil. Acetone and methylene chloride, along with SVOCs, were detected in surface soil but at concentrations significantly less than the RFCA WRW soil ALs. Analytical results from the characterization sampling are presented in the Data Summary Report for IHSS Group 600-3 (DOE 2004b).

No Further Action Recommendation

Based on analytical results and the SSRS, an NFAA determination was justified for IHSS 120.1 because of the following:

- There are no RFCA WRW soil AL exceedances at IHSS 120.1.
- Migration of contamination to surface water through erosion is unlikely because this IHSS Group is not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS 120.1.

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 120.1 on May 12, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: Data Summary Report for IHSS Group 600-3 (B668) - Approval, May 12.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final RFI/RI Work Plan – 400-800 Area – Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-04-05, IHSS Group 600-3, IHSS 120.1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 600-3, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-120.2

IHSS Number: 120.2

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: 400-10

Unit Name: Fiberglassing Area West of Building 664

This Final Update to the HRR for PAC 600-120.2 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 120.2 is summarized in this update. The following HRR volumes contain IHSS 120.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1972 to 1979

Historical Summary

Fiberglassing of waste-packing boxes occurred in the areas north and west of Building 664 during the 1970s. Interviewees for the CEARP indicated that a spill of polyester resin might have occurred west of Building 664 during 1978 or 1979. Foam was sprayed on the ground, indicating something was being contained. Interviewees also recalled fiberglass and epoxy components, as well as solvents, being spilled west and north of Building 664. The location of IHSS 120.2 is shown on Figure 20.

The Aerial Radiological Measurements System survey, conducted in 1977, detected elevated gamma radiation and americium concentrations in the vicinity of these sites. Plutonium- and uranium-contaminated liquid and solid wastes staged in Building 664 are the likely constituents that led to the elevated radiation readings in 1977.

IHSS Investigations

IHSS 120.2 was investigated in accordance with the Final RFI/RI Work Plan for OU 12 (DOE 1992b). OU 12 analytical data are presented in the IA Data Summary Report (DOE 2000). Twelve surface soil samples were collected and analyzed for radionuclides and metals. Americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238 were detected at activities greater than background values, but significantly less than RFCA Tier II soil ALs (DOE et al. 1996). The maximum americium-241 activity detected was 0.048 pCi/g and the maximum plutonium-239/240 activity was 4.414 pCi/g. The maximum activities of uranium-234, uranium-235, and uranium-238 were 2.422, 0.579, and 2.53 pCi/g, respectively. Detected metals included beryllium at 8.4 mg/kg, cadmium at 11.4 mg/kg, chromium at 28.2 mg/kg, copper at 70 mg/kg, and zinc at 368 mg/kg. Soil gas samples indicated that acetone, benzene, toluene, methane, ethylbenzene and total xylenes were detected at concentrations greater than 1 μg/L. Methane had the highest detection a 390 μg/L (DOE 2000).

Based on historical sampling results and information, subsurface soil samples were collected from three locations targeting metals, radionuclides, SVOCs, and VOCs in accordance with IASAP Addendum #IA-02-01 (DOE 2002). Acetone, methylene chloride, toluene, and 2-butanone were detected at concentrations only slightly higher than the detection limit. All results were less than RFCA WRW soil ALs (DOE et al. 2003). Analytical results from the characterization sampling are presented in the Data Summary Report for IHSS Group 400-10 (DOE 2003b).

No Further Action Recommendation

Based on analytical results and the SSRS, an NFAA determination was justified for IHSS 120.2 in the Data Summary Report because of the following:

- All contaminant concentrations were less than RFCA Tier II soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003).
- There was no identified potential to exceed surface water standards from contaminants at IHSS 120.2.

DOE received approval of NFAA status for IHSS 120.2 from CDPHE (the LRA) on July 15, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE; Re: Final Data Summary Report for IHSS Group 400-10, July 15.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final RFI/RI Work Plan – 400-800 Area – Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Characterization Data Summary Report for IHSS Group 400-10, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-152

IHSS Number: 152

Current Operable Unit: Not Applicable

Former Operable Unit: 13

IHSS Group: Not Applicable

Unit Name: Fuel Oil Tank 221 Spills

This Final Update to the HRR for PAC 600-152 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 152 is summarized in this update. The following HRR volumes contain IHSS 152 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

Prior to 1955 to 1966

Historical Summary

Tank 221 was an 800,000-gallon surface-mounted storage tank located east of Building 452. Tank 221 began operation in 1955 and contained No. 6 fuel oil. Tank 224, also used for No. 6 fuel oil, was located directly east of Tank 221 and had a 1,800,000-gallon capacity. Spills and releases from these fuel oil tanks resulted in the formation of IHSS 152 (DOE 1992a). IHSS 152 overlaps with PAC 600-117.3. The location of IHSS 152 is shown on Figure 20.

On January 29, 1971, 700 gallons of No. 6 fuel oil leaked from Tank 221 because the fill line valve, which was used to transfer oil from transport trucks to the tank, had not been closed after use. Reportedly, the released oil was confined to ditches and an open field east of the tank. Documentation on the incident indicates that this was the second incident of this nature in four weeks. In response to this occurrence, ditches and ponds were dug to prevent the spread of contamination. The oil was scraped up and disposed in the Present Landfill (PAC NW-114) (DOE 1992a).

On April 4, 1975, a leak was discovered in the heater coil of one of the fuel oil tanks when the pressure dropped below the head pressure of oil in the tank. The leak enabled oil to flow through the condensate drain line and into the diked area around the tank. The area was cleaned up at a cost of $4,680 (DOE 1992a).

During the week ending February 16, 1979, an estimated 400 gallons of No. 6 fuel oil was spilled during the filling of the Central Avenue storage tanks. During the week ending February 17, 1989, approximately 50 gallons of No. 6 fuel oil were released when a valve was left open. Reportedly, the oil did not enter a water course (DOE 1992a).

IHSS Investigations

Investigations were conducted at IHSSs 117.3 and 152 as part of the OU 13 RFI/RI in accordance with the Phase I RFI/RI Work Plan for OU 13 (DOE 1992b). The two IHSSs were considered a single source because of their overlap and proximity. Fifty-five soil gas samples were collected at a depth of 5 ft and analyzed for VOCs. Trichlorofluoromethane was detected in a number of locations. The highest detection was 31 μg/L. Benzene and vinyl chloride were detected in very small amounts at one location. Eleven surface soil samples were collected and analyzed for radionuclides and metals. Plutonium-239/240, uranium-233/234, or uranium-238 were detected at concentrations greater than background at six locations. The highest plutonium-239/240 detection was 0.385 pCi/g. Uranium-233/234 was detected at two locations (2.09 and 2.26 pCi/g), and uranium-238 was detected at 1.95 pCi/g at one location. Cobalt, lead, selenium, or zinc was detected at concentrations greater than background at seven locations. Cobalt was detected at one location at 53.5 mg/kg. Lead concentrations ranged from 78.5 to 90.6 mg/kg, selenium was detected at 1.5 mg/kg at one location, and zinc concentrations ranged from 147 to 1,680 mg/kg (DOE 1995a). All results were less than the OU 13 PPRGs (DOE 1995b) and RFCA Tier II soil ALs (DOE et al. 1996). Data for IHSS 152 are reported in the narrative for IHSSs 117.3 and 152 in the 1997 Annual Update to the HRR (DOE 1997).

No Further Action Recommendation

IHSS 152 was recommended for NFA status in the 1997 Annual Update to the HRR (DOE 1997) for the following reasons:

- Comparison of IHSS 152 sampling results to the RFETS PPRGs (DOE 1995b) and RFCA Tier II soil ALs (DOE et al. 1996) showed these data were less than both the applicable PPRGs and Tier II soil ALs (see Table 1 of the narrative for IHSS 152 in the 1997 Annual Update to the HRR).
- Application of the CDPHE conservative screen in accordance with RFCA (DOE et al. 1996) showed that both the total carcinogenic ratio and the total noncarcinogenic ratio sums are below the level of concern (ratio sum less than 1) (see Tables 3 and 4 of the narrative for IHSS 152 in the 1997 Annual Update to the HRR).

DOE received approval of NFA status for IHSS 152 from CDPHE (the LRA) on July 9, 1999 (CDPHE 1999).

Comments

None

References

CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: Annual Update for the Historical Release Report (September 1997), July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan – 100 Area – Operable Unit 13, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995a, Draft Data Summary 2, Operable Unit 13, 100 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1995b, Programmatic Risk-Based Preliminary Remediation Goals, Final Revision #3, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 600-160

IHSS Number: 160

Current Operable Unit: IA

Former Operable Unit: 14

IHSS Group: 600-4

Unit Name: Radioactive Site – 444 Parking Lot

This Final Update to the HRR for PAC 600-160 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 160 is summarized in this update. The following HRR volume contains IHSS 160 information:

Original Report – 1992 (DOE 1992a)

Dates(s) of Operation or Occurrence

Prior to 1959 to 1971

Historical Summary

IHSS 160 contained the Building 444 parking lot and a section of Seventh Avenue located east of Building 444. The location of IHSS 160 is shown on Figure 20. The Building 444 parking lot was paved, but the area had previously been unpaved when it was used to store wastes prior to off-site disposal. The actual date of paving is uncertain, but it is likely that paving operations were undertaken when the storage area became a parking lot. Aerial photographs taken in June 1965 and June 1969 show drums and boxes in the unpaved area that was associated with IHSS 160 (DOE 1992a).

Two retired employees interviewed for the original HRR (DOE 1992a) stated that the area now occupied by the Building 444 parking lot had been used for the storage of drummed and boxed waste; in particular, waste resulting from the May 1969 fire in Building 776 and Building 777. Uranium- and plutonium-contaminated oils and coolants were reportedly stored here in great quantity. In the early 1970s, surface soil was removed from this area; however, Rocky Flats personnel interviewed for CEARP Phase I mentioned that small amounts of plutonium may have remained.

On May 24, 1971, two boxes leaked an unknown contaminated liquid onto the ground at the waste box storage yard. Approximately 1,000 ft^2 of ground were contaminated from 1,000 cpm to greater than 100,000 cpm. The quantity of released liquid was not documented. Apparently the leaks were due to rain or melting snow entering the boxes. The boxes were returned to Building 777. On June 16, 1971, decontamination activities at the waste box storage yard were completed.

Results of an alpha probe survey at the waste storage yard east of Building 444 in February 1973 indicated that no contamination was detected (DOE 1992a).

IHSS Investigations

IHSS 160 was investigated in accordance with the Phase I RFI/RI Work Plan for OU 14 (DOE 1992b). The OU 14 Draft Data Summary (DOE 1995) presented results of the investigation. Fifty-six surface soil samples were collected within the boundaries of IHSS 160 on a grid with 50-ft spacing. Subsurface soil samples were also collected at four boreholes ranging from 4.6 to 27.5 ft bgs in the southern portion of IHSS 160, and one 24-ft borehole in the northeastern portion of the IHSS along its eastern border. Surface soil samples were analyzed for metals and radionuclides, and subsurface soil samples were analyzed for VOCs and metals. Plutonium-239/240 was detected above background means plus two standard deviations in 75 percent of the surface soil samples. Plutonium-239/240 was detected at three times the RFCA WRW soil AL (DOE et al. 2003) at one location, SS441294 at an activity of 150 pCi/g. This is the only historical exceedance identified in IHSS 160. Copper, lead, and zinc concentrations exceeded background means plus two standard deviations in approximately 20 percent of the surface soil samples. The maximum concentrations are 50.2, 426, and 314 mg/kg, respectively. Chlorinated solvents, including 1,1,1-trichloroethane, 1,2-dichloroethane, and tetrachloroethene, were detected in subsurface soil in the northeastern portion of IHSS 160. There were sporadic detections of VOCs in subsurface soil in the southern part of IHSS 160, chiefly methylene chloride and carbon disulfide. All detections of VOCs were four to eight orders of magnitude less than the RFCA WRW soil ALs (DOE 1995, DOE et al. 2003).

Characterization samples were collected at IHSS 160 as part of RFCA (DOE et al. 1996) accelerated action activities for IHSS Group 600-4 in accordance with IASAP Addendum #IA-03-09 (DOE 2003). One hundred and twenty-six surface and 194 subsurface soil samples were collected. Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Eighteen samples were analyzed for PCBs. Contaminant concentrations in soil greater than RFCA WRW soil ALs at IHSS Group 600-4 were limited to plutonium-239/240 in surface soil at one sampling location (CA37-013), and arsenic in subsurface soil at two sampling locations (CB37-000 and CB38-003). The maximum plutonium-239/240 activity was 183.77 pCi/g. Aroclor-1254 was detected at one location at a concentration of 27 µg/kg. Arsenic was detected in subsurface soil at a maximum concentration of 26 mg/kg. Based on the SSRS, the subsurface soil exceedances of arsenic at sampling locations CB37-000 and CB38-003 did not require remediation (DOE 2004a).

Surface soil at sampling locations CA37-013 and SS441294 required remediation because plutonium-239/240 activities in soil collected at these locations were more than three times the RFCA WRW soil AL (DOE et al. 2003).

Notification of the planned RFCA accelerated action (DOE et al. 1996) was provided in ER RSOP Notification #04-20 (DOE 2004b). Activities were conducted between July 8 and December 8, 2004, and involved removal of soil from two hot-spot locations. At sampling location CA37-013, soil was excavated to a depth of approximately 2 ft bgs and approximately 2.5 ft laterally to the east, west, and south, and approximately 5 ft to the north. At historical sampling location SS441294, soil was excavated to a depth of approximately 1 ft bgs and approximately 8 ft laterally in a north-south direction, and 16 ft laterally in an east-west direction. Six confirmation soil samples were collected from each excavation and analyzed. All radionuclide activities in confirmation samples were less than the RFCA WRW soil ALs (DOE et al. 2003) based on analysis by alpha spectroscopy. Residual plutonium-239/240

activities ranged from 0.161 to 4.83 pCi/g in confirmation samples. Details and analytical results are provided in the Final Closeout Report for IHSS Group 600-4 (DOE 2004a).

No Further Action Recommendation

Results from confirmation sampling indicate that plutonium-239/240 levels were remediated to below the RFCA WRW soil AL (DOE et al. 2003) at the two excavated hot spots. Residual contamination exceeding RFCA WRW soil ALs (DOE et al. 2003) is limited to arsenic in subsurface soil at two sampling locations. Based on application of the hot spot methodology and the SSRS, soil at these arsenic locations did not require accelerated action.

IHSS 160 was recommended for NFAA status in the Closeout Report for IHSS Group 600-4 (DOE 2004a) for the following reasons:

- All ER RSOP RAOs (DOE 2004b) and accelerated action goals established for IHSS 160 soil were achieved. Soil with plutonium-239/240 contamination was removed.
- All residual contaminant activities and concentrations in surface soil were less than WRW soil ALs.
- The SSRS and stewardship evaluations indicated no additional accelerated action is required.

DOE received approval of NFAA status for IHSS 160 from CDPHE (the LRA) on December 23, 2004 (CDPHE 2004).

Comments

None

References

CDHPE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: Approval, Draft Closeout Report for IHSS Group 600-4, IHSS 160 – Radioactive Site, Building 444 Parking Lot, December 23.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Operable Unit 14 Radioactive Waste Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Draft Data Summary 1, Operable Unit No. 14, Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-09, IHSS Group 600-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004a, Closeout Report for IHSS Group 600-4, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-20, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-161

IHSS Number:	161
Current Operable Unit:	IA
Former Operable Unit:	14
IHSS Group:	400-10
Unit Name:	Radioactive Site – Building 664

This Final Update to the HRR for 600-161 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 161 is summarized in this update. The following HRR volumes contain IHSS 161 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1971 to 2002

Historical Summary

Building 664 was constructed in 1971 and was used to stage drummed and boxed waste prior to off-site shipment for disposal. The location of IHSS 161 is shown on Figure 20. Persons interviewed for the CEARP Phase 1 report indicated the area west of Building 664 may have had low-level residual plutonium and uranium contamination resulting from punctured or leaking drums and boxes of solid and liquid wastes. Soil was reportedly removed from this area in the early 1970s; however, no documentation was found that provides details of soil remediation activities (DOE 1992a).

Results of an aerial radiological survey conducted in 1977 indicate an area of elevated americium and gamma activity concentrations centered around the area of the northwest corner of Building 664. Plutonium- and uranium-contaminated liquid and solid wastes staged in Building 664 are the likely constituents that led to the elevated radiation readings in 1977 (DOE 1992a).

In November 1988, a forklift leaked hydraulic oil outside Building 664. The cause was a rupture of a 1-inch hose on the forklift. The oil spread over the asphalt area and adjacent ground. An oil absorbent was spread over the oil (DOE 1992a).

IHSS Investigations

IHSS 161 was studied in accordance with the Phase I RFI/RI Work Plan for OU 14 (DOE 1992b). Thirty surface soil locations were sampled and analyzed for radionuclides. Plutonium-239/240, uranium-234, uranium-235, and uranium-238 were detected at maximum activities of 20.57, 2.422, 0.579, and 5.693 pCi/g, respectively. Detailed results are presented in the Draft OU 14 RFI/RI report (the final report was not completed) (DOE 1995).

Forty-six subsurface soil locations were sampled at IHSS 161 as part of RFCA (DOE et al. 1996) accelerated action activities for IHSS Group 400-10 in accordance with IASAP Addendum #IA-

02-01 (DOE 2002). Samples were analyzed for metals, radionuclides, SVOCs, and VOCs. Surface soil samples were not collected because sufficient surface soil samples were collected as part of the OU 14 RFI/RI (DOE 1995). Results indicated uranium-235 and uranium-238 were detected at activities slightly greater than background values, but less than RFCA WRW soil ALs (DOE et al. 2003) in subsurface soil. Maximum activities for uranium-235 and uranium-238 were 0.35 and 5.74 pCi/g, respectively. Acetone, 2-butanone, methylene chloride, naphthalene, and toluene were detected at concentrations close to detection limits. Metals detected at concentrations greater than background values, but less than RFCA WRW soil ALs (DOE et al. 2003) were aluminum at 48,000 mg/kg, arsenic at 21.6 mg/kg, cobalt at 38.1 mg/kg, lead at 63.8 mg/kg, and strontium at 214 mg/kg. As shown in the Data Summary Report (DOE 2003b), analytical results for all analytes were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

IHSS 161 was recommended for NFAA status in the Data Summary Report (DOE 2003b) for the following reasons:

- All contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- There is no identified potential to exceed surface water standards.

DOE received approval of NFAA status for IHSS 161, from CDPHE (the LRA) on July 15, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE; Re: Final Data Summary Report for IHSS Group 400-10, July 15.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Operable Unit 14 Radioactive Waste Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Draft Data Summary 1, Operable Unit No. 14, Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 400-10, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-164.1

IHSS Number:	164.1
Current Operable Unit:	IA
Former Operable Unit:	14
IHSS Group:	Not Applicable
Unit Name:	Radioactive Slab from Building 771

This Final Update to the HRR for PAC 600-164.1 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 164.1 is summarized in this update. The following HRR volumes contain IHSS 164.1 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

September 1957

Historical Summary

After the 1957 fire in Building 771, a radioactively contaminated slab from the east wall of the building was placed in an area northwest of Building 881 for temporary storage. The slab was originally documented in the HRR (DOE 1992a) as coming from Building 776. That origin is almost certainly in error because Building 776 first came online in 1957, and there are no identified fires related to Building 776 in 1957 (DOE 1992a). The location of IHSS 164.1 is shown on Figure 20.

The slab was reportedly broken up and removed, and the area cleaned. Several hundred square feet of ground surface were considered to be impacted. The area was later covered by the southeastern corner of the Building 881 parking lot. In the 1992 HRR, IHSS 164.1 was placed in the southeastern section of the 600 Area, in the 881 parking lot (DOE 1992a). This was the area investigated for the OU 14 RFI/RI (DOE 1995).

No documentation was found that detailed the constituents released to the environment. However, because the concrete slab was supposed to have originated from a plutonium processing facility (Building 771), it is possible that the slab was contaminated with plutonium (DOE 1992a).

IHSS Investigations

IHSS 164.1 was studied in accordance with the Phase I RFI/RI Work Plan for OU 14 (DOE 1992b). Results are reported in the OU 14 Phase I Draft RFI/RI Report (a final report was not completed) (DOE 1995). 15 surface soil samples were collected and analyzed for radionuclides within IHSS 164.1. Isotopic analyses of these samples indicated that soil activities

are consistent with background levels and potential contamination associated with the slab was effectively cleaned up. The activity of plutonium-239/240 exceeded the background mean plus two standard deviations in only one of the 15 samples analyzed. The maximum detected activity of plutonium-239/240 0.076 pCi/g. Locations and analytical results for these samples are provided in Table 2.4 of the 2000 Annual Update to the HRR (DOE 2000).

No Further Action Recommendation

IHSS 164.1 was recommended for NFA in the 2000 Annual Update to the HRR, consistent with the NFA criteria in RFCA (DOE et al.1996), based on the following:

- All analytical data for the OU 14 RFI/RI were collected in accordance with an approved workplan/SAP.
- All analyses were below RFCA Tier II soil ALs (DOE et al. 1996) and at or below established background levels for radionuclides.
- No current or potential source of contamination was identified.

IHSS 164.1 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for IHSS 164.1 because investigations did not identify any evidence of a release associated with this IHSS. An NFA was verbally agreed to in the November 14, 2001 meeting and formally approved in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Operable Unit 14 Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary 1, Operable Unit No. 14, Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 600-189

IHSS Number: 189

Current Operable Unit: Not Applicable

Former Operable Unit: 12

IHSS Group: Not Applicable

Unit Name: Nitric Acid Tanks

This Final Update to the HRR for PAC 600-189 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 189 is summarized in this update. The following HRR volumes contain IHSS 189 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Annual (DOE 2000); and
Update Report – 2001 Annual (DOE 2001).

Dates(s) of Operation or Occurrence

1952 to 1996

Historical Summary

IHSS 189 is the former location of the 218 Acid Tanks, also referenced as the Building 218 Acid Farm. The location of IHSS 189 is shown on Figure 20. Prior to their removal in 1996, the tanks were located adjacent to the railroad tracks east of Building 444 and south of Cottonwood Avenue. The tanks were used for storing nitric acid from 1952 to 1996 for Buildings 771 and 883. The tanks were designed with secondary containment in the form of 4-inch-thick concrete walls, approximately 4 ft in depth (DOE 1992a). .

On October 27, 1982, a brown cloud of gas was observed coming from the Acid Tank Farm. No documentation was found explaining the incident. An overflow occurred on September 25, 1985, during a filling operation. No documentation could be found pertaining to the quantity of acid released, but two containers of sodium bicarbonate were used to neutralize the September 1985 spill (DOE 1992a).

On June 28, 1986, the level probe in a dumpster tank failed, causing a release of nitric acid to the safety overflow and onto the ground. Approximately 1 gallon of acid was released to the ground surface. However, the Fire Department washed down, diluted, and neutralized the acid with sodium bicarbonate (DOE 1992a).

IHSS Investigations

IHSS 189 was investigated in accordance with the OU 12 RFI/RI Work Plan (DOE 1992b). Surficial soil sampling was conducted at six locations surrounding the former tank area. Samples were analyzed for radionuclides, metals, pesticides, PCBs, and pH (DOE 1995). Pesticides and PCBs were not detected. Chromium and mercury were detected at concentrations greater than background, but less than applicable PRGs. The maximum chromium concentration was

26.1 mg/kg and the maximum mercury concentration was 0.27 mg/kg. Radionuclides were detected at activities very close to background values. Americium-241 was detected at a maximum activity of 0.067 pCi/g and plutonium-239/240 was detected at a maximum activity of 0.551pCi/g. Uranium-238 had the highest activity at 6.239 pCi/g (DOE 1995). Values for pH ranged from 7.15 to 8.33. Sample locations and sample results are presented on Figure 2-10 and in Table 2.21 of the 2001 Annual Update to the HRR (DOE 2001). The acid tanks were removed on September 29, 1996 (DOE 1997).

No Further Action Recommendation

Based on the results of the soil samples collected at IHSS 189, no current or potential contaminant source was identified.

IHSS 189 was proposed for NFA in the 1997 Annual Update to the HRR (DOE 1997) based upon the health effects and exposure scenario. The 2001 Annual Update to the HRR (DOE 2001) provided analytical results to supplement the NFA proposal.

IHSS 189 was addressed through the consultative process in an NFA Working Group meeting on January 31, 2002. An NFA was justified because no current or potential contaminant source was identified for IHSS 189. An NFA was verbally agreed to in the January 31, 2002 meeting and formally approved by CDPHE (the LRA) in a letter dated September 26, 2002 (CDPHE 2002).

Comments

None

References

CDPHE, 2002, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE; RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final RFI/RI Work Plan – 400-800 – Operable Unit 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 1995, Technical Memorandum No. 2, Operable Unit 12, 400/800 Areas, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 600-1000

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer Storage Outside Building 662

This Final Update to the HRR for PAC 600-1000 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of PAC 600-1000 is summarized in this update. The following HRR volumes contain PAC 600-1000 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to August 1982 through August 1986

Historical Summary

Transformers were stored on the eastern side of Building 662 at the location shown on Figure 20. The boundaries of the original PAC location were estimated. For the 2004 Annual Update to the HRR, the boundaries were revised based on sampling location surveys and field reconnaissance.

The first indication of transformer storage outside Building 662 is a photograph dated August 1982. There were approximately 10 pole-mounted transformers located on the eastern side of the building (DOE 1992).

From June to October 1983, a large PCB-containing transformer was stored in a catch basin outside Building 662. On October 13, 1983, the transformer was shipped offsite for disposal. Neither the condition of the transformer nor the PCB content of the transformer oil is known.

During an inspection on January 30, 1986, EPA audited the electrical yard outside of Building 662 and found 28 pole-mounted transformers stored for reuse. One of the transformers was found to be leaking at that time. The PCB content of the leaking oil was then unknown, but the oil was later determined to contain greater than 500 ppm PCBs. Documentation of the inspection indicates, because of their age or condition, 10 of the 28 transformers were awaiting disposal rather than reuse. Subsequent to the discovery of the leaking transformer, the transformer was disposed as PCB waste (DOE 1992).

PAC Investigations

Table 2-1 of the Closeout Report for the Source Removal of PCBs provides pre-remediation soil and concrete PCB levels (DOE 1997) for PAC 600-1000. Twenty-four concrete samples were analyzed and results indicated that the concrete was not contaminated. Concrete was removed and disposed in the Present Landfill (IHSS NW-114). In accordance with the PAM (DOE 1995),

85.1 cy of PCB-contaminated soil were removed from the eastern side of Building 662, containerized, and disposed in July 1996. Seventy-five soil samples were analyzed using immunoassay Method 4020 and 17 soil samples were analyzed using Method 8080. PCB levels remaining in the soil were less than 25 ppm using EPA Method 8080.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site remediation and confirmation data, and the White Paper findings noted above, NFAA was proposed for PAC 600-1000 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR) (DOE 2004c).

After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 600-1000 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-1001

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	600-1
Unit Name:	Temporary Waste Storage Building 663

This Final Update to the HRR for PAC 600-1001 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1001 is summarized in this update. The following HRR volumes contain PAC 600-1001 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

May 1954 to 1971

Historical Summary

The location of PAC 600-1001 is shown on Figure 20. Two temporary buildings were constructed on concrete slabs for use during the initial Plant construction in the early 1950s. These buildings were located near to where Buildings 662 and 663 were later located. The wooden structures were removed prior to 1954; however, the concrete slabs remained. The slabs from Buildings 662 and 663, as well as the area around them, were used for storage (DOE 1992).

Storage operations began in May 1954, when 302 drums of graphite and 49 drums of liquid waste were placed on the Building 663 slab. Waste coolant drums were also stored on the slab. In November 1954, all of the drums were removed from the slab; however, storage at the area later resumed. Most of the waste stored on this slab came from Buildings 334 and 444 (DOE 1992).

The area was an advantageous loading area, and the slab east of Building 663 was connected to a loading facility. The northern end of the loading facility was reinforced and refinished with concrete in October 1958 (DOE 1992).

On October 15, 1960, a waste storage building was erected on the Building 663 slab. Accumulated drums of waste from the production buildings were moved to the building. In November 1962, drums and boxes of waste from Buildings 771 and 774 were moved to the western side of Building 663 for outside storage (DOE 1992).

Documented releases of radionuclides, oil, coolant, perclene, and acids that occurred at these storage areas are described in the 2003 Annual Update to the HRR (DOE 2003a) and Appendix C of the IASAP (DOE 2001a).

PAC Investigations

A RFCA accelerated action (DOE et al. 1996) was conducted at IHSS Group 600-1 (PAC 600-1001) between August 5 and October 10, 2002, in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) and ER RSOP Notification #02-04 (DOE 2002a). PCOCs at IHSS Group 600-1 (PAC 600-1001) were radionuclides, metals, and SVOCs in surface and subsurface soils and VOCs in subsurface soils. Forty surface and subsurface soil samples were collected at PAC 600-1001. Results at one location beneath the Building 663 slab, where the concrete was cracked, indicated plutonium-239/240 activities of 3,600 pCi/g. Soil at this location was excavated to a depth of 4.5 ft over an approximately 20 ft by 30 ft area. Several in-process confirmation samples were collected and two confirmation samples were collected and analyzed. Only two final confirmation samples were collected in this small excavation because the in-process samples had already confirmed that soil removal was complete (DOE 2003b). Confirmation samples indicated all plutonium-239/240 results were less than RFCA Tier II soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). The maximum residual plutonium-239/240 activity was 17.1 pCi/g. In addition to removing the contaminated soil, the Building 662 and 663 slabs and a number of smaller slabs were removed and disposed (DOE 2003b).

No Further Action Recommendation

An NFAA for PAC 600-1001 was justified in the Closeout Report for IHSS Group 600-1 (DOE 2003b), based on the following:

- Residual radionuclide activities in surface and subsurface soil were less than RFCA Tier II soil ALs (DOE et al. 1996) and only slightly greater than background means plus two standard deviations (DOE 2003b).
- Further action was not indicated by the SSRS (DOE 2003b).

DOE received approval of NFAA status for PAC 600-1001 from CDPHE (the LRA) on June 24, 2003 (CDPHE 2003).

Comments

On June 23, 1997, while conducting a walk-down inspection of PAC 600-1001, two stained soil areas were identified immediately west of Building 663. The 1997 Annual Update to the HRR initially reported this occurrence as an addition to the original PAC 600-1001. Clarification was necessary based upon review, and it was decided in a meeting with the Agencies on May 18, 2000, to track the June 23, 1997 occurrence as PAC 600-1001(a). Refer to PAC 600-1001(a) for a description of the status of this occurrence.

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE; RE: Final Closeout Report for IHSS Group 600-1 (PAC 600-1001), June 24.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001a, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE 2001b, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002a, Environmental Restoration RFCA Standard Operating Protocol (ER RSOP) Notification #02-04, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 600-1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-1001(a)

IHSS Number:	Not Applicable
Current Operable Unit:	Not Applicable
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Waste Oil in PAC 1001

This Final Update to the HRR for PAC 600-1001(a) consolidates the information in the 1997 Annual Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1001(a) is summarized in this update. The following HRR volumes contain PAC 600-1001(a) information:

Original Report – 1997 Annual (DOE 1997);
Update Report – 1999 Annual (DOE 1999);
Update Report – 2000 Annual (DOE (2000a);
Update Report – 2000 Interim (DOE 2000b); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

June 23, 1997

Historical Summary

On June 23, 1997, while conducting a surveillance walk-down of the Building 663 Lay-down Yard (PAC 600-1001), two oil-stained soil areas were identified immediately west of the building. The first stained area was approximately 10 ft west of the southwestern corner of the building where a 5-gallon bucket containing an oil-water mixture had overflowed due to recent rain. Stained soil around the bucket indicated that overflowing of the bucket had been ongoing for a prolonged period of time. During the assessment of the first finding, a second oil stain was identified approximately 100 ft north of the first where an abandoned piece of equipment was observed leaking what appeared to be hydraulic fluid onto the ground (soil). The location of PAC 600-1001(a) is shown on Figure 20.

Hazardous constituents may have been present because of past storage activities (refer to PAC 600-1001) and documented releases of radionuclides, oil, perclene, coolant, and acids.

PAC Investigations

In response to the June 23, 1997 occurrence, the HAZMAT Team responded to the site. Radiological surveys were conducted at both sites, followed by soil sampling and sampling of the unknown oil in the 5-gallon bucket. The bucket and contents were placed into an overpack container, and both oil-stained areas were immediately cleaned up in accordance with Plant procedures. Gravel and soil from the two sites were containerized in accordance with Plant procedure and transported to a RCRA permitted storage facility. Samples were collected from the liquid in the bucket and both soil areas.

The following analyses were performed on the samples: fingerprint analysis (oil), radiological screens, isotopic analysis (plutonium, uranium, americium), TCLP metals, VOCs, and PCBs. Several VOCs were detected in the liquid sample, including 1,1,1-trichloroethane at 230 ppm, 1,2,4-trimethylbenzene at 100 ppm, and total xylenes at 260 ppm. Organics were not detected in either soil sample, and metals and radionuclides were not detected at levels greater than background (DOE 2000b).

No Further Action Recommendation

Sampling and analysis adequately characterized the compounds associated with the oil in the 5-gallon bucket and stained soil in both areas. The area was immediately cleaned up in accordance with Plant procedures, and the soil was containerized prior to transporting to a RCRA-permitted storage facility. In addition, the 5-gallon bucket and contents were overpacked prior to removal. There were no other contaminants associated with the release, and the spill was verified to be cleaned up.

PAC 600-1001(a) was addressed through the consultative process in NFA Working Group meetings on October 24, 2001, and November 14, 2001. Based on these discussions and the above facts, agreement was reached that an NFA was justified for PAC 600-1001(a). An NFA was verbally agreed to in the November 14, 2001 meeting and was formally approved in a letter from both CDPHE and EPA dated February 14, 2002 (CDPHE and EPA 2002).

Comments

The 1997 Annual Update to the HRR initially reported this occurrence as an addition to the original PAC 600-1001. Clarification was necessary based upon review, and it was decided in a meeting with the regulatory agencies on May 18, 2000, to track the June 23, 1997 occurrence as PAC 600-1001(a).

The February 14, 2002, NFA approval letter (CDPHE and EPA 2002) clarified, given that PAC 600-1001(a) was originally identified as part of PAC 600-1001, only PAC 600-1001(a) was agreed to as NFA. PAC 600-1001 would require further investigation (refer to PAC 600-1001).

References

CDPHE and EPA, 2002, Correspondence to J. Legare from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000b, Interim Update to the Historic Release Report - Response to Comments for HRR Annual Updates (1997, 1998, 1999), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

PAC REFERENCE NUMBER: 600-1002

IHSS Number:	Not Applicable
Current Operable Unit:	Not Applicable
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer Storage - West of Building 666

This Final Update to the HRR for PAC 600-1002 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1002 is summarized in this update. The following HRR volumes contain PAC 600-1002 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to 1992

Historical Summary

Unused and unusable transformers were stored and dismantled for spare parts on a concrete pad west of Building 666. It is suspected that the transformers were also stored inside of Building 666 within secondary containment basins. Leaks and spills of transformer oil may have occurred at this site according to Plant employees. The location of PAC 600-1002 is shown on Figure 20.

PCBs are the PCOCs at this location; however, radionuclides (plutonium-239/240) were also present in soil samples collected in July 1991. Plutonium-239/240 of unknown origin was detected at levels up to 9.1 pCi/g (DOE 1996).

Transformer storage had ceased by 1992; however, the building was also used as a primary TSCA waste storage facility (DOE 1992).

PAC Investigations

As part of a site-wide study of potential environmental releases of PCBs conducted in July 1991 (DOE 1991), eight soil samples were collected and analyzed for PCBs and radionuclides. The results indicated the highest PCB contamination level in the soil adjacent to the concrete transformer pad was 1.6 ppm (DOE 1996). Radionuclides were detected at activities greater than background. Plutonium-239/240 ranged from 0.4 to 9.1 pCi/g and did not require remediation.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of

PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site data and White Paper findings noted above, NFAA status was recommended for PAC 600-1002 in No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR) (DOE 2004c).

After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the lead agency) on the NFAA status for PAC 600-1002 on May 6, 2004 (CDPHE 2004).

Comments

The boundaries of the original PAC location were estimated. PAC 600-1002 boundaries were revised based on sampling location surveys and field reconnaissance and documented in the 2004 Annual Update to the HRR (DOE 2004a).

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-1003

IHSS Number:	Not Applicable
Current Operable Unit:	Not Applicable
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformers North and South of 661/675 Substation

This Final Update to the HRR for PAC 600-1003 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1003 is summarized in this update. The following HRR volumes contain PAC 600-1003 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to 1997

Historical Summary

PAC 600-1003 consisted of two transformer sites. Evidence of a leaking valve was discovered on the northern side of Transformer 661-1 (PCB Site 12), which was located on the northern side of the 661/675 Substation (DOE 1991). The transformer was situated on a concrete pad and there was no berm around the transformer pad. Another transformer was located south of the 661/675 Substation, identified as Transformer 675-1 (PCB Site 13). There was no evidence that the transformer was leaking or had leaked in the past, and it was retrofitted in 1987. The location of PAC 600-1003 is shown on Figure 20.

PAC Investigations

Based on 1985 analytical results, PCB levels in the 661-1 and 675-1 transformer dielectric oil were 12 and 5 ppm, respectively (DOE 1992).

As part of a site-wide study of potential environmental releases of PCBs conducted in July 1991 (DOE 1991), soil samples were collected in accordance with approved EPA sampling protocol and analyzed for PCBs using EPA Method 8080. PCB results obtained in 1992 for the 661-1 and 675-1 transformer dielectric oil were 11 and 5 ppm, respectively (DOE 1996). Results from four soil samples collected in 1991 at 661-1 (PCB Site 12), indicated PCB concentrations ranged from 5.4 to 61 ppm. Radionuclide results from analyses at the same locations indicated activities greater than background. Plutonium-239/240 ranged from 0.5 to 22.5 pCi/g. Results from four soil samples collected in 1991 at 675-1 (PCB Site 13), indicated PCB concentrations ranged from 1.0 to 4.1 ppm. Radionuclide results from analyses collected at the same locations indicated activities greater than background. Plutonium-239/240 ranged from 1.04 to 2.71 pCi/g.

Under the approved Final PAM for Remediation of PCBs (DOE 1995), 46.3 cy of PCB-contaminated soil were excavated from PAC 600-1003, containerized, and disposed of

(DOE 1997). No concrete was removed because PCB levels on the concrete transformer pads were measured at less than 0.086 ppm using EPA Method 8080.

Verification soil samples and concrete samples were collected and screened (DOE 1997). Twenty-one soil samples were collected around 661-1. All were analyzed using immunoassay Method 4020 and five were analyzed using EPA Method 8080. Method 8080 results indicated PCB concentrations did not exceed 0.46 ppm. Nine soil samples were collected around 675-1. All were analyzed using immunoassay Method 4020 and three were analyzed using EPA Method 8080. Method 8080 results indicated PCB concentrations did not exceed 0.27 ppm. Additionally, 24 soil samples were collected east of the 661-1/675-1 substation. All were analyzed using immunoassay Method 4020 and six were analyzed using EPA Method 8080. Method 8080 results indicated PCB concentrations did not exceed 0.67 ppm. The 661/675 Substation was demolished in 1997.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site remediation and confirmation data, and the White Paper findings noted above, NFAA was recommended for PAC 600-1003 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR) (DOE 2004c).

After review of site data, including the closeout report for the source removal of PCBs (DOE 1997), and the White Paper by the regulatory agencies, DOE received approval from CDPHE (the lead agency) on the NFAA status for PAC 600-1003 on May 6, 2004 (CDPHE 2004).

Comments

The boundaries of the original PAC location were estimated. PAC 600-1003 boundaries were revised based on sampling location surveys and field reconnaissance and documented in the 2004 Annual Update to the HRR (DOE 2004a).

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: No Further Accelerated Action Justification PCB Potential Areas of Concern April 16, 2004, May, 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PACs) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-1004

IHSS Number(s):	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	600-5
Unit Name:	Central Avenue Ditch Soil Spreading

This Final Update to the HRR for PAC 600-1004 consolidates the information in the Sixth Quarterly HRR Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1004 is summarized in this update. The following HRR volumes contain PAC 600-1004 information:

Original Report – Sixth Quarterly (DOE 1994a);
Update Report – Seventh Quarterly (DOE 1994b); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

September 27, 1993

Historical Summary

On September 27, 1993, during a walk-down tour, CDPHE representatives observed the spreading of excavated soil from the Central Avenue Ditch (PACs 400-157.1, 000-172, and 000-190 [Figures 14 and 18]) into areas adjacent to the two large fuel-oil tanks located on the southwestern corner of Central Avenue and Seventh Street (PAC 600-152) (DOE 1994a). The location of PAC 600-1004 is shown on Figure 20.

A review of the operations revealed that the ditch soil was spread into IHSS 152 without proper authorization and in conflict with the April 7, 1993, Environmental Assessment for Construction Activities (Soils Disturbance Permit #TG048663) which provided specific instructions that all dirt, soil, gravel, and rock removed from any of the ditches were to remain on the bank of the ditch and in the immediate area from which they were originally removed. All material removed was to be spread and incorporated into the banks of the ditch. Although no soil and/or water samples were required for this work, radiological screening was required when working in any of the IHSSs involved in this activity (DOE 1994a).

The operation was immediately shut down due to the potential of cross-contamination from one or more IHSSs to IHSS 152. Several actions were taken to prevent a similar occurrence in the future. In general, these included briefings/training of personnel to increase awareness of proper procedures by employees working in IHSS areas (DOE 1994a).

PAC Investigations

HPGe surveys of the Central Avenue Ditch were conducted both before and after the disturbance. No radiological contamination was observed above background levels in either case (DOE 1994a).

Nine surface and subsurface soil RFCA (DOE et al. 1996) accelerated action characterization samples were collected at PAC 600-1004 in accordance with the IASAP (DOE 2001) and IASAP Addendum #IA-04-09 (DOE 2004b). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003). Plutonium-239/240 exceeded background levels in only one sample at an activity of 0.578 pCi/g, uranium-234, uranium-235, and uranium-238 were detected at maximum activities of 4.8, 0.203, and 3.736 pCi/g, respectively. PAHs were detected in a majority of samples. These compounds are associated with runoff from asphalt paved areas entering the ditch. Analytical results for the characterization are presented in the Data Summary Report for IHSS Group 600-5 (DOE 2004c).

No Further Action Recommendation

Based on analytical results and the SSRS, an NFAA determination was justified for PAC 600-1004 for the following reasons:

- Concentrations of COCs were less than RFCA WRW soil ALs.
- Migration of contamination to surface water through erosion is unlikely because this IHSS Group is not in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in PAC 600-1004.

After review of the Data Summary Report (DOE 2004c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 600-1004 on June 18, 2004 (CDPHE 2004).

Comments

This PAC was formerly identified as PAC 400-820 in the Sixth Quarterly Update to the HRR (DOE 1994a). It was re-designated as PAC 600-1004 in the Seventh Quarterly Update (DOE 1994b) to more accurately reflect its mapped location.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE; RE: Approval, Draft Data Summary Report for IHSS Group 600-5, PAC 600-1004 (June 2004), June 18.

DOE, 1994a, Sixth Quarterly Update for Historical Release Report, October 1, 1993 to January 1, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1994b, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Industrial Area Sampling and Analysis Plan Addendum #IA-04-09, Rocky flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004c, Data Summary Report for IHSS Group 600-5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 600-1005

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	600-6
Unit Name:	Former Pesticide Storage Area

This Final Update to the HRR for PAC 600-1005 consolidates the information in the Seventh Quarterly HRR Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 600-1005 is summarized in this update. The following HRR volumes contain PAC 600-1005 information:

Original Report – Seventh Quarterly (DOE 1994);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

Mid-1970s to approximately 1982

Historical Summary

PAC 600-1005 represents the former site of a shed (Building 667) that was used to store pesticides. This site was located several hundred feet north of Building 850 in the Building 881 parking lot. The location of PAC 600-1005 is shown on Figure 20. It is believed that sometime in 1982, the original pesticide shed was relocated to an area southwest of Building 371. At this new location, the building was renamed Building 367 (now designated PAC 300-702) and continued to house pesticides until 1988.

It is assumed that pesticides and herbicides were stored at the Building 667 location through at least 1978. It is possible that pesticides and/or herbicides were spilled during loading or mixing operations. In addition, it is possible that the floor of the shed at this location consisted of bare soil for a period of time, increasing the potential for residual amounts of pesticides remaining at the site. Although possible, no known rinsing of pesticide containers occurred at the shed. There has never been a documented release from activities performed at this location (DOE 1994).

A list of pesticides known to have been stored in Building 667 as of 1978 is provided in the 2003 Annual Update to the HRR (DOE 2003a).

PAC Investigations

In accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-02-01 for IHSS Group 600-6 (DOE 2001), two surface soil characterization samples were collected at PAC 600-1005 on April 8, 2002. Analytical results for herbicides and pesticides from two locations were all below the RL (and therefore all were less than the RFCA WRW soil ALs [DOE et al. 2003]). Analytical results for characterization samples for PAC 600-1005 are presented in the Data Summary Report for IHSS Group 600-6 (DOE 2003b).

No Further Action Recommendation

Based upon characterization sample results collected for PAC 600-1005 (DOE 2003b), no potential contaminant source could be identified for PAC 600-1005. All sample results were below the RLs for PCOCs. PAC 600-1005 was proposed for NFAA status in the Data Summary Report (DOE 2003b) for the following reasons:

- All contaminant concentrations were less than RFCA WRW soil ALs.
- There is no identified potential to exceed surface water standards at a POC from this IHSS Group.

DOE received approval of NFAA status for PAC 600-1005 from CDPHE (the LRA) on May 15, 2003 (CDPHE 2003).

Comments

The storage shed was relocated from the Building 881 parking lot to make room for additional parking spaces. However, the location of PAC 600-1005 did not change.

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE; RE: Final Data Summary Report for IHSS Group 600-6, May 15.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report, IHSS Group 600-6, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

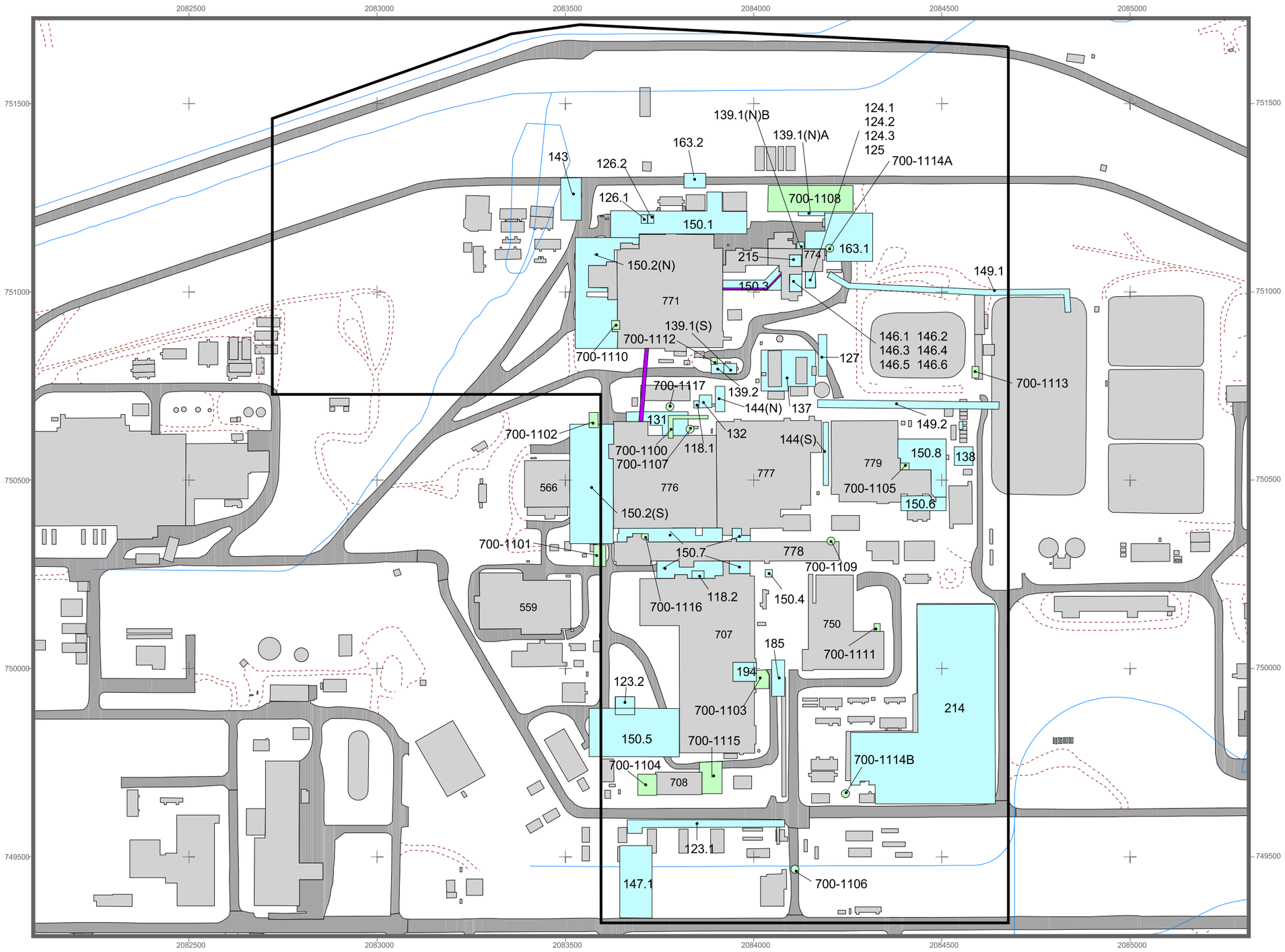

Figure 21
HRR 700 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building
- Tunnel

N
W E
S

250 0 250 Feet

Scale = 1: 4000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_700.apr

PAC REFERENCE NUMBER: 700-118.1

IHSS Number:	118.1
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Solvent Spills West of Building 730

This Final Update to the HRR for PAC 700-118.1 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 118.1 is summarized in this update. The following HRR volumes contain IHSS 118.1 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1998 Annual (DOE 1998).

Date(s) of Operation or Occurrence

Prior to 1970s to June 18, 1981

Historical Summary

IHSS 118.1 consists of the area around a 5,000-gallon underground carbon tetrachloride storage tank located adjacent to the western side of Building 730. The location of IHSS 118.1 is shown on Figure 21. This underground tank had its long axis running north-south, with the southern end exposed in a valve pit. The northern end of the tank was buried directly in soil. The base of the tank was approximately 9.1 ft below grade, and the base of the valve pit was approximately 10.25 ft below grade.

In the 1970s, tank overflows occurred during filling operations. No documentation was found that detailed the response to spills. Persons interviewed recalled a solvent spill of 100 to 200 gallons north of Building 776 prior to 1970 but did not recall any cleanup operations.

Pipes in the tank pit leaked a small amount of carbon tetrachloride in March 1976. Air samples were typically averaging 10 mg/L carbon tetrachloride; however, during the month prior to April 15, 1976, the average concentration increased to almost 2,000 mg/L. It was thought that the tank or its associated pipes in the sump released the carbon tetrachloride into the ground. In winter and spring 1976, there were efforts to stop the pipe leaks.

On June 18, 1981, the tank failed, releasing carbon tetrachloride into the sump and onto the ground surface. The tank was removed following its failure in 1981, along with a limited amount of soil. One Building 776 employee present at the time of the tank's removal recalled that it appeared sound with no obvious leaks or significant corrosion. It was unclear at the time whether the concrete containment structure was removed.

IHSS Investigations

Subsurface soil samples collected as part of the OU 9 Phase I RFI/RI investigation of OPWL Tanks T-9 and T-10 for PAC 700-132 just east of IHSS 118.1 indicated VOCs and particularly carbon tetrachloride were present with maximum concentrations at 20.0 to 22.5 ft (DOE 1995).

At this depth carbon tetrachloride was present at concentrations ranging from 720 to 250,000,000 μg/kg. Other VOCs at this depth with elevated concentrations included acetone, 1,1,2,2-tetrachloroethane, and chloroform.

A pre-RI of IHSS 118.1 was conducted in 1997 to determine the nature and extent of contamination at IHSS 118.1. Results of this investigation confirmed the presence of dense nonaqueous phase liquids (DNAPLs) in this area. Subsurface soil samples collected from 20 to 25 ft in depth indicated carbon tetrachloride was present at concentrations as high as 390,000 μg/kg. Investigation results determined that the carbon tetrachloride was a DNAPL that pooled on the bedrock below Tanks T-9 and T-10.

Based on historical knowledge and data, soil within IHSS 118.1 was not sampled as part of the IHSS Group 700-3 accelerated action characterization. Building 730 (part of IHSS 132), the tanks, and contaminated soil (including PAC 700-144[N]) were to be removed, therefore characterization was not necessary.

IHSS 118.1, along with IHSSs 132 and 144(N), was remediated through a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #04-04 (DOE 2004). The remediation was part of a major accelerated action that included the removal of Building 730, OPWL Tanks T-9 and T-10 (IHSS 132), and contaminated soil associated with IHSSs 118.1 and 144(N) that took approximately 3.5 months to complete (DOE 2005a). A large excavation was required to remove Building 730, the Tanks, and the associated free product. The maximum length of the excavation was approximately 225 ft, the maximum width was approximately 115 ft, and the depth extended well below the bedrock surface. The project started with clearing the area prior to excavation, including removing aboveground steam line stanchions, miscellaneous concrete slabs and structures, asphalt, and groundwater wells. Wells were abandoned in accordance with State Engineer's Office procedures or totally removed. The clean debris was disposed of as sanitary waste. During excavation, OPWL and sanitary lines were encountered and removed. OPWL lines were bagged, tapped and cut, then disposed of as LLW, or as LLMW if they contained lead or had been in contact with solvent-contaminated soil. The ends of the remaining lines (located along the excavation boundary at least 3 ft below final grade) were grouted. Sanitary lines were mostly disposed of as sanitary waste. Process waste lines close to Building 730, which contained radionuclide contamination, were managed as LLW, or as LLMW if they had been in contact with solvent-contaminated soil.

Approximately 1,700 cy of soil and debris were removed. Soil samples for waste management purposes were collected prior to removal at five locations from three intervals (16.5 to 18.5 ft bgs, 18.5 to 20.5 ft bgs, and 20.5 to 22.5 ft bgs). These samples were analyzed for radionuclides and VOCs. Results indicated all radionuclide activities were less than background, with one minor exception. One activity level was slightly above the background mean plus two standard deviations but significantly less than the WRW soil AL (DOE et al. 2003). All VOC concentrations at 16.5 to 18.5 ft were less than the WR soil W ALs, and only one VOC concentration at 18.5 to 20.5 ft was greater than its WRW soil AL. Various VOC concentrations at 20.5 to 22.5 ft, at all five locations, exceeded their WRW soil ALs.

Based on waste characterization data, most of the removed soil was managed as hazardous waste. Soil adjacent to the upper part of Building 730, which contained radionuclide contamination, was managed as LLW. Soil that was adjacent to the bottom of the tanks and in

contact with solvents was managed as LLMW. Soil around the Building 730 structure was removed to between 25 and 28 ft bgs. The excavation extended well below the bedrock surface.

The below-grade Building 730 was demolished in stages, with the Tanks demolished last. Gravel that had been used as backfill around the lowermost part of the structure was also removed and disposed of as LLMW. In addition, the structure's slab under the southern Tanks was broken up and removed. The portion of slab remaining in place is approximately 23 ft by 35 ft. Prior to being broken up, the entire slab was surveyed for radiological contamination. Based on the survey results, the remaining radioactivity was calculated to be 0.04 pCi/g. The total amount of plutonium remaining in the slab is estimated to be 0.0000586 g. Rubble associated with the top of the building was disposed of as sanitary waste. Rubble from the level of the Tanks was disposed of as LLW. The lowermost rubble that was potentially in contact with carbon tetrachloride was managed as LLMW.

Groundwater was encountered throughout the project and was continuously pumped out into water storage tanks along with accumulated water from precipitation. Free product, primarily carbon tetrachloride, was also pumped out of the lowermost part of the excavation, as encountered, into the storage tanks. The water portion of the tank contents was routinely trucked to Building 891 for treatment. Carbon tetrachloride in the bottom of the frac tanks was solidified with absorbent and soil, then packaged and disposed as mixed waste. Frac tanks were size reduced before disposal.

Soil was removed until no free liquids were visible. After structural components, liquids, and soil were removed, four confirmation soil samples (see below) were collected to indicate residual contaminant concentrations (DOE 2005a). Carbon tetrachloride concentrations in confirmation samples collected at depths of 25 to 28 ft bgs ranged from 38 to 5,500 µg/kg, well below the WRW soil AL of 81,500 µg/kg.

The excavation was then backfilled. Backfilling began with the placement of approximately 4 ft of gravel (630 cy), followed by a layer of HRC®, three 8-inch lifts of compacted soil, a second layer of HRC®, three additional 8-inch lifts of compacted soil, and a third and final layer of HRC®. Placement of HRC® was discussed with CDPHE (the LRA) prior to placement. The remaining excavation was then backfilled. Sources of backfill included soil from the upper 16 ft of the excavation and the Trailer 371 area. Soil from the upper 16 ft of the excavation was analyzed, and carbon tetrachloride concentrations were detected at less than 50 ppb. Approximately 4,200 pounds of HRC® were used. After backfilling, the site was graded. The site was reseeded after the removal of Buildings 776, 777, and 778 and the railroad spur to Building 776.

Confirmation sampling was performed after the accelerated action removal activities to determine residual contaminant activities and concentrations. All contaminant activities and concentrations were less than WRW soil ALs (DOE et al. 2003). Of five residual locations (18499 [23.0 ft bgs], CF46-042 [25.0-25.5 ft bgs], CF46-043 [25.0-25.5 ft bgs], CF46-044 [27.0-28.0 ft bgs], and CF46-045 [25.0-25.5 ft bgs]) only 18499 and CF46-044 had detections of americium-241 (0.065 and 3.43 pCi/g respectively) and plutonium-239/240 (0.123 and 12.7 pCi/g) that were greater than background (DOE et al. 2003). All VOCs were at least two orders of magnitude less than WRW soil ALs except for carbon tetrachloride at 5,500 µg/kg (WRW 81,500 µg/kg) at CF46-042 (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSS 118.1 based on the following

- A significant source of groundwater contamination was removed.
- Groundwater was evaluated in accordance with the Groundwater IM/IRA (DOE 2005b). Monitoring will continue under the Sitewide IMP.
- Confirmation sampling results were less than WRW soil ALs (DOE et al. 2003).
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 118.1 on April 19, 2005 (CDPHE 2005).

Comments

IHSS 118.1 includes PIC 18.

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Draft Data Summary 2, Operable Unit 9, Outside Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-04, IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005b, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-118.2

IHSS Number:	118.2
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Solvent Spills North of Building 707

This Final Update to the HRR for PAC 700-118.2 consolidates the information in the initial HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 118.2 is summarized in this update. The following HRR volume contains IHSS 118.2 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

June 1981

Historical Summary

The location of IHSS 118.2 is shown on Figure 21. IHSS 118.2 is a 20 ft by 30 ft area associated with a 5,000-gallon aboveground carbon tetrachloride tank located adjacent to the northern side of Building 707, in the alleyway between Building 707 and Building 778. In addition to carbon tetrachloride, the tank may have held various degreasing solvents, including petroleum distillates, benzene and dichloromethane paint thinner, 1,1,1-trichloroethane, and methyl ethyl ketone.

Numerous releases occurred during routine filling operations. The most significant release occurred in June 1981 when the tank ruptured and released an unknown quantity of carbon tetrachloride to the environment. The tank and the area of the spill were subsequently cleaned up. However, no documentation was found regarding sampling and analysis to verify the removal of contaminated soil.

IHSS Investigations

A soil gas survey conducted during the OU 8 RFI/RI detected carbon tetrachloride (range 5-1,000 μg/L), tetrachloroethene (range 0.14-2.7 μg/L), toluene (range 0.11-2.7 μg/L), trichloroethene (range 1.8-17 μg/L), chloroform (range 2.3-28 μg/L), benzene (range 0.05-3.7 μg/L), and chloromethane (range 0.61-1.5 μg/L) at concentrations greater than 1 μg/L (DOE 1995). In addition, americium-241 was detected above background in one surface soil sample with an activity of 0.026 pCi/g (SS810093).

Surface and subsurface soil samples were also collected from eight sampling locations within PAC 700-150.7 in the vicinity of IHSS 118.2 during the IHSS Group 700-3 accelerated action soil characterization. Sampling and analysis was conducted in accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-03-04 (DOE 2003). Based on the extensive soil gas data indicating low VOC concentrations, the samples were only analyzed for radionuclides. All activities were less than WRW soil ALs (DOE et al. 2003, DOE 2005).

No Further Action Recommendation

Historical and accelerated action data from IHSS 118.2 indicate that contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). Results of the SSRS and the stewardship evaluation indicate additional action is not necessary.

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSS 118.2 based on the following

- Analytical results were less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 118.2 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Draft Data Summary 2, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-123.1

IHSS Number:	123.1
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	Not Applicable
Unit Name:	Valve Vault 7

This Final Update to the HRR for PAC 700-123.1 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 123.1 is summarized in this update. The following HRR volumes contain IHSS 123.1 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Annual (DOE 2000a);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

April 4, 1983

Historical Summary

IHSS 123.1 is the result of leaks from Valve Vault 7 to surrounding soil. Valve Vault 7 was part of RCRA Unit 374.3 (DOE 2005a). Valve Vault 7 was located to the southwest of Building 707, adjacent to the northern side of the PA inner fence as shown on Figure 21. Valve Vault 7 controlled the 800 Area NPWL. On April 4, 1983, a check valve in Valve Vault 7 malfunctioned, allowing process wastewater to backflow into the sump. The vault filled with process wastewater and overflowed. The high-water-level alarm system in Valve Vault 7 was apparently inoperative at the time of the overflow. The process wastewater drained into an adjacent storm runoff collection system ditch near Eighth Street and Sage Avenue and flowed east toward South Walnut Creek and the B-Series Ponds (PACs NE-142.5 -142.9). Runoff was observed flowing across the former 750 parking lot and through the normal Building 991 runoff drainage (DOE 1992).

The release consisted of process wastewater from the 800 and 400 Areas which typically contained uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride (DOE 1992).

The transfer of liquid waste from the holding tanks at Building 881 was discontinued after personnel verified that wastewater was flowing out of Valve Vault 7. Temporary dikes were constructed to contain the overflow. A dam was constructed in the ditch east of the guard shack at Portal 1 and another dam was placed just west of Guard Shack 762. Drainage from the area was diverted to Pond B-1. Attempts were made to remove oil by using chemical absorbent bats. Environmental samples were collected from the vault. Water was pumped out of the vault and

the containment dikes and transferred to Waste Processing by tanker truck. Snowmelt water was retained in the ditch for several days and later transferred to Process Waste Storage (DOE 1992).

The malfunctioning check valve was replaced, the sump pump was replaced, and repair of the electrical system was initiated. A new type of check valve was ordered for all the check valves in the waste transfer system. The ditch along Sage Avenue between Valve Vault 7 and Ninth Street was cleaned of all visible contamination. The excavated material was stored for drying in the Building 771 parking lot (DOE 1992).

The runoff diversion activities were partially successful. Oil from the spill was visible in Pond B-1. A small amount of oil was observed in Pond B-4 and Pond B-5. All visible contamination was excavated from the ditch along Ninth Street (DOE 1992). No documentation was found that detailed the complete removal of release constituents from the site. Analysis of water samples from Pond B-1 and Pond B-4 one week following the incident indicated normal pH, and no concentrations of oil, nitrate, or radioactivity. Evaluation of data for Pond B-5, the only pond that discharged offsite during that period, did not indicate material from the spill. Valve Vault 7 was removed (2005b).

IHSS Investigations

As part of the Phase I RFI/RI Work Plan for OU 8 (DOE 1995a), IHSS 123.1 was sampled at seven locations for metals, radionuclides, VOCs, and SVOCs. Validated data from these locations were compared to PRGs and background concentrations (if applicable) in use at the time. Only benzo(a)pyrene at two locations, ranging from 93 to 160 µg/kg, exceeded the background and/or PRG (87.7 µg/kg) in use in 1995. Thus sampling indicated that no current or potential source exists. The data were originally reported in Draft Data Summary 2, OU 8, 700 Area, Table 3-7 (DOE 1995b) and were also reported in the 2000 HRR (DOE 2000a) and 2000 Interim Update (DOE 2000b).

No Further Action Recommendation

Evaluation of IHSS 123.1 for NFA status is based on data presented in the Draft Data Summary 2 for OU 8 (DOE 1995b). All analyses were below subsequently established RFCA Tier II soil ALs (DOE et al. 1996) and at or below established background levels for radionuclides (DOE 2004). No current or potential source of contamination was identified. IHSS 123.1 was proposed for NFA in the 1997 Annual Update to the HRR (DOE 1997). The recommendation for NFA at this site was consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996).

In a letter dated July 9, 1999 (CDPHE and EPA 1999), regarding the 1997 NFA proposal, CDPHE and EPA requested additional information regarding IHSS 123.1 because the reference in the 1997 HRR to Data Summary 2, OU 8 (DOE 1995b) was inaccurate. The 1995 data were provided to the agencies in the HRR (Interim Update) (DOE 2000b) and IHSS 123.1 was again submitted for NFA approval in the 2000 Annual Update (DOE 2000a). CDPHE (the LRA) reviewed the 1995 data and granted NFA status to IHSS 123.1 in a letter dated October 2, 2001 (CDPHE 2001). The IHSS was reviewed at the NFA Status Meeting of October 24, 2001 and final NFA status was conferred at the NFA Status Meeting of November 14, 2001. A letter dated February 14, 2002, published in the 2002 Annual Update to the HRR (DOE 2002), documented the CDPHE and EPA approval (CDPHE and EPA 2002).

Comments

None

References

CDPHE, 2001, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report, September 2000, October 2.

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE-RFFO, from S.H. Gunderson, CDPHE and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1997), Rocky Flats Environmental Technology Site, Golden, Colorado, July 9.

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Final Phase I RFI/RI Work Plan, 700 Area, Operable Unit No. 8, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 1995b, Draft Data Summary 2, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Annual Update Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000b, Historical Release Report (Interim Update), Response to Comments for HRR Annual Updates (1997, 1998 & 1999), Kaiser-Hill Company, L.L.C., Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2001, Annual Update Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Industrial Area and Buffer Zone Sampling and Analysis Plan, Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Summary Report for Closure of RCRA Unit 374.3, The 700-800 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005b, Closeout Report for IHSS Group 000-4, New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 700-123.2

IHSS Number:	123.2
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	000-2
Unit Name:	Valve Pit West of Building 707

This Final Update to the HRR for PAC 700-123.2 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. IHSS 123.2 overlapped with PAC 700-150.5. IHSS 150.5 was proposed in the 1998 HRR Update (DOE 1998) for NFA because IHSS 123.2 is the actual contamination site. IHSS 150.5 was accepted for NFA in 1999 and was removed from maps (CDPHE 1999).

The disposition of IHSS 123.2 is summarized in this update. The following HRR volume contains IHSS 123.2 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1953 to 1984

Historical Summary

IHSS 123.2 was the result of documented leaks in the area west of Building 707 related to the overflow of an OPWL valve pit. The location of IHSS 123.2 is shown on Figure 21. The OPWL valve pit west of Building 707 was supposed to have been removed in March 1973 (DOE 1992); however, the Addendum to the OU 9 Field Sampling Plan states that the vault, with no pipeline connections, was inspected as late as 1994 (DOE 1994). Two OPWL pipelines, P-14 and P-15, connected to the vault. P-14 was constructed in 1952 and abandoned in 1968 because of the construction of Building 707. P-15 was its replacement, installed in 1968 and abandoned in 1984 (DOE 1994). Removal of the upper part and grouting of the remaining OPWL valve pit was confirmed in 2005 (DOE 2005). P-15 was also grouted in this area, P-14 was not present (DOE 2005).

OPWL lines west of Building 707 contained and may have leaked process wastewater from Building 123 and the 800 and 400 Areas. The wastewater may have contained acids, bases, solvents, radionuclides, metals, and other wastes including oils, cleaning compounds, ethylene glycol, fluoride, trace PCBs, and ammonium thiocyanate (DOE 1994).

In December 1958, a leak occurred at a process waste line elbow in the valve vault. Process waste followed the containment pipe and flowed into a ditch northeast of Building 707. Up to 1,350 gallons of process waste were released at the time of this occurrence (DOE 1994). The waste associated with this release contained 0.51 ppm of enriched uranium and 120 ppm of nitrate. A soil sample collected just south of Building 777 (near the ditch at the northeastern end of the suspected P-14 location) had a plutonium activity of 0.485 dpm (DOE 1994). No documentation was found that further details response to this occurrence. The elbow was

repaired and the line remained in use for another 10 years. Other leaks occurred because of joint expansion following the introduction of steam condensate from Building 881 (DOE 1994). In March 1973, this valve vault was replaced.

IHSS Investigations

The OPWL valve pit associated with IHSS 123.2 was removed (DOE 2005). OPWL P-14, which was reported connected to this manhole, was not found. OPWL P-15 was grouted and left in place. Characterization samples were collected in accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-03-11 (DOE 2003) at IHSS 123.2 and along the suspected location of P-14 as reported in the Closeout Report for IHSS Group 000-2 OPWL (DOE 2005). One sample was collected in the IHSS and one adjacent to the IHSS along the suspected P-14 location. Detected analytes greater than background included: uranium-234 (range 3.284-3.669 pCi/g), uranium-235 (range 0.196-0.254 pCi/g), uranium-238 (range 1.997-3.669 pCi/g), barium (range 1,210-989 mg/kg), strontium (217.0 mg/kg), and several SVOCs (all at least one order of magnitude less than WRW soil ALs). All concentrations and activities were well below RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

IHSS 123.2 was proposed for NFAA because of the following:

- All radionuclide, SVOCs, and metal activities and concentrations were less than RFCA WRW soil ALs.
- The SSRS indicated that soil removal was not necessary because the area was not subject to erosion.
- The stewardship evaluation indicated soil removal was not necessary because monitoring data did not indicate groundwater or surface water impacts from IHSS 123.2.

After review of the Closeout Report for IHSS Group 000-2 (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 123.2 on October 6, 2005.

Comments

IHSS 123.2 overlapped with PAC 700-150.5. IHSS 150.5 was proposed in the 1998 HRR Update (DOE 1998) for NFA because IHSS 123.2 is the actual contamination site. IHSS 150.5 was accepted for NFA in 1999 and was removed from maps (CDPHE 1999).

References

CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report (September 1998), July 9.

CDPHE, 2005, Correspondence to J. Rampe, DOE RFFO from D. Kruchek, CDPHE, RE: Closeout Report for IHSS Group 000-2, Original Process waste Lines (OPWL) – NFAA Approval, October 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Draft Final Technical Memorandum No. 1, Volume II - Pipelines, Addendum to Phase I RFI/RI Work Plan, Field Sampling Plan, Original Process Waste Lines, (Operable Unit No. 9), Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-124.1, 700-124.2, 700-124.3

IHSS Numbers:	124.1, 124.2, and 124.3
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	700-4
Unit Name:	124.1 – 30,000-Gallon Tank (Tank 68) 124.2 – 14,000-Gallon Tank (Tank 66) 124.3 – 14,000-Gallon Tank (Tank 67)

This Final Update to the HRR for PACs 700-124.1, 700-124.2, and 700-124.3 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 124.1 through 124.3 is summarized in this update. The following HRR volumes contain information relevant to IHSSs 124.1 through 124.3:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 1989 and specifically July 1981

Historical Summary

IHSSs 124.1, 124.2, and 124.3 consisted of three underground tanks on the southeastern side of Building 774. The location of IHSSs 124.1, 124.2, and 124.3 is shown on Figure 21. In addition to the IHSS designation used here, each tank had a number used within the building and an OPWL number. IHSS 124.1 consisted of Tank 68, also called OPWL Tank T-14. It was a 30,000-gallon tank, was constructed in late 1958, and was the southernmost of the three tanks (DOE 1992).

IHSSs 124.2 and 124.3 were identical, twinned 14,000-gallon tanks that shared a common internal wall. They were referred to as Building 774 Tanks 66 and 67 and OPWL Tanks T-16S (south) and T-16N (north) and appear on an engineering drawing dated 1953. They were separate from and located 2 ft north of Tank 68. Because the top of Tanks 66 and 67 was at ground level, a shed was constructed above them with bay doors facing east and west. Access to the tanks was possible through the floor of the shed (DOE 1992).

All three tanks were constructed of reinforced concrete with walls approximately 10 inches thick. The tanks are shown on Plant Drawing 1-5392-74 as located east of Building 774. The IAG (CDPHE et al. 1991) also described a “holding tank” that was subsequently identified as IHSS 700-125 in the HRR (DOE 1992). IHSS 125 is equivalent to IHSS 124.2 (Tank 66); therefore, discussion of IHSS 124.2 in this write-up also addresses IHSS 125. Accordingly, the write-up for PAC 700-125 references this discussion.

The main function of Tanks 66 and 67 was to receive treated liquid decanted from the second-stage batch precipitation process in Building 774. According to personnel interviewed for the

development of the RCRA Tank Closure Plan (Rockwell 1989), the tank floors were cleaned, sandblasted, and coated with eight coats of Amercoat No. 55 in 1956. Details regarding the processes that created the waste destined for the tanks are provided in the RCRA Tank Closure Plan. The tanks were taken out of service in September 1989 because they did not meet the requirements for permitting (DOE 1992).

In July 1981, Tank 66 overflowed, spilling an estimated 500 gallons of liquid waste. A second source states that during the week ending July 17, 1981, approximately 3,300 gallons of process wastewater overflowed a tank in Building 774 and approximately 50 gallons ran onto the asphalt driveway. Another source states that this spill involved between 50 and 100 gallons of liquid that contaminated the ground east of Building 774. The area east of Building 774 was paved following the overflow of Tank 66 in 1981. The contamination may not have been removed prior to paving (DOE 1992).

The released process wastewater was high in nitrate and contaminated with approximately 40,000 dpm/L plutonium. Another source states that the liquid released in the overflow incident was high in nitrate, contained plutonium and uranium, and measured approximately 30,000 dpm/L. An analytical report of the process wastewater released from the July 1981 Tank 66 spill indicated total alpha activity at 7.8×10^4 pCi/L, total beta activity at 4.6×10^4 pCi/L, nitrate at 5.6×10^3 mg/L, and a pH of 12 (DOE 1992).

Tanks 66, 67, and 68 were addressed in the Accelerated Action Plan for IAG Underground Storage Tanks Containing RCRA-Regulated Materials (DOE 1995) and the Final PAM for the Contaminant Stabilization of Underground Storage Tanks (DOE 1996b), both of which are documents that specifically address the accelerated removal action and stabilization of potential contaminants in seven IAG underground tank systems. In accordance with the Accelerated Action Plan and PAM, the contents of these tanks were removed, the tanks were multi-rinsed, and an inert material (polyurethane foam) was used to stabilize any remaining contamination (DOE 1996c).

Removal of Tanks 66, 67, and 68 (foamed) was initiated in October 2003 in accordance with the Building 771 Closure Project Decommissioning Operation Plan (DOP) (DOE 2003).

IHSS Investigations

The nature and extent of contamination was characterized through a RFCA (DOE et al. 1996) accelerated action carried out in accordance with IASAP Addendum #IA-03-01 for IHSS Group 700-4 (DOE 2002), which includes IHSSs 124.1, 124.2, and 124.3 (Tanks 66, 67, and 68). Soil characterization samples were collected and analyzed after the Tanks were removed. Analytical results indicated americium-241 activities ranged from 168.9 pCi/g to 6.115 nCi/g and plutonium-239/240 activities ranged from 1,367 pCi/g to 49.4 nCi/g in subsurface soil beneath Tanks 66 and 67. Analytical results from soil beneath Tank 68 indicated that all concentrations and activities were less than RLs except for molybdenum and silver which were less than background values. Notification of the intent to remove soil under Tanks 66 and 67 is documented in an RCR dated October 28, 2003.

Subsequently approximately 2,112 ft^3 of soil and fill were removed from beneath Tanks 66 and 67 in November 2003. Confirmation samples were collected at six locations and indicated americium-241 activities ranged from 6.57 to 226 pCi/g and plutonium-239/240 activities ranged from 5.68 to 179.38 pCi/g. The combined activities at all locations were less than WRW soil

ALs (DOE et al. 2003) within 3 ft of the surface and less than 1 nCi/g at approximately 4 ft in depth. The excavation was backfilled (RCR dated November 26, 2003). Characterization and confirmation sampling results are described in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b).

No Further Action Recommendation

NFAA was recommended for IHSSs 124.1, 124.2, and 124.3 based on the following:

- Radionuclide-contaminated soil was removed from the IHSSs.
- Confirmation sampling results indicated that residual activities in subsurface soil were less than RFCA WRW soil ALs within 3 ft of the surface and less than 1 nCi/g at a depth greater than 3 ft.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary. The area is not susceptible to high erosion.

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSSs 124.1, 124.2, and 124.3 (Tanks 68, 66, and 67, respectively) on February 6, 2004 (CDPHE 2004).

Comments

The IAG (CDPHE et al. 1991) described a “holding tank” that was subsequently identified as IHSS 700-125 in the HRR (DOE 1992). IHSS 125 is equivalent to IHSS 124.2 (Tank 66); therefore, discussion of IHSS 124.2 in this write-up also addresses IHSS 125. Accordingly, the write-up for PAC 125 references this discussion.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774) - Approval, Rocky Flats Environmental Technology Site, Golden, Colorado, February 6.

CDPHE, DOE, and EPA, 1991, Rocky Flats Interagency Agreement, Rocky Flats Plant, Golden, Colorado, January 22.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1995, Accelerated Action Plan for Interagency Agreement Underground Storage Tanks Containing RCRA-Regulated Materials, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Final Proposed Action Memorandum for the Contaminant Stabilization of Underground Storage Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1996c, Completion Report for the Underground Storage Tanks Source Removal Project, Volume 1, Rocky Mountain Remediation Services, LLC, Environmental Restoration, Rocky Flats Environmental Technology Site, September 23.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003, 771 Closure Project Decommissioning Operation Plan, Modification 5, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004a, Annual Update, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-125

IHSS Number:	125
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	700-4
Unit Name:	Holding Tank (Tank 66)

PAC 700-125 was originally defined in the IAG as a "holding tank" (CDPHE et al. 1991). Subsequent research indicated that was the same as PAC 700-124.2, Tank 66 (OPWL Tank T-16N [north]) (DOE et al. 1996).

Therefore, IHSS 125 is addressed as part of the discussion for PACs 700-124.1 through 700-124.3.

References

CDPHE, DOE, and EPA, 1991, Rocky Flats Interagency Agreement, Rocky Flats Plant, Golden, Colorado, January 22.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBERS: 700-126.1 AND 700-126.2

IHSS Numbers:	126.1 and 126.2
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	700-4
Unit Name:	126.1 – Westernmost Out-of-Service Process Waste Tank 126.2 – Easternmost Out-of-Service Process Waste Tank

This Final Update to the HRR for PAC 700-126.1 and PAC 700-126.2 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 126.1 and 126.2 is summarized in this update. The following HRR volumes contain information relevant to IHSSs 126.1 and 126.2:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Approximately 1953 to 1984 (period of operation of the process waste tanks)

Historical Summary

IHSSs 126.1 and 126.2 consist of two out-of-service process waste tanks housed below grade in Building 728. Building 728 referred to the combined tanks as Tank 8. The locations for PACs 700-126.1 and 700-126.2 are shown on Figure 21. The tanks were built in 1952 and each had an operating capacity of approximately 20,000 gallons and a maximum design capacity of 25,000 gallons. The tanks stored laundry water from the Building 771 laundry facility, which ceased operations in the late 1950s. After being taken out of service in 1984, the tanks were converted to contain fire suppression deluge overflow for Building 771 plenums. The tanks leaked, allowing groundwater to periodically flow into the tanks; the groundwater was then pumped into the process waste system (DOE 1992). The tanks overflowed several times during use.

Each of the two out-of-service process waste tanks was constructed of reinforced concrete. The combined exterior tank dimensions were 33 ft 6 inches (east-west) by 23 ft 5 inches (north-south) and they were 11 ft 8 inches high. The ceiling and wall thicknesses were 10 inches and the floor thickness was 1 ft. The tanks shared the inner wall. The bottom elevation of the tanks' interior was at 5,931 ft. The tanks were designed with a minimum cover of 3 ft of fill except for the area overlain by the building. The original design indicated two pipes entered each tank from the south, OPWL P-24 and P-22 (PAC 000-121). The invert elevations of the pipes where they entered the tanks were 5,939 and 5,938 ft. The volume of material that could have remained in the tanks below the level of the outlet pipes is unclear from the design drawings (DOE 1992).

The pump house (Building 728) was a concrete structure situated directly above the tanks with dimensions of 14 ft 10 inches (east-west) by 7 ft 10 inches (north-south) and was 7 ft 6 inches

high. The southern wall of the pump house was above the southern wall of the tanks. It contained the manholes for access into the tanks and one sump pump for each tank, as well as one sampling point into each tank. The pump house was partially underground, and thus did not appear as large as its dimensions indicate (DOE 1992).

The liquid process wastes stored in the tanks likely contained nitrate, plutonium, uranium, and various other organic and inorganic constituents.

IHSS Investigations

A RFCA (DOE et al. 1996) accelerated action was carried out in accordance with IASAP Addendum #IA-03-01 for IHSS Group 700-4 (DOE 2002). Two soil characterization samples (locations CE49-000 and CF49-007) targeting IHSSs 126.1 and 126.2 were collected as part of accelerated action activities for IHSS Group 700-4 in Fall 2003. Samples were analyzed for radionuclides, metals, and nitrate. Results indicated barium (598.0 and 613.0 mg/kg), chromium (54.2 mg/kg), copper (134.0 and 240.0 mg/kg), iron (25,800.0 mg/kg), lead (63.9 mg/kg), manganese (407.0 mg/kg), nickel (35.0 mg/kg), strontium (215.0 mg/kg), vanadium (102.0 and 142.0 mg/kg), zinc (431.0 mg/kg), and uranium-234 (3.201 and 4.204 pCi/g), uranium-235 (0.404 pCi/g), and uranium-238 (3.201 and 4.204 pCi/g) were detected at concentrations greater than background but less than WRW soil ALs (DOE et al. 2003). Analytical results from the characterization are presented in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b).

Building 728, and Tank 8 were removed as part of the Building 771 Closure Project (DOE 2005a). The P-22 OPWL that terminated in Building 728 was foamed and grouted from the Building 728 excavation to a refusal penetration of 10 ft. The P-24 OPWL was foamed and grouted to a refusal penetration of 35 ft. The P-23 OPWL was grouted to a refusal penetration of 50 ft in the inner pipe and 30 ft in the outer pipe (DOE 2005a, b).

No Further Action Recommendation

Based on analytical results and the SSRS, an NFAA determination was justified for IHSSs 126.1 and 126.2 as presented in the ER Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) because of the following:

- Analyte concentrations and activities were less than WRW soil ALs.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary because erosion of soil at this location was not likely to affect surface water.

After review of the ER Notification and Closeout Report for IHSS Group 700-4 by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSSs 126.1 and 126.2 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774) - Approval, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005a Decommissioning and Closeout Report, 771 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005b, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-127

IHSS Number:	127
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	000-2
Unit Name:	Low-Level Radioactive Waste Leak

This Final Update to the HRR for PAC 700-127 consolidates the information in the initial HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 127 is summarized in this update. The following HRR volume contains IHSS 127 information:

Original Report – 1992 (DOE 1992).

Dates(s) of Operation or Occurrence

October 1957 to 1971

Historical Summary

IHSS 127, an area in which low-level radioactive waste leaked from OPWL, is north of Tank 207 as shown on Figure 21. The location of IHSS 127 as defined in the IAG (CDPHE et al. 1991) did not correspond with the location of any process waste lines on RFETS utility drawings. The HRR (DOE 1992) indicates the location of the process waste line between Building 774 and Building 995 is approximately 70 ft west of the previously identified IAG location. It was proposed that the location of IHSS 127 be redefined to coincide with the location of the process waste line discussed as PAC 700-127 (OPWL P-28) (DOE 2005).

Persons interviewed for the CEARP recalled construction activities near Building 774 and west of Pond 207-C that resulted in breaking a low-level radioactive waste discharge line several times. This line carried liquids from the process waste treatment facility (Building 774) to the sanitary wastewater treatment plant (Building 995) (DOE 2005).

On October 14, 1957, a line that carried process waste between Building 774 and a 200,000-gallon waste holding tank (Tank 207) leaked at a joint. It was determined that the joint had not been properly packed during construction. The joint was repaired and the excavation backfilled by November 5, 1957. Another leak was detected in 1971 when the waste line between Building 774 and Building 995 was pressure-tested. The liquid waste that flowed from Building 774 to Building 995 was high in nitrate and had small amounts of plutonium. In April 1982, the leaking section of line was replaced (DOE 2005).

A soil sample collected in 1976 from a depth of 4 ft beside the leak area, north of Tank 207 and south of Building 774, was analyzed and found to contain 76 mg/kg ("76 ppm" in original source) nitrate and 1.83 dpm/g plutonium (DOE 1992).

IHSS Investigations

IHSS 127 and P-28 were investigated as part of the IHSS Group 000-2 RFCA (DOE et al. 1996) accelerated action activities, which were planned and executed in accordance with IASAP

Addendum #IA-03-11 (DOE 2003a) and ER RSOP Notification #03-14 (DOE 2003b). Three subsurface samples were collected in IHSS 127 and several more were collected in the immediate vicinity as part of the IHSS Group 000-2, 700-3, 700-4, and 700-7 ER projects. In total, 67 locations were sampled in the Tank 207 area, including 56 characterization locations and 11 confirmation locations. Detections of radionuclides at activities greater than RFCA WRW soil ALs (DOE et al. 2003) were reported in soil samples at one sampling location (DOE 2005).

Americium-241 was reported at an activity of 388 pCi/g (WRW soil AL is 76 pCi/g) and plutonium-239/240 was reported at 99.3 pCi/g (DOE 2005) at sampling location CH47-044. All other analyte concentrations and activities were less than WRW soil ALs.

As part of the Tank 207 remediation, two excavations of radionuclide-contaminated surface soil and subsurface soil from the valve vault and manway area north of the tank were conducted. The northern most excavation was approximately 7 ft by 9 ft and 1 ft deep. The largest excavation in the Tank 207 area was completed directly north of the former tank. The excavation in this area was approximately 37 ft by 58 ft and 4.5 ft deep. Results of confirmation samples indicate that both areas were successfully remediated (DOE 2005).

The P-28 OPWL extended north from Tank 207. P-28 was completely filled with grout from the Tank 207 excavation north to the grout plug approximately 60 ft south of Tanks 14 and 16 (PACs 700-124.1, 124.2, and 124.3). The P-29 OPWL that was thought to extend north from Tank 207 was not found (DOE 2005).

No Further Action Recommendation

As a result of the accelerated actions performed, an NFAA was justified for IHSS 127 in the Closeout Report for IHSS Group 000-2 (DOE 2005) based on the following:

- The potential sources of contamination in IHSS 127 at concentrations greater than RFCA WRW soil ALs were removed.
- Residual contaminant concentrations are below RFCA WRW soil ALs.
- Tank 207 was removed, eliminating this area as a potential source of future contaminant releases.
- P-28 was grouted, further eliminating potential future releases of contamination.
- In accordance with the SSRS, subsurface soil in the area is not subject to significant erosion.
- All RFCA Attachment 14 criteria were met.

After review of the Closeout Report for IHSS Group 000-2 (DOE 2005) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for IHSS 127 on October 6, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFFO from D. Kruchek, CDPHE, RE: Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL) –NFAA Approval, October 6.

CDPHE, DOE, and EPA, 1991, Rocky Flats Interagency Agreement, Rocky Flats Plant, Golden, Colorado, January 22.

DOE, 1990, First Draft Phase I RFI/RI Work Plan Operable Unit No. 5, Rocky Flats Plant, Golden. Colorado, July 23.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, FY03 ER RSOP Notification #03-14 for IHSS Group 000-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-131

IHSS Number: 131

Current Operable Unit: IA

Former Operable Unit: 14

IHSS Group: 700-3

Unit Name: Radioactive Site 700 Area No. 1

This Final Update to the HRR for PAC 700-131 consolidates the information in the initial HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 131 is summarized in this update. The following HRR volume contains IHSS 131 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

June 1964 and May 1969

Historical Summary

IHSS 131 lies north of Building 776, the location is shown on Figure 21. In June 1964, an explosion in Building 776 resulted in the release of plutonium. One account claimed that an area approximately 1,500 ft^2 adjacent to the Building 776 gas-bottle dock was affected (western end of the northern side of Building 776). Radiological surveys showed activities exceeding 300,000 dpm/100 cm^2. A later account claimed that an area of approximately 40 ft^2 north of Building 776 was affected. Soil from the area with the highest counts was removed, a seal coat of oil was applied, and approximately 2 inches of gravel were added (DOE 1992).

Approximately 2,000 ft^2 on the western end of the northern side of Building 776 was affected by the release of plutonium as a result of firefighting activities during the 1969 fire in Building 776. Radiological surveys detected plutonium contamination along three northern exterior walls of Building 776. Plutonium was tracked out of Door 17 (center of northern side of Building 776) by the firefighters during the blaze. To reduce mobility of the contaminated soil, the area around Door 17 was paved twice with asphalt. In fall 1971, the asphalt was removed and placed in barrels. New asphalt was later placed in the area of Door 17 (DOE 1992).

IHSS Investigations

HPGe surveys conducted during the OU 14 Phase I RFI/RI did not indicate elevated activities of radionuclides. NaI surveys indicated radionuclides exceeded background in the northwestern corner, and south-central and north-central portions of the IHSS. Twenty-one surface soil samples collected as part of the OU 14 RFI/RI indicated radionuclides, metals, and SVOCs exceeded background values or MDLs. However, all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 1995, 2005).

Surface and subsurface samples were also collected from 10 sampling locations within IHSS 131 as part of RFCA (DOE et al. 1996) IHSS Group 700-3 accelerated action soil characterization. Sampling and analysis was conducted in accordance with IASAP Addendum #IA-03-04

(DOE 2003). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Contaminant activities and concentrations were less than WRW soil ALs, with the following five exceptions in subsurface soil (DOE 2005):

- Benzo(a)pyrene concentrations in subsurface soil at sampling location CF46-021 (5,200 µg/kg at 2.5 - 4.5 ft and 5,200 µg/kg at 4.5 - 6.5 ft) exceeded the WRW soil AL of 3,490 µg/kg.
- The arsenic concentration in subsurface soil (4.5 - 6.5 ft) at sampling location CF46-025 was 38 mg/kg, exceeding the WRW soil AL of 22.2 mg/kg.
- The arsenic concentration in subsurface soil (4.5 - 6.5 ft) at sampling location CF46-027 was 44 mg/kg, exceeding the WRW soil AL of 22.2 mg/kg.
- The chromium concentration in subsurface soil (4.5 - 6.5 ft) at sampling location CF46-027 was 11,000 mg/kg, exceeding the WRW soil AL of 268 mg/kg. Additional sampling was conducted during the Building 776/777 demolition and chromium was not detected at concentrations greater than RFCA WRW soil ALs. It was determined that this was a small, isolated occurrence and remediation was not necessary.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSS 131 based on the following

- Historical and accelerated action data indicated that residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with five exceptions in subsurface soil.
- Results of the SSRS did not indicate additional action was necessary. Elevated concentrations are located at least 4.5 ft bgs, and the area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 131 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Draft OU 14 Data Summary No.1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-132

IHSS Number:	132
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	700-3
Unit Name:	Radioactive Site 700 Area, Site No. 4 (Tanks T-9 and T-10)

This Final Update to the HRR for PAC 700-132 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 132 is summarized in this update. The following HRR volumes contain IHSS 132 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 1997 (DOE 1997).

Date(s) of Operation or Occurrence

1955 to 1984

Historical Summary

IHSS 132 consists of the area around OPWL Tanks T-9 and T-10 and Building 730 that housed the tanks. Tanks T-9 and T-10 (also known as Tanks 776A/776C and 776B/776D) were located in the 700 Area beneath Building 730, which was referred to as the Building 776 Process Waste Pit. These tanks were approximately 50 ft north of Building 776 and approximately 30 ft east of Building 701, and were designated as IHSS 132. The location of IHSS 132 is shown on Figure 21. Tank T-9 consisted of one 22,500-gallon underground concrete tank and one 4,500-gallon concrete UST. Tank T-10 consisted of one 22,500-gallon concrete underground tank and one 4,500-gallon concrete UST. The T-9 tanks were installed in 1955 and were taken out of service in October 1984, at which time both chambers were cleaned, painted, and converted to plenum deluge catch tanks. These tanks originally received laundry waste from Building 778. The T-10 tanks were installed in 1955 and were abandoned in December 1982; however, these tanks reportedly were not cleaned when abandoned. Tank T-10 received waste streams from Building 776, Production Support, and Building 778, the Laundry (DOE 2005a).

Waste streams for both sets of tanks included radionuclides, solvents, metals, and limited amounts of machinery and lubricating oils. Documented releases from Tanks T-9 and T-10 were not found; however, releases from the tanks were considered likely because of their condition. Furthermore, numerous releases were documented from a previously removed UST adjacent to Building 730 that contained solvents including carbon tetrachloride and possibly tetrachloroethene (DOE 2005a). This tank was reportedly located approximately 9.0 to 10.0 ft below grade (refer to PAC 700-118.1).

IHSS Investigations

Historical soil data below are presented in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005a).

The area was investigated as part of the OU 8 (700 Area) and OU 9 (Outside Tanks) Phase I RFI/RIs (DOE 1995a, 1995b). HPGe surveys conducted during the OU 9 Phase I RFI/RI indicated that americium-241 and plutonium-239/240 activities exceeded background. One NaI location registered levels of 1,687 cpm with background of 1,595 cpm. Activities of americium-241 and plutonium-239/240 were above background at various depths at all borehole locations. Various metals were detected at boreholes around the tanks at concentrations greater than background.

Soil samples were collected around Tanks T-9 and T-10 (IHSS 132) just east of IHSS 118.1. Subsurface soil sampling results indicated VOCs and particularly carbon tetrachloride was present in subsurface soil with maximum concentrations from 20.0 to 22.5 ft in depth. At this depth carbon tetrachloride was present at concentrations ranging from 720 to 250,000,000 µg/kg. Other VOCs at this depth with elevated concentrations include acetone, 1,1,2,2-tetrachloroethane, and chloroform.

A pre-RI of IHSS 118.1 was conducted in 1997 to determine the nature and extent of contamination at IHSS 118.1. Results of this investigation confirmed the presence of DNAPLs in this area. Subsurface soil samples collected from 20 to 25 ft in depth indicated carbon tetrachloride was present at concentrations as high as 390,000 µg/kg. Investigation results determined that the carbon tetrachloride was a DNAPL that pooled on the bedrock below the Tanks T-9 and T-10.

Sample results from liquid inside both tanks at Tank T-9 indicated positive activity for all radionuclides analyzed except for radium-226 (DOE 1995b). Sample results from liquid inside one of the Tank T-10 tanks indicated positive activity for all radionuclides tested for and elevated concentrations of calcium, copper, lithium, manganese, nickel, strontium, and zinc. Sample results from the other Tank T-10 tank indicated activity for all radionuclides analyzed for except radium-226 and gross alpha and elevated concentrations of lithium and zinc.

Based on historical knowledge and data, soil around Tanks T-9 and T-10 (IHSS 132) was not sampled as part of the IHSS Group 700-3 accelerated action characterization. Building 730, the tanks, and contaminated soil from IHSSs 118.1 and 700-144(N) were to be removed, therefore characterization was not necessary.

IHSS 132, along with IHSSs 118.1 and 144(N), was remediated through a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #04-04 (DOE 2004). The remediation was part of a major accelerated action that included the removal of Building 730, OPWL Tanks T-9 and T-10 (IHSS 132), and contaminated soil associated with IHSSs 118.1 and 144(N) that took approximately 3.5 months to complete (DOE 2005a). A large excavation was required to remove Building 730, the Tanks, and the associated free product. The maximum length of the excavation was approximately 225 ft, the maximum width was approximately 115 ft, and the depth extended well below the bedrock surface. The project started with clearing the area prior to excavation, including removing aboveground steam line stanchions, miscellaneous concrete slabs and structures, asphalt, and groundwater wells. Wells were abandoned in accordance with State Engineer's Office procedures or totally removed. The clean

debris was disposed of as sanitary waste. During excavation, OPWL and sanitary lines were encountered and removed. OPWL lines were bagged, tapped and cut, then disposed of as LLW, or as LLMW if they contained lead or had been in contact with solvent-contaminated soil. The ends of the remaining lines (located along the excavation boundary at least 3 ft below final grade) were grouted. Sanitary lines were mostly disposed of as sanitary waste. Process waste lines close to Building 730, which contained radionuclide contamination, were managed as LLW, or as LLMW if they had been in contact with solvent-contaminated soil.

Approximately 1,700 cy of soil and debris were removed. Soil samples for waste management purposes were collected prior to removal at five locations from three intervals (16.5 to 18.5 ft bgs, 18.5 to 20.5 ft bgs, and 20.5 to 22.5 ft bgs). These samples were analyzed for radionuclides and VOCs. Results indicated all radionuclide activities were less than background with one minor exception. One activity level was slightly greater than the background mean plus two standard deviations but significantly less than the WRW soil AL (DOE et al. 2003). All VOC concentrations at 16.5 to 18.5 ft were less than the WRW soil ALs, and only one VOC concentration at 18.5 to 20.5 ft was greater than its WRW soil AL. Various VOC concentrations at 20.5 to 22.5 ft, at all five locations, exceeded their WRW soil ALs.

Based on waste characterization data, most of the removed soil was managed as hazardous waste. Soil adjacent to the upper part of Building 730, which contained radionuclide contamination, was managed as LLW. Soil that was adjacent to the bottom of the tanks and in contact with solvents was managed as LLMW. Soil around the Building 730 structure was removed to between 25 and 28 ft bgs. The excavation extended well below the bedrock surface.

The below-grade Building 730 was demolished in stages, with the tanks demolished last. Gravel that had been used as backfill around the lowermost part of the structure was also removed and disposed of as LLMW. In addition, the structure's slab under the southern tanks was broken up and removed. The portion of slab remaining in place is approximately 23 ft by 35 ft. Prior to being broken up, the entire slab was surveyed for radiological contamination. Based on the survey results, the remaining radioactivity was calculated to be 0.04 pCi/g. The total amount of plutonium remaining in the slab is estimated to be 0.0000586 g. Rubble associated with the top of the building was disposed of as sanitary waste. Rubble from the level of the tanks was disposed of as LLW. The lowermost rubble that was potentially in contact with carbon tetrachloride was managed as LLMW.

Groundwater was encountered throughout the project and was continuously pumped out into water storage tanks along with accumulated water from precipitation. Free product, primarily carbon tetrachloride, was also pumped out of the lowermost part of the excavation as encountered into the storage tanks. The water portion of the tank contents was routinely trucked to Building 891 for treatment. After water collection ceased, the remaining carbon tetrachloride free product was pumped into two intermediate bulk container (IBC) containers for disposal as radiologically contaminated free product.

Soil was removed until no free liquids were visible. After structural components, liquids, and soil were removed, four confirmation soil samples (see below) were collected to indicate residual contaminant concentrations (DOE 2005a). Carbon tetrachloride concentrations in confirmation samples collected at depths of 25 to 28 ft bgs ranged from 38 to 5,500 µg/kg, well below the WRW soil AL of 81,500 µg/kg.

The excavation was then backfilled. Backfilling began with the placement of approximately 4 ft of gravel (630 cy), followed by a layer of HRC®, three 8-inch lifts of compacted soil, a second layer of HRC®, three additional 8-inch lifts of compacted soil, and a third and final layer of HRC®. Placement of HRC® was discussed with CDPHE (the LRA) prior to placement. The remaining excavation was then backfilled. Sources of backfill included soil from the upper 16 ft of the excavation and the Trailer 371 area. Soil from the excavation was analyzed, and carbon tetrachloride concentrations were detected at less than 50 ppb. Approximately 4,200 lbs of HRC® were used. After backfilling, the site was graded. The site was reseeded after the removal of Buildings 776, 777, and 778 and the railroad spur to Building 776 (DOE 2005a).

Confirmation sampling was performed after the accelerated action removal activities to determine residual contaminant activities and concentrations. All contaminant activities and concentrations were less than WRW soil ALs (DOE et al. 2003). Of five residual locations (18499 [23.0 ft bgs], CF46-042 [25.0-25.5 ft bgs], CF46-043 [25.0-25.5 ft bgs], CF46-044 [27.0-28.0 ft bgs], and CF46-045 [25.0-25.5 ft bgs]) only 18499 and CF46-044 had detections of americium-241 (0.065 and 3.43 pCi/g respectively) and plutonium-239/240 (0.123 and 12.7 pCi/g) that were greater than background (WRW soil ALs [DOE et al. 2003] are 76.0 pCi/g for americium-241 and 50 pCi/g for plutonium-239/240). All VOCs were at least two orders of magnitude less than WRW soil ALs except for carbon tetrachloride 5,500 µg/kg (WRW 81,500 µg/kg) at CF46-042 (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSS 132 based on the following:

- A significant source of groundwater contamination was removed.
- Groundwater was evaluated in accordance with the Groundwater IM/IRA (DOE 2005b). Monitoring will continue under the Sitewide IMP.
- Accelerated action data indicated that residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005a) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for IHSS 132 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Draft Data Summary 2, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1995b, Draft Data Summary 2, Operable Unit 9, Outside Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-04, IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, July

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005b, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-137

IHSS Number: 137

Current Operable Unit: IA

Former Operable Unit: 8

IHSS Group: 700-6

Unit Name: Buildings 712/713 Cooling Tower Blowdown

This Final Update to the HRR for PAC 700-137 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 137 is summarized in this update. The following HRR volumes contain IHSS 137 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Late 1950s to 2000

Historical Summary

IHSS 137 is associated with two cooling towers, Building 712 and Building 713. The location of IHSS 137 is shown on Figure 21. The two cooling towers serviced Buildings 776 and 777, and were situated next to each other in an area located between Buildings 774 and 777. IHSS 137 was initially defined as a 50- by 150-ft area (DOE 1992). Because of information obtained during the development of the OU 8 Phase I RFI/RI Work Plan, IHSS 137 site boundaries were expanded to include the area adjacent to and surrounding the cooling towers, an area located approximately 10 ft beyond the foundation of Buildings 712 and 713 (DOE 1994).

Building 712 was constructed in 1962 to service Buildings 776 and 777, and Building 713 was constructed in 1966 to provide additional capacity. Buildings 702 and 703 were pump houses for Building 712 and Building 713, respectively. The cooling tower sump was located between Building 712 and Building 702. Building 713 was operated during the winter, and Building 712 was operated during the summer because it had greater cooling capacity (DOE 2001). Both cooling towers were removed prior to RFCA soil characterization and remediation (DOE 2004b, 2005).

In the past, utility workers cleaned out the sump and scraped slime off the cooling tower slats at each tower. Material removed during these activities was disposed of on the ground immediately adjacent to the cooling towers (DOE 1992).

Wind and rain damaged the cooling towers, and Building 712 was re-sided at least once. In 1991, Building 712 had open panel siding and Building 713 had open slat siding. The slat siding allowed some water to spray out of the tower onto the surrounding ground surface and form puddles (DOE 1994).

Filtered, untreated raw water from the onsite raw water reservoir was generally used in the towers. Chemicals were added to the water to prevent the biological growth and chemical

processes (corrosion and scaling) that degrade system performance by fouling heat-transfer surfaces. Prior to 1976, arsenic, chromates, and sodium silicate were added to cooling tower water to act as corrosion inhibitors (DOE 1994).

Water was removed from the cooling tower system by blowdown and drift. Drift water was released to the atmosphere and sprayed to the ground surrounding the tower. Tower water was periodically blown down to maintain a specified range of TDS. Prior to 1974, it was routine for the cooling towers to blow down effluent through underground pipes onto the soil outside the buildings where it evaporated, infiltrated into the soil, or flowed into the storm water culverts and pipes and was directed to North Walnut Creek (DOE 1994). From 1974 forward, the blowdown water from Buildings 712 and 713 was piped to the sanitary sewers and treated in the wastewater treatment plant (DOE 1994).

A leak in a cooling tower within the IHSS was reported to have occurred between August 20 and September 6, 1990. The cooling tower was reportedly releasing approximately 20 to 40 gallons per minute (gpm) of water. It is not known how long the cooling tower had been leaking prior to the response. Releases were attributed to leaks in the corroded sides of the cooling towers (DOE 1994).

IHSS Investigations

Prior to accelerated action characterization, surface soil samples were collected from seven locations within and south of the IHSS in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994). Samples were analyzed for radionuclides, metals, SVOCs, and VOCs. At one of the locations (sampling location SS801893, between the cooling towers), the arsenic concentration was greater than the RFCA WRW soil AL, and at another location (SS801993, east of Building 713), the arsenic and chromium concentrations were greater than the RFCA WRW soil ALs (DOE et al. 2003). The elevated arsenic concentrations were 56.2 and 201 mg/kg, respectively, and the WRW soil AL is 22.2 mg/kg. The elevated chromium concentration was 309 mg/kg, and the WRW soil AL is 268 mg/kg.

During RFCA (DOE et al. 1996) accelerated action characterization, surface and subsurface soil samples were collected from 28 sampling locations within the IHSS in accordance with IASAP Addendum #IA-03-18 (DOE 2003). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated contaminant activities and concentrations were less than RFCA WRW soil ALs with the following exceptions:

- Arsenic at sampling location CG47-024 at 0.0 to 0.5 ft was 32 mg/kg, and the AL is 22.2 mg/kg.
- Arsenic at sampling location CG47-025 at 0.0 to 0.5 ft was 97 mg/kg, and the AL is 22.2 mg/kg.
- Chromium at sampling location CG47-011 at 0.5 to 0.8 ft was 300 mg/kg, and the AL is 268 mg/kg.
- Benzo(a)pyrene at sampling location CH47-010 at 8.0 to 8.5 ft was 4,500 µg/kg, and the AL is 3,490 µg/kg.

Based on the historical and accelerated action characterization results, the RFCA hot spot methodology, and the SSRS, surface soil was removed from the two areas where surface soil concentrations were greater than three times the WRW ALs (sampling locations SS801993 and

CG47-025). Soil removal activities were proposed and conducted in accordance with ER RSOP Notification #04-17 (DOE 2004c). Accelerated action activities (characterization and soil removal) at IHSS 137 and the rationale for NFAA are discussed in detail in the Closeout Report for IHSS Group 700-6 (DOE 2004b).

Five confirmation samples were collected from each excavation (sidewalls and bottom) and analyzed for metals. All concentrations were less than WRW soil ALs, except the arsenic concentration at the eastern sidewall (sampling location CG47-052), where the concentration was 29 mg/kg. Arsenic concentrations greater than the WRW AL were not detected in soil collected at any of the confirmation or un-remediated characterization sampling locations in the vicinity of CG47-052 (DOE 2004b).

No Further Action Recommendation

NFAA was recommended for IHSS 137 based on the following:

- The two small areas of surface soil that contained arsenic concentrations more than three times the WRW AL were removed.
- Residual contaminant concentrations greater than RLs or background means plus two standard deviations remain in surface and subsurface soil located in IHSS 137. Residual contaminant concentrations greater than WRW ALs are limited to two analytes (arsenic and chromium) at four sampling locations. Based on application of the hot spot methodology and SSRS, soil at these four locations did not require remedial action. The area is not susceptible to high erosion.

After review of the Closeout Report for IHSS Group 700-6 by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 137 on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 700-6, Buildings 712/713 Cooling Tower Blowdown, IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, September 29.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1994, Phase I RCRA Facility Investigation/Remedial Investigation Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Appendix C, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-18, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 700-6 IHSS 700-137, Buildings 712/713 Cooling Tower Blowdown, and IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004c, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-17, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005, Decommissioning Closeout Report for the 776/777 Closure Project (Rev. 1), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-138

IHSS Number:	138
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-7
Unit Name:	Building 779 Cooling Tower Blowdown

This Final Update to the HRR for PAC 700-138 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 138 is summarized in this update. The following HRR volumes contain IHSS 138 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

December 8, 1976, and December 8, 1990

Historical Summary

IHSS 138 is associated with the cooling towers near Building 779. The location of IHSS 138 is shown on Figure 21. The original Building 779 cooling towers were built in 1964 east of Building 779, and were replaced in 1986 by new cooling towers (Buildings 784, 785, 786, and 787). Building 783 was the pump house associated with the replacement towers and contained much of the ancillary piping (DOE 2004b). The cooling towers were removed in the late 1990s as part of the Building 779 closure project (DOE 2000).

On December 8, 1976, a leak occurred in an underground pipeline connected to the original cooling towers. This encompassed a 50- by 50-ft area. The leak discharged approximately 400 gallons of cooling tower effluent, which was released into a storm sewer east of Building 779 and northwest of Building 727. At the time, it was stated that the spilled effluent drained toward Trench No. 6, which was part of the original surface water and shallow groundwater collection system north of the SEP (PAC 000-101). The line involved in the leak was excavated and repaired, and later removed when the original cooling towers were replaced (DOE 2004b).

On December 8, 1990, an estimated 1,000 gallons of cooling tower water overflowed from the Building 785 Cooling Tower Number 2 onto the ground. The cooling tower water released in the 1990 incident was known to contain “Nalco 2826,” an inorganic phosphate rust inhibitor (DOE 1992). There is no documentation to describe cleanup efforts for this spill (DOE 2004b).

IHSS Investigations

The cooling tower water was sampled following the 1976 incident and found to contain 50 mg/L total chromium and approximately 3,000 dpm/L alpha activity. A radiological survey was conducted along the course of the spill. No readings above background were observed. Soil samples were collected in the area; however, analytical results are not known. Samples were also

reportedly collected daily from Trench No. 6; however, analytical results are not known (DOE 2004b).

Surface soil sampling was conducted in IHSS 138 as part of the OU 8 Phase I RFI/RI. Ten samples were collected and analyzed for radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2003 and DOE et al. 2003).

Characterization was conducted as part of the RFCA (DOE et al. 1996) IHSS Group 700-7 accelerated action (September 30, 2003, to August 18, 2004) in accordance with IASAP Addendum #IA-03-15 (DOE 2003). Surface and subsurface samples were collected from five sampling locations. COCs included radionuclides, metals, and VOCs. No COCs were detected at activities or concentrations greater than WRW soil ALs (DOE 2004b). Americium-241 ranged from 0.361 to 4.1 pCi/g, plutonium-239/240 from 0.187 to 23.5 pCi/g, uranium-234 from 3.197 to 4.756 pCi/g, uranium-235 from 0.122 to 0.237 pCi/g, and uranium-238 from 1.618 to 4.756 pCi/g. Acetone and zinc were at least two orders of magnitude less than their WRW soil ALs.

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for IHSS 138 based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS indicated that the IHSS area was not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-7 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 138 on October 1, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7 (B779) – Approval, October 1.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 2000, Decommissioning Closeout Report for the 779 Closure Project, Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-15, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-139.1(S)

IHSS Number:	139.1(S)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-6
Unit Name:	Caustic/Acid Spills Hydroxide Tank Area

This Final Update to the HRR for PAC 700-139.1(S) consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 139.1(S) is summarized in this update. The following HRR volumes contain IHSS 139.1(S) information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Approximately 1953 to 2000

Historical Summary

The location of IHSS 139.1(S) is shown on Figure 21. IHSS 139.1(S) consists of an area around a 5,400-gallon aboveground potassium hydroxide (KOH) tank located southeast of Building 771. The tank was surrounded by a berm that was constructed prior to 1973. The HRR (DOE 1992a) describes the tank site as an "L" shaped area 25 ft wide and 140 ft long that surrounded the KOH tank and included the hydroxide transfer line into Building 771. Because of information obtained during the development of the OU 8 Phase I RFI/RI Work Plan, site boundaries were changed to include only the 35- by 25-ft area adjacent to and surrounding the KOH tank (DOE 1994). The tank was removed prior to RFCA soil characterization and remediation (DOE 2004b, 2005).

Several releases of KOH during routine filling operations are documented for the KOH tank. The 1992 HRR states that the KOH tank overflowed before 1973, and, as a result, it was likely that the caustic seeped through the soil and infiltrated beneath the building. Interviewees for the CEARP indicated that small leaks and spills from the IHSSs 139.1(S & N) hydroxide tanks were flushed with water to dilute the caustic and carry it away from the buildings and into the storm sewers (DOE 1992a).

During the week ending May 5, 1978, a spill occurred at a caustic tank near Building 771 during a routine filling operation but was contained by the berm that surrounded the tank. This spill was believed to have involved the KOH tank (DOE 1992a).

On November 13, 1989, the KOH tank was overfilled. Approximately 5 gallons of 12-molar KOH spilled into the earthen berm that surrounded the tank. In response, approximately 100 lbs of "Oil-Dri®" was used to absorb the KOH. The contaminated soil and Oil-Dri® were removed and placed into drums. Soil samples were collected and tested for pH to verify this cleanup. The area was backfilled with new gravel. Additionally, a RCRA CPIR (89-020) was developed for this incident (DOE 1992a).

IHSS Investigations

Prior to accelerated action characterization, surface soil samples were collected from four locations within and south of the IHSS in accordance with Phase I RFI/RI Work Plans for OU 8 (DOE 1992b, 1994, 2004b). Samples were analyzed for radionuclides, metals, SVOCs, and VOCs. At one of the locations (sampling location SS804093), the benzo(a)pyrene concentration (4,300 µg/kg) was greater than the RFCA WRW soil AL (3,490 µg/kg) (DOE et al. 2003).

During RFCA (DOE et al. 1996) accelerated action characterization, surface and subsurface soil samples were collected from eight sampling locations within the IHSS in accordance with IASAP Addendum #IA-03-18 (DOE 2003). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated contaminant activities and concentrations were less than RFCA WRW soil ALs with the following exceptions:

- Benzo(a)pyrene at sampling location CF47-008 at 0.5 to 2.5 ft was 7,700 µg/kg, and the AL is 3,490 µg/kg.
- Benzo(a)pyrene at sampling location CF47-010 at 0.0 to 0.5 ft was 4,100 µg/kg, and the AL is 3,490 µg/kg.

No Further Action Recommendation

NFAA was recommended for IHSS 139.1(S) based on the following:

- Residual contaminant concentrations greater than RLs or background means plus two standard deviations remain in surface and subsurface soil located in IHSS 139.1(S). Residual contaminant concentrations greater than WRW ALs are limited to one analyte (benzo[a]pyrene) at three sampling locations (one historical and two accelerated action sampling locations).
- Based on application of the hot spot methodology and SSRS, soil containing benzo(a)pyrene at three locations did not require remedial action.
- Based on the SSRS and stewardship evaluation, no additional accelerated actions are required. The area is not susceptible to high erosion.

After review of the Closeout Report for IHSS Group 700-6 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 139.1(S) on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 700-6, Buildings 712/713 Cooling Tower Blowdown, IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Phase I RCRA Facility Investigation/Remedial Investigation Work Plan for Operable Unit 8, 700 Area, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1994, Phase I RCRA Facility Investigation/Remedial Investigation Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-18, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 700-6 IHSS 700-137, Buildings 712/713 Cooling Tower Blowdown, and IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005, Decommissioning Closeout Report for the Building 771 Closure Project Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July 9.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-139.1(N)(a)

IHSS Number:	139.1N(a)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-11
Unit Name:	Hydroxide Tank, KOH, NaOH Condensate

This Final Update to the HRR for PAC 700-139.1(N)(a) consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 139.1(N)(a) is summarized in this update. The following HRR volumes contain IHSS 139.1(N)(a) information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1953 to 2001

Historical Summary

IHSS 139.1(N)(a) consisted of the area adjacent to two steel, 8,000-gallon aboveground storage tanks (T-107 and T-108) that received steam condensate from an evaporative waste concentration system formerly used in Building 774. The location of IHSS 139.1(N)(a) is shown on Figure 21. The tanks were located approximately 100 yards north of Building 774 and situated on a concrete slab. The tank bottoms were corroded (DOE 1992a). The tanks received condensate after testing indicated the absence of radioactive contamination. After approximately 1980, condensate was no longer conveyed to the tanks. Since then, the western tank received overflow and precipitation runoff from the bermed area surrounding the NaOH tank located north of Building 774. The two condensate receiving tanks were removed in October 2001. A storm drain line originating north of the concrete slab conveyed runoff from the slab to the north and then east, where it emptied into North Walnut Creek at surface water monitoring station SW093.

IHSS Investigations

Five sediment samples were collected in 1993 and analyzed for metals and VOCs in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1992b). All contaminant concentrations were less than RFCA Tier I and WRW soil ALs (DOE 2004, DOE et al. 1996 and 2003). Surface and subsurface soil samples were also collected from two sampling locations in 1999 and analyzed for radionuclides, metals, VOCs, SVOCs, and PCBs in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994). All contaminant activities and concentrations were less than RFCA Tier I and WRW soil ALs (DOE 1999, DOE et al. 2003).

During RFCA (DOE et al. 1996) accelerated action characterization of IHSS Group 700-11, surface and subsurface soil samples were collected from two sampling locations within the IHSS in accordance with IASAP Addendum #IA-04-10 (DOE 2004). COCs included radionuclides,

metals, VOCs, SVOCs, and PCBs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2005). Maximum concentrations or activities greater than background for locations CH49-033 and CG49-063 (maximum depth is 2 ft bgs) were arsenic at 11.1 mg/kg, barium at 774.0 mg/kg, chromium at 82.0 mg/kg, iron at 47,500.0 mg/kg, nickel at 66.2 mg/kg, strontium at 188.0 mg/kg, vanadium at 174.0 mg/kg, zinc at 130.0 mg/kg, uranium-234 at 5.132 pCi/g, uranium-235 at 0.228 pCi/g, uranium-238 at 5.132 pCi/g, and trichloroethene 76.1 μg/kg.

No Further Action Recommendation

NFAA was recommended for IHSS 139.1(N)(a) based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than RFCA WRW soil ALs.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary. The area is not susceptible to high erosion.

After review of the Closeout Report for IHSS Group 700-11 (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 139.1(N)(a) on February 4, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, Closeout Report for IHSS Group 700-11, February 4.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1992b, Phase I RFI/RI Work Plan, 700 Area, Operable Unit 8, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1994, Phase I RFI/RI Work Plan, 700 Area, Operable Unit 8, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Industrial Area Sampling and Analysis Plan FY04 Addendum #IA-04-10, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005, Closeout Report for IHSS Group 700-11, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-139.1(N)(b)

IHSS Number:	139.1(N)(b)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Hydroxide Tank, KOH, NaOH Condensate

This Final Update to the HRR for PAC 700-139.1(N)(b) consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 139.1(N)(b) is summarized in this update. The following HRR volumes contain IHSS 139.1(N)(b) information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1953 to 2001

Historical Summary

IHSS 139.1(N)(b) consisted of the area around a 6,500-gallon aboveground NaOH tank that was located north of Building 774. The location of IHSS 139.1(N)(b) is shown on Figure 21. The tank was surrounded by a berm that had been constructed prior to 1973. Interviews for the CEARP indicated small leaks and spills at the caustic receiving areas north and south of Building 774 and that numerous releases of NaOH are documented for the 6,500-gallon aboveground NaOH tank. Small leaks and spills from the hydroxide tank were flushed with water to dilute the caustic and carry it away from the buildings and into the storm sewers (DOE 1992).

In April 1985, a pinhole leak was discovered in the piping from the tank. Although the leak was inside Building 774, the caustic was found to have seeped along the pipe outside the building. In late April or early May of the same year, a small leak was discovered at a thermocouple fitting on this tank. The released caustic had solidified on the tank, never reaching the secondary containment. Caustic observed in the pit was suggested to be the result of a poor sampling technique that allowed the valve to drip. In October 1986, it was estimated that 80 to 100 gallons of NaOH were released over the history of the tank because of this problem (DOE 1992).

On June 22, 1987, during a routine delivery transfer from a tanker truck to the Building 774 NaOH supply tank, approximately 100 gallons of the liquid caustic soda overflowed. The caustic spilled inside the bermed area of the tank and drained to the caustic catch tank (western condensate receiving tank PAC 700-139.1[N][a]). Approximately 1 to 2 gallons of caustic leaked out of the bermed area onto the roadway in front of Building 774. The NaOH on the roadway was diluted and rinsed off immediately following the occurrence. A work order was initiated to repair and seal the cracks in the berm on the same day of the occurrence. In approximately 1988, the NaOH tank north of Building 774 was overfilled again. No documentation was found that further detailed this event (DOE 1992).

The NaOH tank was removed during the Building 771/774 closure project (DOE 2005).

IHSS Investigations

One surface soil sample was collected in the area of the NaOH tank, in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994). Analytical results indicated that the only contaminant measured above RLs was zinc, and the zinc concentration was less than the RFCA Tier II soil AL (DOE et al. 1996).

During RFCA (DOE et al. 1996) accelerated action characterization of IHSS Group 700-4, surface and subsurface soil samples were collected from one sampling location within IHSS 139.1(N)(b) in accordance with IASAP Addendum #IA-03-01 (DOE 2003). COCs included radionuclides, metals and nitrate. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2004b, DOE et al. 2003). Maximum values for results greater than background at location CG48-015 (2 intervals 0.0-0.5 ft and 0.5-2.5 ft bgs) included: aluminum at 25,000 mg/kg, arsenic at 15.3 mg/kg, barium at 699.0 mg/kg, beryllium at 1.0 mg/kg, chromium at 39.6 mg/kg, copper at 189.0 mg/kg, iron at 32,500.0 mg/kg, lithium at 14.0 mg/kg, nickel at 44.9 mg/kg, strontium at 162.0 mg/kg, vanadium at 168.0 mg/kg, zinc at 181.0 mg/kg, uranium-234 at 4.700 pCi/g, and uranium-238 at 4.819 pCi/g.

No Further Action Recommendation

NFAA was recommended for IHSS 139.1(N)(b) based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than RFCA WRW soil ALs.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary because erosion of soil at this location was not likely to affect surface water.

After review of the ER Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for IHSS 139.1(N)(b) on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774), February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005, 771 Closure Project Closeout Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-139.2

IHSS Number:	139.2
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Caustic/Acid Spills Hydrofluoric Acid

This Final Update to the HRR for PAC 700-139.2 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 139.2 is summarized in this update. The following HRR volumes contain IHSS 139.2 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Prior to May 1971 to 2001

Historical Summary

IHSS 139.2 is located in the area of two 1,200-gallon hydrofluoric acid supply tanks, which were located to the southeast of Building 771 in a small shed known as Building 714. The location of IHSS 139.2 is shown on Figure 21. Hydrofluoric acid (HF) had reportedly infiltrated the soil in the vicinity of the storage area. Numerous small spills and leaks were reported to have occurred during routine filling and transfer operations. Later, the HF was delivered in portable tanks that were replaced when empty and required no open transfer. These "portable tanks" were sealed cylinders with a weight of approximately 1,300 lbs fully loaded (DOE 1992).

In May 1971, a leak in an HF connection outside Building 771 was reported. A small amount of vapor was released but no personnel exposures occurred. No further details of this incident were provided (DOE 1992).

The HF tanks and shed were removed during the 771 closure project prior to RFCA soil characterization and remediation (DOE 2004b, 2005).

IHSS Investigations

One surface soil sample was collected in the area of the HF tanks, in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994). Analytical results indicated all contaminant activities and concentrations were less than RFCA Tier I soil ALs (DOE et al. 1996).

Surface soil samples were collected from two sampling locations within the IHSS in accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-03-01 (DOE 2003). COCs included radionuclides, metals, and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2004b, DOE et al. 2003). Maximum values for results greater than background at locations CF47-006 and CF47-007 (one interval in each, 0.0-0.5 ft bgs) included: arsenic at 17.3 mg/kg, barium at 805.0 mg/kg, chromium at 45.4 mg/kg, copper at 118.0 mg/kg, iron at 35,900 mg/kg, manganese at 591.0 mg/kg, nickel at

63.9 mg/kg, strontium at 240.0 mg/kg, vanadium at 92.4 mg/kg, zinc at 175.0 mg/kg, uranium-234 at 4.927 pCi/g, uranium-235 at 0.302 pCi/g, and uranium-238 at 4.927 pCi/g. SVOCs were not detected above WRW soil ALs.

No Further Action Recommendation

NFAA was recommended for IHSS 139.2 based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than RFCA WRW soil ALs.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary because impacts to surface water were unlikely.

After review of the ER Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 139.2 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774), February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005, 771 Closure Project Closeout Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-143

IHSS Number:	143
Current Operable Unit:	IA
Former Operable Unit:	6
IHSS Group:	000-3
Unit Name:	Old Outfall – Building 771

This Final Update to the HRR for PAC 700-143 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 143 is summarized in this update. The following HRR volumes contain IHSS 143 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 (DOE 1997); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1953 to May 1971

Historical Summary

IHSS 143 is located northwest of Building 771 as shown on Figure 21. During the building's early history starting in 1953, some waste liquids were discharged to a storm drain located north and west of the building. The storm drain discharged into North Walnut Creek. The main discharge source was an outfall from the Building 771 laundry holding tanks. Other sources included the analytical laboratory and radiography sinks, the personnel decontamination room, and runoff from the roof of Building 771 and the ground areas (DOE 1992a).

Liquid wastes in the laundry holding tanks were discharged to this storm drain if the plutonium concentration was less than 3,300 dpm/L. Between mid-1953 and mid-1957, 4.5 million gallons of liquid were released containing a total of 2.23 millicuries (mCi). As early as 1953, contamination at the outfall was measured at 17,400 dpm/g in the soil. Soil contamination at the discharge was reported in May 1956, with the highest sample containing 130 dpm/g gross alpha activity.

In 1957, a waste line was completed that allowed the option of releasing these liquids to the Building 774 outfall below Building 995 (Pond B-1 [PAC NE-142.5]). Because of equipment problems, periodic releases from the laundry holding tanks to the 771 outfall continued until 1965. From 1957 until 1965, 430,000 gallons were released containing a total of 0.25 mCi. No documentation exists regarding the liquid quantity or quality from other sources. In April 1958, instrument readings of up to 8,000 cpm were obtained on the rocks in the area. In May 1958, soil contamination was reported to be as high as 2,000 dpm/g gross alpha activity(DOE 1992a).

In April 1970, soil samples collected contained more than 190,000 dpm/g plutonium. Results for subsequent soil samples collected had radioactivity as high as 229,290 dpm/g plutonium. In September 1970, approximately 75 ft^3 of contaminated soil was removed from the area. Another document states that two 55-gallon drums of contaminated soil were removed during this time.

In January 1971, a report stated that instrument surveys conducted in the ditch area indicated the prior removal of two barrels of soil and vegetation was insufficient. The removal resumed in February 1971 and was completed by August 31, 1971. A total of 149 drums of contaminated soil were removed from an area approximately 800 ft^2. In one small area the contamination was as deep as 3.5 ft. A final survey of the area showed no direct alpha count greater than 250 cpm. Final soil sampling results averaged 34 dpm/g with a maximum of 150 dpm/g (DOE 1992a).

In May 1971, a sewer line break resulted in storage tanks overflowing through the 771 outfall (DOE 1992a).

During the week ending August 4, 1978, a hot spot approximately 875 ft^2 was found near a culvert northwest of the Building 771 parking lot during construction of the PSZ (DOE 1992a). Cleanup of the soil occurred during summer 1980. Nine boxes of contaminated soil were removed.

The area that was formally the outfall culvert was filled in with soil and paved for a Building 771 parking lot in approximately 1980 (DOE 1992a).

IHSS Investigations

Environmental data were collected at IHSS 143 in accordance with the Phase I RFI/RI Work Plan for the Walnut Creek Priority Drainage (OU 6) (DOE 1992b), and reported in the Phase I RFI/RI Report (DOE 1996). Four surface soil samples, seven subsurface soil samples, and one groundwater sample were analyzed for radionuclides, metals, VOCs (except surface soil), SVOCs, pesticides, PCBs, and water quality parameters.

Surface soil contained above-background concentrations of several metals, plutonium-239/240, and several SVOCs. The metal concentrations and plutonium activities were of the same order of magnitude as the background levels and well below the RFCA WRW soil ALs (DOE et al. 2003). SVOC concentrations were all below the WRW soil ALs, generally by a large margin.

From the NFAA Justification for IHSS 143 (Table 2) (DOE 2004b) selected maximum surface soil concentrations or activity include: chromium at 17.7 mg/kg, cobalt at 12.9 mg/kg, manganese at 374 mg/kg, nickel at 21.3 mg/kg, strontium at 53.8 mg/kg, zinc at 85.4 mg/kg, plutonium-239/240 at 0.52 pCi/g, benzo(a)anthracene at 1,800 μg/kg, benzo(a)pyrene at 2,300 μg/kg, benzo(b)fluoranthene at 3,200 μg/kg, benzo(k)fluoranthene at 1,200 μg/kg, indeno(1,2,3-cd)pyrene at 890 μg/kg, and nitrate at 1.41 mg/kg.

Subsurface soil contained above-background concentrations of radionuclides, barium, strontium, Aroclor-1254, and VOCs (DOE 1996). The metals were detected above background infrequently, and their concentrations were well below the WRW soil ALs. Aroclor-1254 was detected only once and at a concentration an order of magnitude lower than the WRW soil AL. The radionuclides were detected more frequently above background than the metals, but at activities two orders of magnitude less than the WRW soil ALs. Methylene chloride and toluene were the VOCs detected in subsurface soil. Methylene chloride was detected in only one of the 26 samples and at a very low concentration (5 μg/kg). Toluene was detected in all the subsurface soil samples; however, concentrations were several orders of magnitude lower than the WRW soil AL.

From the NFAA Justification for IHSS 143 (Tables 3a and 3b) (DOE 2004b) selected maximum native subsurface soil or fill results include: barium at 1,150 mg/kg, strontium at 279 mg/kg,

Aroclor-1254 at 940 µg/kg, americium-241 at 0.09 pCi/g, plutonium-239/240 at 0.28 pCi/g, uranium-238 at 1.6 pCi/g, methylene chloride at 5 µg/kg, and toluene at 1,200 µg/kg.

In alluvial well 77492, which is directly downgradient of IHSS 143, only a few metals, one pesticide (alpha-BHC), one SVOC (bis[2-ethylhexyl]phthalate), and one VOC (carbon tetrachloride) were detected above RFCA Tier II groundwater ALs (DOE 1996).

The Building 771 outfall, along with other Building 771 storm drains that may have connected to the outfall, were removed or plugged as part of PAC 000-505 (DOE 2005).

No Further Action Recommendation

NFAA was recommended for IHSS 143 based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than RFCA WRW soil ALs.
- Previous remediation activities at this IHSS effectively addressed the release of contamination.
- Results of the SSRS and stewardship evaluation indicated that additional action was not necessary. The IHSS area is not susceptible to high erosion.

After review of the NFAA Justification (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 143 on September 29, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action (NFAA) Request for IHSS 143 (B771), September 29.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan, Walnut Creek Priority Drainage (Operable Unit No. 6), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1996, Final Phase I RFI/RI Report, Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, No Further Accelerated Action (NFAA) Request for IHSS 143, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Data Summary Report for IHSS 000-3, PAC 000-505, Storm Drains, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBERS: 700-144(N) and 700-144(S)

IHSS Numbers:	144(N) and 144(S)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Sewer Line Overflow

This Final Update to the HRR for PACs 700-144(N) and 700-144(S) consolidates the information in the initial HRR with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 144(N) and 144(S) is summarized in this update. The following HRR volume contains IHSS 144(N) and 144(S) information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

June 7, 1972

Historical Summary

IHSS 144 was originally defined as a 10- by 10-ft area between Buildings 777 and 779 (DOE 1992a). Based on information obtained during development of the OU 8 Phase I RFI/RI Work Plan (DOE 1992b), IHSS 144 was divided into two separate sites: IHSS 144(N) and IHSS 144(S). IHSS 144(N) is approximately 25 ft by 70 ft and located adjacent to and east of Building 730. IHSS 144(S) is approximately 15 ft by 170 ft and located between Buildings 777 and 779. Both IHSSs are associated with the release of radioactive laundry wastewater during transfer of wastewater from the laundry waste holding tanks, which were located beneath the Building 730 pump house, to the sanitary sewer system. The locations of IHSSs 144(N) and 144(S) are shown on Figure 21.

The Building 730 pump house was located north of Building 776 and east of Building 701. The Building 776 laundry wastewater was stored in two concrete underground tanks, designated as Tanks 776A and 776C. Tank 776A had a 22,500-gallon capacity, and Tank 776C had a 4,500-gallon capacity. The tanks had three discharge pipes (two OPWL lines and one sanitary sewer line) that exited Building 730 on the northern side. The tanks were collocated with two concrete process waste holding tanks, designated as Tanks 776B and 776D. Tanks 776A and 776C are also known as Tank 9, and Tanks 776B and 776D are also known as Tank 10. These four tanks constitute PAC 700-118.1 and are associated with PAC 700-132.

Tanks 776A and 776C were taken out of service in October 1984, at which time both chambers were cleaned, painted, and converted to plenum deluge catch tanks. Tanks 776B and 776D were abandoned in December 1982; however, these tanks reportedly were not cleaned when abandoned.

On June 7 or 8, 1972, the increased pumping rate, resulting from a recent Building 776 radiography vault floor drain remodel, during a transfer of laundry wastewater from the tanks to Building 995 caused suspension of high-level radioactive sediment in the tanks and

pressurization of the sewer line. The pressurization of the line caused a toilet and sink in Building 701 to overflow, and the sanitary sewer line east of the tanks to rupture. The toilet, sink, and floor of Building 701, as well as the ground east of the building, were contaminated. The line section that ruptured was apparently located between Buildings 777 and 779. The pressurization of the transfer line also caused sanitary waste to back up and overflow at a cleanout plug near Building 701 (DOE 1992a). Approximately 50 drums of contaminated soil were removed from east of the holding tanks, and 19 drums of contaminated soil were removed from around Building 701. According to an employee logbook, no radioactivity was detected at that time.

IHSS Investigations

The radiological survey performed in the late 1970s and early 1980s did not indicate areas above 500,000 pCi/g near the IHSS.

Soil gas and surface soil samples were collected from IHSS 144(N) and analyzed during the OU 8 Phase I RFI/RI in accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1992b, 1995, 2005). Carbon tetrachloride was present at a concentration of 3.2 μg/L at one soil gas location. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)-pyrene were also detected. Concentrations of antimony, calcium, chromium, copper, lead, magnesium, silver, zinc, americium-241, and plutonium-239/240 exceeded background values. Surface soil samples collected from IHSS 144(S) indicated plutonium-239/240 activities exceeded background values.

Surface and subsurface samples were collected from eight sampling locations within IHSS 144(N) as part of the RFCA (DOE et al. 1996) IHSS Group 700-3 accelerated action soil characterization (DOE 2005). Sampling and analysis were conducted in accordance with IASAP Addendum #IA-03-04 (DOE 2003). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. All contaminant activities and concentrations were less than WRW soil ALs (DOE et al. 2003).

All of the OU 8 and IHSS Group 700-3 sampling locations became no longer representative (NLR) because of the excavation associated with remediation of IHSSs 118.1 and 132. Soil from these locations was completely removed (DOE 2005).

Based on the characterization results obtained during the OU 8 Phase I RFI/RI (DOE 1995), no additional characterization of IHSS 144(S) was included in IASAP Addendum #IA-03-04 (DOE 2003). Results from the OU 8 data set include: silver at 0.56 mg/kg, zinc at 179 mg/kg, americium-241 at 0.026 pCi/g, plutonium-239/240 at 0.98 and 0.130 pCi/g, and uranium-235 at 0.120 pCi/g.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 2003), an NFAA was justified for IHSSs 144(N) and 144(S) based on the following:

- All contaminant activities and concentrations in surface and subsurface soil were less than WRW soil ALs.
- Results of the SSRS indicate that the IHSS area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSSs 144(N) and 144(S) on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Phase I RFI/RI Work Plan, 700 Area, Operable Unit 8, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, IHSS Group 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBERS: 700-146.1 – 700-146.6

IHSS Numbers:	146.1 – 146.6
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-4
Unit Name:	Concrete Process Waste Tanks

This Final Update to the HRR for PACs 700-146.1 through 700-146.6 consolidates the information in the initial HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 146.1 through 146.6 is summarized in this update. The following HRR volumes contain IHSS 146.1 through 146.6 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to 1956 to 1972

Historical Summary

The location of IHSSs 146.1 through 146.6 is shown on Figure 21. Six underground process waste holding tanks were located south of Building 774. Building 774, a liquid waste processing facility, had been modified several times since its construction in 1952. During the construction of a southern addition in 1972, the tanks were removed. The six tanks were immediately west of Tanks 66, 67, and 68, (PACs 700-124.1, 124.2, and 124.3). The process waste stored in the tanks was an aqueous solution containing plutonium, uranium, acids, and caustics. These tanks overflowed frequently (DOE 1992).

IHSS 146 consisted of a six-chambered reinforced concrete structure south of Building 774. The chambers of the structure were referred to as Tank 30 (IHSS 146.5), Tank 31 (IHSS 146.1), Tank 32 (IHSS 146.2), Tank 33 (IHSS 146.6), Tank 34W (IHSS 146.3), and Tank 34E (IHSS 146.4). These tanks were also referred to as Tanks 13 and 15. Tanks 30 and 33 had 3,750-gallon capacities, and the others had 7,500-gallon capacities. The tanks were 11 ft, 8 inches high, and had walls that were approximately 10 inches thick. The area occupied by the tanks was 22.5 ft (east-west) by 32.5 ft (north-south). The elevation of the bottoms of the tanks was approximately 5,955 ft. The floors of the tanks were at the same approximate height as the second floor of Building 774. The ground surface south of Building 774 slopes steeply to the north and levels out near the top of the tanks.

In October 1956, the process waste tanks overflowed and in August 1957, some of the tanks leaked again. Radioactivity was measured at levels up to 2,500 dpm/g. The 1957 release was cleaned up. One of the releases reportedly flowed down the East Road toward North Walnut Creek. Minor leaks from the six tanks was suspected of causing contamination found in footing drain water north of Building 774. Water from the Building 774 footing drains contained activities as high as 500 dpm/L (DOE 1992).

Excavation for the Building 774 addition construction began in February 1972 when contamination resulting from the overflow of the tanks was detected. Contaminated soil was removed and by April 1972, 101 barrels of contaminated soil were reportedly shipped to Idaho Falls (DOE 1992).

Demolition of the concrete tanks began on May 8, 1972. Approximately 200 cy of contaminated soil were removed in 1972 at the time the tanks were decommissioned, as well as during construction of the southern addition to Building 774. The soil was initially piled north of Building 334 (PAC 300-156.1), and subsequently moved to the eastern end of the Triangle Area by June 1973 (PAC 900-165). Another 60 cy of soil, removed from around the tanks, was buried under 3 ft of fill dirt east of Building 881 (PAC 800-130). This soil averaged approximately 250 dpm/g (DOE 1992).

IHSS Investigations

RFCA (DOE et al. 1996) accelerated action characterization samples were collected and analyzed in accordance with RFCA (DOE et al. 1996) IASAP Addendum #IA-03-01 for IHSS Group 700-4 (DOE 2002). Two locations targeting IHSSs 146.1 through 146.6 were sampled (CG48-011 and CG48-012, surface soil) and analyzed for radionuclides, metals, SVOCs, nitrate, PCBs, and VOCs. Of the radionuclides, only uranium-234 (3.4 pCi/g), uranium-235 (0.100 pCi/g), and uranium-238 (3.4 pCi/g) were detected at activities greater than background but less than RFCA WRW soil ALs. Arsenic (20.2 mg/kg), barium (764.0 and 675.0 mg/kg), chromium (50.1 and 40.5 mg/kg), copper (103.0 and 81.6 mg/kg), iron (42,300 and 24,100 mg/kg), manganese (387.0 mg/kg), nickel (61.4 and 38.3 mg/kg), strontium (170.0 and 161.0 mg/kg), vanadium (136.0 and 120.0 mg/kg), and zinc (90.5 and 103.0 mg/kg) were detected at concentrations greater than background but less than WRW soil ALs. Benzo(a)anthracene (110.0 and 230.0 μg/kg), benzo(a)pyrene (150.0 and 320.0 μg/kg), chrysene (200.0 and 450.0 μg/kg), indeno(1,2,3-cd)pyrene (51.0 μg/kg) were detected along with benzyl alcohol (360.0 μg/kg) and xylene (17.0 μg/kg), all at levels less than WRW soil ALs. Analytical results from the characterization are presented in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b).

Because IHSSs 146.1 through 146.6 are part of IHSS Group 700-4 and are associated with Buildings 771/774, the following should be noted:

- As a result of the routine predischarge sampling for Pond A-4 (PAC NE-142.4), conducted on November 3, 2004, elevated americium-241 activities were noted in Pond A-4. These elevated activities were detected in samples collected by both DOE and CDPHE. These activities exceeded the RFCA surface water ALs for americium-241 and, as a result, the pond water was not discharged.
- In early December 2004, DOE collected a number of surface water samples in the North Walnut Creek drainage to investigate the source of elevated americium-241 noted in Ponds A-3 (PAC NE-142.3) and A-4. The sampling was concentrated in the area where Buildings 771/774 formerly stood. One sample, collected from a pool of water in OPWL (PAC 000-121) Manway 3, northwest of Building 771, contained elevated americium-241 activities without significant plutonium-239/240 activity, which is the same americium-241/plutonium-239/240 signature observed in Ponds A-3 and A-4. This manway received

outfall from former Building 771 and consisted of a series of sanitary sewer lines, footing drains, and other lines that dumped into storm drain Grate 771-4 at Sixth Street.

- Based on this sampling result, actions to stop any additional water from this source from entering North Walnut Creek were taken. The manway, which had been covered with soil as a result of site grading activities at former Building 771, was excavated and flows from the incoming pipes were intercepted, analyzed, and treated as needed. All pipes to and from the manway were removed, as well as the manway itself. The storm drain from Building 771 was grouted.
- Subsequently, the water in Pond A-4 was treated using a co-precipitation and filtration process and met stream standards for discharge.

No Further Action Recommendation

Based on analytical results and the SSRS, further action was not required and an NFAA determination was justified for IHSS 146.1 through 146.6.

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (includes IHSSs 146.1 to 146.6) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for IHSSs 146.1, 146.2, 146.3, 146.4, 146.5, and 146.6 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774) - Approval, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-147.1

IHSS Number:	147.1
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	000-2
Unit Name:	Process Waste Line Leaks

This Final Update to the HRR for PAC 700-147.1 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 147.1 is summarized in this update. The following HRR volume contains IHSS 147.1 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1955 to 1984

Historical Summary

Three OPWLs are located within IHSS 147.1: P-11, P-12, and P-13. P-11 is a 3-inch ribbed hose inside a 10-inch vitrified clay line, P-12 is a 3-inch stainless steel line inside a 10-inch vitrified clay line, and P-13 is a 3-inch ribbed hose inside a 4-inch fiberglass line. All three lines were grouted as part of the IHSS Group 000-2 accelerated action and left in place (DOE 2005). The location of IHSS 147.1 is shown on Figure 21.

On September 27, 1955, a leak in the process waste line north of the 800 Area was reported. Approximately 1 ft of process wastewater was present in a manhole. In June 1959, monitoring indicated low-level contamination along the process waste line from Building 881 to Building 774. During summer 1984, the process waste line connecting Building 881 to Building 374 cracked. The break occurred approximately 150 yards south of the guard gate into the Building 777 complex. Approximately 2 yards of contaminated soil were removed during the cleanup process.

A May 1971 report stated that the transfer line from Building 444 and Building 881 to Building 774 had broken and leaked several times during the past 20 years (DOE 1992). The leaks generally occurred east of Eighth Street and north of Central Avenue. Typical constituents of waste discharged into the process waste system included uranium, plutonium, beryllium, acids, and solvents. The report states that nitrate migration in the soil from the leaking transfer line was traced by samples collected from shallow wells.

IHSS Investigations

IHSS 147.1 was characterized during RFCA (DOE et al. 1996) accelerated actions within IHSS Group 000-2 in accordance with IASAP Addendum #IA-03-11 (DOE 2003). Soil characterization had not been conducted prior to the accelerated action. Groundwater samples collected from monitoring wells located at various points east of where breaks had occurred indicated up to several hundred ppm nitrate (DOE 1992).

One subsurface soil sample was collected from 9.0 to 10.5 ft bgs and analyzed for radionuclides, metals, and VOCs. The sampling location (CE40-000) targeted the junction of lines P-11, P-12, and P-13 where leaks potentially occurred. All contaminant activities and concentrations were less than the WRW soil ALs (DOE 2005, DOE et al. 2003). Results greater than background or RLs include: cadmium at 160.0 mg/kg, uranium (total) at 7.6 mg/kg, acetone at 14 µg/kg, methylene chloride at 1.5 µg/kg, uranium-234 at 4.4 pCi/g, uranium-235 at 0.81 pCi/g, and uranium-238 at 8.5 pCi/g.

No Further Action Recommendation

NFAA was recommended for IHSS 147.1 based on the following:

- All contaminant activities and concentrations were less than RFCA WRW soil ALs.
- Results of the SSRS and the stewardship evaluation indicated that additional action was not necessary.

After review of the Closeout Report for IHSS Group 000-2 (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 147.1 on October 6, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFFO from D. Kruchek, CDPHE, RE: Closeout Report for IHSS Group 000-2, Original Process waste Lines (OPWL) –NFAA Approval, October 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-149.1

IHSS Number:	149.1
Current Operable Unit:	IA
Former Operable Unit:	9
IHSS Group:	000-2
Unit Name:	Effluent Line

This Final Update to the HRR for PAC 700-149.1 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 149.1 is summarized in this update. The following HRR volume contains IHSS 149.1 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1972 to 1980

Historical Summary

IHSS 149.1 was defined along two OPWL (PAC 000-121) lines (referred to as P-26) which were installed in 1972 to transfer wastes from Building 774 to SEP 207-A (PAC 000-101). The location of IHSS 149.1 is shown on Figure 21. One of the lines was a 1.5-inch polyethylene line, and the other was a PVC line of unknown diameter (DOE 2005). These lines were abandoned in place in 1980 after the vapor compression evaporator in Building 374 was constructed. While in use during June or July 1973, a contractor broke a PVC line, and the line was repaired (DOE 1992).

In the late 1970s, another release may have occurred along one of the lines. A process waste line break southeast of Building 774 resulted in a release of liquid that flowed around to the front of the building. Another more detailed document reports that on July 21, 1980, an 8-year-old process waste line was discovered leaking southeast of Building 774. Wastewater was observed seeping up in the soil on the southern side of the road southeast of Building 774. The wastewater flowed downslope and through a 30-foot culvert, along the east chain-link fence and under the fence at the corner. From this point, the liquid flowed under the unpaved access road into a boggy area, the 771/774 Footing Drain Pond (Bowman's Pond), north of Building 774 (PAC 700-1108). It was estimated that approximately 1,000 gallons had leaked from the process waste line (DOE 1992).

The initial response to the July 1980 incident was to stop the flow through the waste line causing the leak to stop. When the soil dried, a FIDLER survey was conducted and verified that the flow did not go beyond the 771/774 Footing Drain Pond (Bowman's Pond). On July 24, the broken waste line was excavated and the problem identified as a loose flange. Soil excavation began July 28, 1980, with radiation monitors checking the soil as it was excavated (DOE 1992).

IHSS Investigations

Prior to accelerated actions, very limited characterization was conducted within IHSS 149.1. Two subsurface samples are known to have been collected along the length of P-26, and all contaminant activities and concentrations were less than RFCA WRW soil ALs, with one exception. The arsenic concentration in one of the samples was 24.6 mg/kg, and the WRW soil AL is 22.2 mg/kg (DOE 2002a, DOE et al. 2003).

IHSS 149.1 was characterized as part of accelerated actions in accordance with IASAP Addenda #IA-02-07 (SEP AOC) (DOE 2002a), #IA-03-01 (IHSS Group 700-4) (DOE 2003a), and #IA-03-11 (IHSS Group 000-2/OPWL) (DOE 2003b). Fourteen subsurface soil samples were collected along the length of P-26. Three of the samples were collected within IHSS Group 700-4 and analyzed for radionuclides, metals, and nitrates (DOE 2004). Five of the samples were collected within IHSS Group 000-2 and analyzed for radionuclides, metals, and VOCs (DOE 2005). Six of the samples were collected within IHSS Group 000-1 (SEP AOC) and analyzed for radionuclides, metals, and nitrates (DOE 2003c). All contaminant activities and concentrations were less than RFCA WRW soil ALs, with two exceptions noted below.

The samples were collected at characterization locations, which remain as residual locations along IHSS 149.1. The locations are CH48-000, CH48-003, CH48-016, CH48-020, CH48-021, CH48-051, CI48-000, CI48-001, CI48-002, CI48-039, CI48-040, CJ48-000, CJ48-001, and CJ48-041 (DOE 2005). Locations CJ48-000 and CJ48-001 each had arsenic concentrations (36.3 and 31.1 mg/kg, WRW soil AL is 22.2 mg/kg) greater than WRW soil AL (DOE 2005) that were left in place because they were less than RFCA Tier I soil ALs (DOE 2005).

Both lines were suspected of leaking along their entire length. P-26 was removed as part of RFCA (DOE et al. 1996) accelerated actions in accordance with ER RSOP Notification #02-08 (IHSS Group 000-1, Solar Ponds [DOE 2002b]) and ER RSOP Notification #03-14 (IHSS Group 000-2, OPWL [DOE 2003d]). Accelerated action results are presented in the Closeout Reports for IHSS Group 000-1 (DOE 2003c) and the Closeout Report for IHSS Group 000-2 (DOE 2005).

No Further Action Recommendation

NFAA was recommended for IHSS 149.1 based on the following:

- All contaminant activities and concentrations were less than RFCA WRW ALs, with one exception noted above.
- P-26 was removed as part of IHSS Group 000-2 accelerated actions.
- Results of the SSRS and the stewardship evaluation indicated that additional action was not necessary.

After review of the Closeout Report for IHSS Group 000-1 (DOE 2003c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 149.1 on July 29, 2003 (CDPHE 2003). In addition, after review of the Closeout Report for IHSS Group 000-2 (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 149.1 on October 6, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 000-1, July 29.

CDPHE, 2005, Correspondence to J. Rampe, DOE RFFO from D. Kruchek, CDPHE, RE: Closeout Report for IHSS Group 000-2, Original Process waste Lines (OPWL) –NFAA Approval, October 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002a, Industrial Area Sampling and Analysis Plan FY02 Addendum #IA-02-07, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation IHSS Group 000-1 Solar Evaporation Pond Area of Concern, August.

DOE, 2003a, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003b, Final Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003c, Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003d, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation IHSS Group 000-2 OPWL, October.

DOE, 2004, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-149.2

IHSS Number: 149.2

Current Operable Unit: IA

Former Operable Unit: 9

IHSS Group: 000-2

Unit Name: Effluent Line

This Final Update to the HRR for PAC 700-149.2 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 149.2 is summarized in this update. The following HRR volumes contain IHSS 149.2 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1972 to 1980

Historical Summary

IHSS 149.2 consists of the area around three OPWL (PAC 000-121) lines (P-36, P-37, and P-38) running east-west, north, and northeast of former Building 779 connecting the IA to the SEP (PAC 000-101) area. The location of IHSS 149.2 is shown on Figure 21. P-36 is a 3-inch PVC and stainless steel line. P-37 is a 3-inch steel, PVC, and vitrified clay line. P-38 is a 6-inch and 10-inch vitrified clay line (DOE 2005). Leaks were suspected along the length of all three lines, including pipe joints and Valve Pit No. 1, which was located southeast of Pond 207-C (DOE 2005).

IHSS Investigations

IHSS 149.2 was characterized as part of RFCA (DOE et al. 1996) accelerated actions in accordance with IASAP Addenda #IA-02-07 (SEP AOC) (DOE 2002), #IA-03-11 (IHSS Group 000-2/OPWL) (DOE 2003b), and #IA-03-15 (IHSS Group 700-7) (DOE 2003c). Twenty-one subsurface soil samples were collected along the length of the three lines. Twelve of the samples were collected as part of IHSS Group 700-7 and analyzed for radionuclides, metals, and VOCs (DOE 2004). Two of the samples were collected as part of IHSS Group 000-2 and analyzed for radionuclides, metals, and VOCs (DOE 2005). Seven of the samples were collected as part of IHSS Group 000-1 (SEP AOC) and analyzed for radionuclides, metals, and nitrates (DOE 2003d). Contaminant activities and concentrations were less than RFCA WRW soil ALs, with the following six exceptions:

- The arsenic concentration at sampling location CI46-001, collected from 3.5 to 4.5 ft bgs within IHSS Group 700-7, was 25 mg/kg, and the WRW AL is 22.2 mg/kg.
- The americium-241 activity at sampling location CJ46-057, collected from 9.0 to 9.5 ft bgs within IHSS Group 700-7, was 4,230 pCi/g, and the WRW AL is 76 pCi/g.

- The plutonium-239/240 activity at sampling location CJ46-057, collected from 9.0 to 9.5 ft bgs within IHSS Group 700-7, was 24,111 pCi/g, and the WRW AL is 50 pCi/g.
- The arsenic concentration at sampling location CJ46-DR01, collected from 7.5 to 7.51 ft bgs within IHSS Group 000-1, was 30.9 mg/kg, and the WRW AL is 22.2 mg/kg.
- The plutonium-239/240 activity at sampling location CJ46-000, collected from 11.0 to 11.1 ft bgs within IHSS Group 000-1, was 148.2 pCi/g, and the WRW AL is 50 pCi/g.
- The plutonium-239/240 activity at sampling location CJ46-002, collected from 11.0 to 11.1 ft bgs within IHSS Group 000-1, was 182.4 pCi/g, and the WRW AL is 50 pCi/g.

The sample from location CJ46-057, with high americium-241 and plutonium-239/240 activities, was obtained from soil where liquid spilled from the end of an OPWL that was being removed. Those activities were not representative of residual soil conditions prior to OPWL excavation (refer to data for sampling location CJ46-005 [DOE 2004]). The area where the spill occurred was remediated as verified by five confirmation samples (sampling locations CJ46-051 through CJ46-055[DOE 2004]). Approximately 12 cy of radiologically contaminated soil was removed down to approximately 3.5 ft bgs.

The lines within the IHSS were not removed; however, Valve Pit No. 1 was removed (DOE 2003d, 2005). Pipe ends were grouted.

No other remediation within the IHSS was conducted based on RFCA (DOE et al. 2003), the SSRS, and the depth of the contaminant activities and concentrations. Plutonium-239/240 activities greater than the WRW AL were less than 1 nCi/g and located more than 3 ft below final grade.

No Further Action Recommendation

NFAA was recommended for IHSS 149.2 based on the following:

- Residual contaminant activities and concentrations were less than RFCA WRW ALs, with the six exceptions noted above.
- Results of the SSRS indicated that additional action was not necessary. The IHSS is not in an area susceptible to high erosion.
- Results of the stewardship evaluation indicated that additional action was not necessary.

After review of the Closeout Report for IHSS Group 000-1 (DOE 2003d) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 149.2 on July 29, 2003 (CDPHE 2003). Also, after review of the Closeout Report for IHSS Group 700-7 (DOE 2004) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 149.2 on October 1, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 000-1, July 29.

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7, October 1.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan FY02 Addendum #IA-02-07 Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-11 IHSS Group 000-2 Original Process Waste Lines, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003c, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-15 IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003d, Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.1

IHSS Number:	150.1
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Radioactive Site North of Building 771

This Final Update to the HRR for PAC 700-150.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.1 is summarized in this update. The following HRR volumes contain IHSS 150.1 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

September 1957 to 1974

Historical Summary

As shown on Figure 21, IHSS 150.1 is located along the northern side of Building 771 and extends east to Building 770. This area is paved and served as the main access road to Buildings 771 and 774. Building 771's main function was plutonium recovery and Building 770 was used for radioactive waste storage for part of its history.

Several incidents occurred north of Building 771 that impacted the IHSS 150.1 area. Brief descriptions of these follow (DOE 1992):

- On September 11 and 12, 1957, a fire in Building 771 caused the high efficiency particulate air (HEPA) filters in the plenum to be breached. An unknown amount of radioactivity was released, primarily north and southwest of the building.
- In October 1964, a barrel leak resulted in contamination of the ground near the carpenter shack and Building 770. The east dock of Building 771 was also contaminated.
- In September 1966, a leaking barrel containing washables was found to be the source of contamination west of Building 770 and on the east dock and ramp of Building 771. The contamination was spread when the leaking barrel was moved from west of Building 770 to the east dock of Building 771. Contamination was measured up to 100,000 cpm at the Building 771 east dock and ramp and up to 60,000 cpm west of Building 770. In response, the area west of Building 770 was roped off, the east dock of Building 771 was partially decontaminated, and the ramp was marked.
- In October 1967, contamination was spread from Building 770 to the East Dock of Building 771 during the transport of a leaking barrel containing contaminated washables. Contamination levels were as high as 100,000 cpm. In response, the contaminated ground in front of Building 770 was covered with plastic, and all other contamination was removed.

- From approximately 1962 until approximately 1968, a 5,000-gallon stainless steel tank was located approximately 30 ft north of Building 771. The tank was used in the Filtrate Recovery Ion Exchange system that concentrated plutonium and americium for recovery. The resulting liquid contained in the tank was a nitrate solution high in americium-241 with some plutonium-239/240. The tank was on 6-ft legs and was approximately 8 ft in diameter. Two overhead pipes from Room 114 in Building 771 connected to the tank. In 1968, a pinhole leak developed in the tank, and liquid dripped onto the slab foundation. The tank was temporarily sealed to mitigate the leak until the tank could be emptied. Once emptied, the tank was taken out of service, size-reduced, and disposed of as radioactive waste. The concrete slab was decontaminated and the concrete was painted to secure the fixed radioactivity. The slab was moved to a ditch directly north of the area and buried (PAC 700-163.2). The area was paved sometime prior to June 1969.
- On June 11, 1968, during the removal of drums from the 903 Pad (PAC 900-112), a drum leaked on the roadway as it was being transported from the 903 Pad to Building 774. The drum was a solvent or rinse drum. The forklift that carried the drum to Building 774 traveled across the northern side of Building 771. The leak resulted in contamination of levels up to 50,000 cpm over 500 ft^2 of ground surface north of the Building 771 west dock. Four barrels of soil were removed. This incident and other incidents impacting the Plant roadways are discussed as PAC 000-172.
- A drum leak incident in July 1968 contaminated the concrete slab outside Building 771. Most of the slab was decontaminated. One small area with contamination to 1,500 cpm was covered with plastic.
- Drums that had previously been stored east of the SEP in the Triangle Area (PAC 900-165) and barrels of waste from the 1969 fire were stacked in the paved area north of Building 771. In October 1969, soil contaminated by a leaking barrel at Building 770 was removed.
- On November 16, 1970, contamination leaked from a hole in the bottom of a barrel of ful-flo filters as it was being transported from the storage area east of the SEP (PAC 000-101) to Building 771 for processing. The ground surface near the dock at Building 771, the truck, and the cargo container in which the drum was stored were contaminated. The drum was placed on the ground in the northeastern corner of the parking area. The workers monitored themselves after returning to the building and found their booties contaminated. In response, the area was decontaminated, and the floor of the cargo container was replaced. In addition, the contaminated soil was removed.
- On March 9, 1971, a monthly status report noted a significant increase in the number of "hot waste" drums stored in the open, north of Building 771.
- On June 8, 1971, a waste barrel leaked in the storage yard north of Building 771. The rigid liner and plastic bag within the drum had been punctured allowing liquid to corrode the barrel. Between 115 and 200 ft^2 of asphalt were contaminated. A monthly status report for June 1971 stated that approximately 1,000 drums were being stored on the asphalt slab north of Building 771, unprotected from the environment. In response, soil and approximately 200 ft^2 of asphalt were removed for off-site disposal.
- On July 2, 1971, a leaking waste drum was discovered outside Building 771. The employee that discovered the spill tracked contamination around the area while retrieving a monitor.

A subsequent rainstorm spread the contamination. The waste drum leak incident resulted in contamination of asphalt and gravel surfaces in an area between 2,300 and 2,500 ft^2 in size. Contamination levels ranged from 500 to 1,000,000 cpm. Other documentation reports that contamination ranged from 100,000 to 300,000 dpm/100 cm^2 on the asphalt. In response, strippable paint was applied to the spill area and the area where the employee tracked contamination. Approximately 2,300 ft^2 of asphalt and an undetermined amount of soil were removed for off-site disposal.

- In August 1972, a punctured scrap box stored inside Building 770 contaminated 3,600 ft^2 inside the building and 500 ft^2 outside. Levels of radioactivity ranged up to 200,000 dpm/cm^2. Removal of asphalt and soil for off-site disposal began immediately following the incident.
- On September 15, 1972, a 55-gallon drum containing spent ion-exchange residue leaked inside Building 770 onto the concrete floor. Contamination was tracked between Building 771 and Building 770. The incident resulted in contamination levels ranging from 5,000 to 100,000 cpm over 600 ft^2. Decontamination activities occurred; however, it is unclear as to the nature of these activities.

Use of this area for material storage ceased in approximately 1974 when storage operations were moved to Building 776. Efforts were made, sitewide, in the early 1970s to move all radioactively contaminated materials to indoor storage (DOE 1992).

IHSS Investigations

In accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994), eight surface soil samples were collected within IHSS 150.1 and analyzed for radionuclides, metals, and SVOCs. The maximum detected activities of plutonium-239/240 and americium-241 were 0.028 and 0.015 pCi/g, respectively. Benzo(a)pyrene and benzo(b)fluoranthene were detected at 2,600 and 7,800 µg/kg, which exceed the RFCA Tier II soil ALs (DOE et al. 1996). All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2003, DOE et al. 2003).

During accelerated action characterization of IHSS Group 700-4, surface and subsurface soil samples were collected from 26 locations within IHSS 150.1 in accordance with IASAP Addendum #IA-03-01 (DOE 2003). Samples were analyzed for radionuclides and metals. The maximum activities of americium-241 and plutonium-239/240 did not exceed background levels. Uranium-234, uranium-235, and uranium-238 were detected at maximum activities of 6.175, 0.338, and 6.175 pCi/g, respectively. All radionuclide activities were less than the RFCA WRW soil ALs (DOE et al. 2003). All metal concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with the following two exceptions:

- Arsenic was detected at 22.8 mg/kg in surface soil at sampling location CF49-000, and the WRW soil AL is 22.2 mg/kg.
- Arsenic was detected at 30 mg/kg in surface soil at sampling location CF49-005, and the WRW soil AL is 22.2 mg/kg.

Arsenic was detected in IHSS Group 700-4 at a concentration greater than the RFCA WRW AL at two surface soil locations. An action was required when the 95 percent UCL of the mean of the COC across the AOC divided by the AL is greater than one. The 95 percent UCL of the mean

for arsenic was 14.3 across the AOC, and the WRW soil AL is 22.2 mg/kg. The resulting ratio is 0.642, and, therefore, action for arsenic was not indicated (DOE 2004b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was recommended for IHSS 150.1 based on the following:

- Contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with the two arsenic exceptions noted above.
- The ratio of the 95 percent UCL for arsenic to the RFCA WRW soil AL (DOE et al. 2003) for arsenic was less than one.
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-4 did not indicate that further action is required (DOE 2004b).

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.1 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.2(N)

IHSS Number:	150.2(N)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Radioactive Site West of Buildings 771/776

This Final Update to the HRR for PAC 700-150.2(N) consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.2(N) is summarized in this update. The following HRR volumes contain IHSS 150.2(N) information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

September 11, 1957

Historical Summary

IHSS 150.2 was originally defined as a 70-ft by 250-ft area west of Building 771. Subsequent information obtained for the Final OU 8 Phase I RFI/RI Work Plan indicated that IHSS 150.2 should be divided into two separate areas (DOE 1994). The northern portion is located adjacent to the western side of Building 771 and is addressed in this writeup. The southern portion is located adjacent to the western side of Building 776 and is addressed in the PAC 700-150.2(S) writeup.

The location of IHSS 150.2(N) is shown on Figure 21. IHSS 150.2(N) is associated with radiological contamination that resulted from the September 11, 1957 fire in Building 771. The fire was discovered in Room 108 of Building 771, and fires in the box exhaust booster filters and main filter plenum were discovered soon after. An explosion in the main exhaust duct probably contributed to the release of plutonium from the stack. During firefighting and decontamination activities at Building 771, access to the main filter plenum was gained through a hatchway on the western side of the building. This activity was the main cause of the spread of contamination on the western side of Building 771. In general, the fire released radioactive contamination primarily north and southwest of the building (DOE 1992).

The results of a radiological survey during the late 1970s and early 1980s did not indicate that the areas around the western side of Buildings 771 and 776 were highly contaminated (DOE 1992). No other historical data were found for the IHSS (DOE 2004a).

IHSS Investigations

In accordance with IASAP Addendum #IA-03-01 (DOE 2003), surface samples were collected from 25 sampling locations within IHSS 150.2(N) as part of IHSS Group 700-4 accelerated action soil characterization (DOE 2004b). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. All radionuclide activities were less than RFCA WRW soil ALs (DOE et al.

2003). Americium-241 and plutonium-239/240 were not detected above background levels. The maximum detected activities of uranium-234, uranium-235, and uranium-238 were 6.076, 0.311, and 6.076 pCi/g, respectively. Concentrations of metals, VOCs, and SVOCs were less than RFCA WRW soil ALs (DOE et al. 2003), with the following exceptions:

- Benzo(a)pyrene was detected at 23,000 µg/kg at sampling location CE47-012 and the WRW soil AL is 3,490 µg/kg.
- Dibenz(a,h)anthracene was detected at 5,500 µg/kg at sampling location CE47-012 and the WRW soil AL is 3,490 µg/kg.
- Benzo(a)pyrene was detected at 16,000 µg/kg at sampling location CE48-012 and the WRW soil AL is 3,490 µg/kg.

Because the benzo(a)pyrene and dibenz(a,h) anthracene occurrences were isolated exceedances, the 95 percent UCLs were calculated for these contaminants over the AOC. An action is required when the 95 percent UCL of the mean of the COC across the AOC divided by the AL is greater than one. The 95 percent UCL of the mean for benzo(a)pyrene was 2,997.8 across the AOC, and the AL is 3,490 µg/kg. The resulting ratio was 0.859; thus, action for benzo(a)pyrene was not indicated. The 95 percent UCL of the mean for dibenz(a,h)anthracene was 1,610.9 across the AOC, and the WRW soil AL is 3,490 µg/kg. The resulting ratio was 0.462; thus, action for dibenz(a,h)anthracene was not indicated.

In accordance with the consultative process, DOE removed the soil from sampling locations CE47-012 and CF48-012 as part of IHSS Group 000-2 (OPWL) activities. Four confirmation samples were collected at each location. Results of confirmation sampling at these locations indicated that all PAHs were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was recommended for IHSS 150.2(N) because residual concentrations of contaminants in soil following the accelerated action were less than RFCA WRW soil ALs (DOE et al. 2003).

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.2(N) on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.2(S)

IHSS Number:	150.2(S)
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Radioactive Site West of Buildings 771/776

This Final Update to the HRR for PAC 700-150.2(S) consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.2(S) is summarized in this update. The following HRR volume contains IHSS 150.2(S) information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

May 11, 1969

Historical Summary

IHSS 150.2 was originally defined as a 70-ft by 250-ft area west of Building 771. Subsequent information obtained for the Final OU 8 Phase I RFI/RI Work Plan indicated that IHSS 150.2 should be divided into two separate areas (DOE 1994). The northern portion is located adjacent to the western side of Building 771 and is addressed in the IHSS 150.2(N) writeup. The southern portion is located adjacent to the western side of Building 776 and extends south to the northwestern corner of Building 778. This portion is addressed in this writeup. The location of IHSS 150.2(S) is shown on Figure 21.

IHSS 150.2(S) is associated with radiological contamination that resulted from the May 11, 1969 fire in Buildings 776 and 777. Plutonium was tracked outside Building 776 by firefighting and support personnel and was detectable on the ground around the building. The tracking of contamination was confined to an area 20 by 100 ft west of the building. Another source states that the contaminated area extended from the southern wall of Building 778 to the northern wall of the maintenance addition to Building 776 in a strip approximately 30 ft wide along the western wall of Building 776. Following the fire, rain carried contamination into the soil. Airborne contamination was carried predominately to the west-southwest, the average wind direction at the time. Contamination was detected outside the building up to 200 ft away (DOE 1992).

Oil and gravel were placed on areas of contaminated soil to stabilize the contamination. The soil, oil, and gravel were removed on July 19, 1969. At least a portion of the sidewalk on the western side of Building 776 was also removed. A new asphalt road was constructed on top of the affected area by the end of July 1969. In May 1971, contaminated steps, the dock, and ramp areas on the western side of Building 776 were covered with an epoxy paint. Areas of contamination outside Building 776 were covered with asphalt. In June 1980, contaminated asphalt was removed from the western side of Building 776 and boxed as radioactive waste (DOE 1992).

The radioactivity of soil removed during 1969 was measured at 7 dpm/g. In May 1971, a study of the steps, dock, and ramp areas on the western side of Building 776 indicated radioactive contamination as high as 6,000 cpm. In January 1972, the soil at the southwestern corner of Building 776 was considered contaminated. The cause of the contamination was not stated. In 1973, a survey was conducted on the asphalt road west of Building 776 to determine contamination levels prior to widening the road. The maximum soil activity found was 70 dpm/g plutonium. The results of the radiological survey, performed at Rocky Flats during the late 1970s and early 1980s, indicated no extremely contaminated areas (500,000 to 1,000,000 pCi/g) around the western sides of Buildings 771 and 776.

IHSS Investigations

Surface and subsurface samples were collected from 34 sampling locations within IHSS 150.2(S) in accordance with IASAP Addendum #IA-03-04 as part of IHSS Group 700-3 accelerated action soil characterization (DOE 2003). Samples were analyzed for radionuclides, VOCs, and PCBs. Plutonium-239/240 was detected at maximum activities of 0.556 and 0.778 pCi/g in surface and subsurface soil, respectively. Americium-241 was detected at a maximum activity of 0.144 pCi/g in surface soil and was not detected in subsurface soil at activities exceeding background. Aroclor-1254 was detected at maximum concentrations of 25 and 370 μg/kg in surface and subsurface soil, respectively; and Aroclor-1260 was detected at maximum concentrations of 26 and 210 μg/kg in surface and subsurface soil, respectively. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2005, DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for IHSS 150.2(S) based on the following:

- Residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) indicated that additional action was not necessary because the soil is not in an area susceptible to erosion and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.2(S) on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan, 700 Area, Operable Unit 8, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, IASAP Addendum #IA-03-04, IHSS Group 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.3

IHSS Number:	150.3
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Radioactive Site Between Buildings 771 and 774

This Final Update to the HRR for PAC 700-150.3 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.3 is summarized in this update. The following HRR volumes contain IHSS 150.3 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

August, September, and December 1971, and late 1970s or early 1980s

Historical Summary

During excavation for construction between Buildings 771 and 774 in August 1971, a cement tunnel containing process waste lines was exposed. At one time, the tunnel had also been used as an exhaust ventilation duct for Building 774. Three cracks in the concrete walls were found to be contaminated. The incident resulted in the release of plutonium contamination to the soil. After the incident, the contaminated cracks were sealed, and eight drums of soil were removed. The location of IHSS 150.3 is shown on Figure 21.

In September 1971, construction excavation resulted in further exposure of the tunnel. This incident resulted in 24 dpm/g of contamination in the soil. After the incident, the contaminated cracks were sealed, and contaminated soil was removed.

In December 1971 (or possibly early January 1972), construction activities in this area resulted in a broken process waste line. Samples of the process waste indicated an activity of approximately 1,000 pCi/L. Soil samples from the area were found to be only slightly contaminated. It is not clear whether liquid released was process, laundry, or sanitary wastewater.

Personnel recall an incident in this area in the late 1970s or early 1980s. A flange in a line separated releasing an unspecified amount of aqueous process waste that reached the ground surface. The liquid waste contained low levels of radionuclides as well as nitrate and other contaminants.

IHSS Investigations

In accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994), seven surface soil samples were collected within IHSS 150.3 and analyzed for radionuclides, metals, and SVOCs. Plutonium-239/240 was detected at a maximum activity of 1.9 pCi/g. Americium-241 was not detected in excess of background levels. All contaminant activities and concentrations were less

than RFCA WRW soil ALs, with two exceptions (DOE 2002, DOE et al. 2003). Benzo(a)pyrene was detected at 3,900 μg/kg at one sampling location and at 9,800 μg/kg at another location. The WRW soil AL is 3,490 μg/kg. However, these locations became NLR during the IHSS Group 700-4 accelerated action (DOE 2004b).

Subsurface samples were collected from four sampling locations within IHSS 150.3 in accordance with IASAP Addendum #IA-03-01 (DOE 2003). Results are presented in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b). Samples were analyzed for radionuclides, metals, and VOCs. Neither plutonium-239/240 nor americium-241 were detected at activities exceeding background levels. Uranium-234, uranium-235, and uranium-238 activities slightly exceeded background levels, with maximum detections of 4.788, 0.247, and 4.788 pCi/g, respectively. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was recommended for IHSS 150.3 based on the following:

- Contaminant activities and concentrations were less than RFCA WRW soil ALs.
- Results of the SSRS indicated that erosion of soil at this IHSS was not likely to expose residual contaminants and affect surface water, therefore additional action was not necessary.

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.3 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.4

IHSS Number:	150.4
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Radioactive Site Northwest of Building 750

This Final Update to the HRR for PAC 700-150.4 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.4 is summarized in this update. The following HRR volume contains IHSS 150.4 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1969 to 1981

Historical Summary

IHSS 150.4 consists of a 20- by 20-ft area around the sump located south of Building 778 outside Door 3, where a leaking process waste line was discovered in 1981. The location of IHSS 150.4 is shown on Figure 21. Decontamination fluid storage tanks were stored in this general area (southeast of Building 778) following the May 1969 fire in Building 776. The leaking line was repaired. No documentation regarding soil removal or other cleanup activities was found.

Specific isotopic analyses performed at the time of discovery indicated 900 pCi/L uranium but no plutonium (DOE 1992). Whether the analyses were performed on soil or water was not specified.

IHSS Investigations

One surface soil sample was collected in accordance with the Phase I RFI/RI Work Plan for OU 8, 700 Area (DOE 1994), and results indicated activities of uranium-234, uranium-235, and uranium-238 at 3.3, 0.15, and 3.5 pCi/g, respectively. Plutonium-239/240 and americium-241 were not detected at activities exceeding background values (DOE 1995, 2005). All radionuclide activities were less than RFCA WRW soil ALs (DOE et al. 2003).

One surface and four subsurface samples were collected from one sampling location in accordance with IASAP Addendum #IA-03-04 as part of IHSS Group 700-3 accelerated action soil characterization (DOE 2003). Samples were analyzed for radionuclides, metals, and VOCs. Americium-241 and plutonium-239/240 were not detected above background levels. Uranium-234, uranium-235, and uranium-238 were detected at maximum activities of 4.519, 0.26, and 4.519 pCi/g, respectively. Ethylbenzene, toluene, and xylenes were detected at concentrations of 36.3, 40.4, and 207 μg/kg in subsurface soil. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2005, DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for IHSS 150.4 based on the following:

- Residual COC activities and concentrations in IHSS 150.4 were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) indicated that additional action was not necessary because the soil is not in an area susceptible to erosion and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.4 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, IASAP Addendum #IA-03-04, IHSS Group 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.5

IHSS Number:	150.5
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	Not Applicable
Unit Name:	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)

This Final Update to the HRR for PAC 700-150.5 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.5 is summarized in this update. The following HRR volumes contain IHSS 150.5 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Date(s) of Operation or Occurrence

1953 to 1983

Historical Summary

PAC 700-150.5 was originally defined in the IAG as a radioactive leak west of Building 707 and was later determined to be the same as PAC 700-123.2. The location of IHSS 150.5 is shown on Figure 21.

IHSS Investigations

No investigation was deemed necessary for IHSS 150.5 because the site was investigated as IHSS 123.2. See PAC Reference Number 700-123.2 for a discussion of investigations at this site.

No Further Action Recommendation

IHSS 150.5 was proposed in the 1998 Annual Update to the HRR (DOE 1998) for NFA because IHSS 123.2 is the actual contamination site. IHSS 150.5 was approved as an NFA because the environmental investigations were planned and implemented as IHSS 123.2. IHSS 150.5 was approved by CDPHE (the LRA) and EPA as NFA in 1999 (CDPHE and EPA 1999) and was removed from maps. See PAC Reference Number 700-123.2 for information regarding the dispositioning of this site.

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBERS: 700-150.6 and 700-150.8

IHSS Numbers:	150.6 and 150.8
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-7
Unit Name:	Radioactive Site South of Building 779 (150.6) and Radioactive Site Northeast of Building 779 (150.8)

This Final Update to the HRR for PACs 700-150.6 and 700-150.8 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 150.6 and 150.8 is summarized in this update. The following HRR volumes contain information on IHSSs 150.6 and 150.8:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

June 1969

Historical Summary

In June 1969, radioactive contamination occurred due to an improperly opened waste drum in Building 779, and was spread by pedestrians tracking the contamination to areas east (IHSS 150.8) and south (IHSS 150.6) of the building. The locations of IHSSs 150.6 and 150.8 are shown on Figure 21. One portion of IHSS 150.8 overlaps with PAC 700-1105, a transformer site. The waste drum was being cut apart near the Building 779 eastern dock, which was located along the northern half of the eastern side of the building. The drum contained residual oil with radionuclides. Although the exact pathway along which workers walked was unknown, it was known that the building's south entrance was also contaminated. It is unclear whether workers got from the dock to the south entrance by walking inside the building, or by walking outside and around the building. The surface outside the building was mostly paved, and was heavily used by pedestrian traffic.

At the time of the incident, contaminated soil was placed in barrels and removed for off-site disposal. It is not known whether all areas affected by this incident were included in cleanup activities. It is also not known whether the removal of soil was in response to the incident described above or a separate incident. Contamination was measured at up to 50,000 dpm/100 cm^2 of gross alpha activity (DOE 1992).

IHSS Investigations

These IHSSs were investigated in accordance with the Phase I RFI/RI Work Plan for OU 8, 700 Area (DOE 1994), which required visual observations, radiological surveys, and surface soil sampling (DOE 1995). Ten surface soil samples were collected beneath paved areas and in unpaved areas, and analyzed for radionuclides, metals, and SVOCs. At one surface soil sampling

location near the overlap area between IHSS 150.8 and PAC 700-1105, Aroclor-1260 was detected at 21,000 µg/kg. This detection was considered to be part of PAC 700-1105, a transformer site that underwent soil remediation for PCBs; see PAC 700-1105 for details of this action. All other contaminant activities and concentrations for OU 8 samples in IHSSs 150.6 and 150.8 were less than RFCA WRW soil ALs (DOE et al. 2003). The maximum detected plutonium-239/240 activity was 2.6 pCi/g and the maximum detected americium-241 activity was 0.4 pCi/g (DOE 1995).

Based on this historical data, no additional characterization of IHSSs 150.6 and 150.8 was conducted as part of the IHSS Group 700-7 accelerated action (DOE 2003b, 2004).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for IHSSs 150.6 and 150.8 based on the following:

- Residual COC activities and concentrations in IHSSs 150.6 and 150.8 were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for 700-7 (DOE 2004) indicated that additional action was not necessary because the soil is not in an area susceptible to erosion and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the 2003 Annual HRR Update (DOE 2003a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSSs 150.6 and 150.8 on October 20, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S.H. Gunderson CDPHE, RE: No Further Accelerated Action (NFAA) for IHSS Groups 150.6 and 150.8 (B779), October 20.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-03-15, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-150.7

IHSS Number:	150.7
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-3
Unit Name:	Radioactive Site South of Building 776

This Final Update to the HRR for PAC 700-150.7 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 150.7 is summarized in this update. The following HRR volume contains IHSS 150.7 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

May 1969

Historical Summary

As shown on Figure 21, IHSS 150.7 consists of an area between Buildings 776/777 and 778, and an area between Buildings 778 and 707. Plutonium was tracked in these areas when firefighting and support personnel responded to the May 11, 1969 fire in Buildings 776 and 777. The spread of contamination south of Buildings 776 and 777 can also be attributed to the runoff of firewater sprayed on the building to contain the fire. Following the May 1969 fire, rain carried contamination into the soil.

Road oil and gravel were initially placed over the contaminated soil. An asphalt roadway was completed in the area on July 22, 1969. By December 1969, asphalt in the area, contaminated soil, and presumably the road oil and gravel had been removed from between the buildings.

In 1972, the soil at the southwestern corner of Buildings 776 and 777 was considered contaminated. The levels and source of this contamination were unknown, and it was not known whether the contamination was related to the 1969 fire.

IHSS Investigations

One surface soil sample was collected within IHSS 150.7, in accordance with the Phase I RFI/RI Work Plan for OU 8, 700 Area (DOE 1994), and the sample was analyzed for radionuclides. Americium-241 was detected above background at an activity of 0.026 pCi/g; however, all activities were less than the RFCA WRW soil AL (DOE 1995, DOE et al. 2003).

Surface and subsurface soil samples were collected from 20 sampling locations within IHSS 150.7 in accordance with IASAP Addendum #IA-03-04 as part of IHSS Group 700-3 accelerated action characterization sampling (DOE 2003). Most of the samples were analyzed for only radionuclides, however some were also analyzed for metals and VOCs. Americium-241 and plutonium-239/240 were detected at maximum activities of 0.993 and 5.662 pCi/g, respectively. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2005, DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for IHSS 150.7 based on the following:

- Residual COC activities and concentrations in IHSS 150.7 were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) indicated that additional action was not necessary because the soil was not in an area susceptible to erosion and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 150.7 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, IASAP Addendum #IA-03-04, IHSS Group 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-163.1

IHSS Number:	163.1
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Radioactive Site 700 North of Building 774 (Area 3) Wash Area

This Final Update to the HRR for PAC 700-163.1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS, which was conducted in accordance with the RFCA accelerated action process. The disposition of IHSS 163.1 is summarized in this update. The following HRR volumes contain IHSS 163.1 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Unknown

Historical Summary

CEARP Phase 1 interviewees indicated the area north of Building 774 was used to wash radioactively contaminated equipment. The location of IHSS 163.1 is shown on Figure 21 where the washwater flowed onto the ground. Building 774 personnel did not recall this area ever being used to wash equipment. The eastern half of the area is mostly flat and paved and was repaved in 1987 or 1988 (DOE 1992).

Washwater from radioactively contaminated equipment would be expected to have low levels of radionuclides and may also have contained various organic and inorganic compounds. A sitewide radiological survey was performed from 1977 through 1984. No radioactivity above background levels was indicated at this location by the radiological survey (DOE 1992).

IHSS Investigations

In accordance with the Phase I RFI/RI Work Plan for OU 8 (DOE 1994), nine surface soil samples were collected within IHSS 163.1 and analyzed for radionuclides, metals, and SVOCs. Americium-241 and plutonium-239/240 were detected at maximum activities of 0.017 and 0.55 pCi/g, respectively. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 1995, DOE et al. 2003).

During accelerated action characterization of IHSS Group 700-4, surface and subsurface soil samples were collected from 16 sampling locations within IHSS 163.1 in accordance with IASAP Addendum #IA-03-01 (DOE 2003). Samples were analyzed for radionuclides, metals, SVOCs, and PCBs. The maximum detected activities of plutonium-239/240 and americium-241 were 1.061 and 13.671 pCi/g, respectively. All contaminant activities and concentrations were less than WRW soil ALs (DOE 2004b, DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was recommended for IHSS 163.1 based on the following:

- All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-4 (DOE 2004b) indicated that additional action was not necessary because erosion of soil at this location was not likely to affect surface water.

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 163.1 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-163.2

IHSS Number:	163.2
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	700-4
Unit Name:	Radioactive Site 700 Area 3 Americium Slab

This Final Update to the HRR for PAC 700-163.2 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 163.2 is summarized in this update. The following HRR volume contains IHSS 163.2 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

Prior to 1973

Historical Summary

Burial of an americium-contaminated concrete slab was documented as north of Building 771. This slab was originally believed to be buried in the area near Building T771A by the Perimeter Road. According to this same source, the slab was later excavated and the contaminated portion cut away for off-site disposal. The location of IHSS 163.2 is shown on Figure 21.

The slab was approximately 8 ft square and 10 inches thick. From approximately 1962 until approximately 1968, the slab served as a foundation for a 5,000-gallon stainless steel tank located approximately 30 ft north of Building 771 (PAC 700-150.1). The tank was on 6-ft legs and was approximately 8 ft in diameter. Two overhead pipes from Room 114 in Building 771 connected to the tank. The tank was used in the Filtrate Recovery Ion Exchange system, which concentrated plutonium and americium for recovery. The resulting liquid contained in the tank was a nitrate solution high in americium with some plutonium (DOE 1992).

In approximately 1968, a pinhole leak developed in the tank and dripped onto the slab. The tank was temporarily sealed to mitigate the leak until the tank could be emptied through the processing of the contained solution. Once emptied, the tank was taken out of service and remained in place until it was taken to the size-reduction facility in Building 776 sometime shortly thereafter. Once size-reduced, the tank was disposed of as radioactive waste. When the tank was removed to the size-reduction facility, the concrete slab was decontaminated until the point where smear samples did not detect further removable radioactivity. Paint was applied to the concrete to secure the fixed radioactivity. The slab was moved to a ditch directly north of the area and buried at a probable depth of less than 10 ft. The area was paved sometime prior to June 1969. In the mid-1970s, Building T771A, a prefabricated structure, was constructed in the same general area. Interviewees familiar with the tank and the buried pad did not recall any subsequent excavation of the slab (DOE 1992).

In early 2003, information provided by a former employee who had been involved in the burial of the slab indicated that the burial site had been incorrectly located in the 1992 HRR

(DOE 1992). Based on the information provided, the slab was buried approximately 50 ft north of the original IHSS 163.2 location, in an area later covered by the North Patrol Road. This information was discussed with CDPHE and EPA on February 27, 2003, resulting in an agreement to move the IHSS location. A contact record dated March 7, 2003 documents the decision.

IHSS Investigations

IHSS 163.2 was sampled in accordance with IASAP Addendum #IA-03-01 (DOE 2003). The five sampling locations originally proposed were moved approximately 50 feet north in response to the IHSS location change discussed above. Both surface and subsurface (to 6.5 ft bgs) soil samples were analyzed for radionuclides. Plutonium-239/240 and americium-241 were not detected in excess of background levels. Uranium-234, uranium-235, and uranium-238 were detected slightly in excess of background levels, with maximum activities of 5.394, 0.271, and 5.394 pCi/g, respectively. Based on these results, an americium-contaminated slab did not appear to have been buried in the area sampled. The Geoprobe used to collect the subsurface samples did not encounter buried concrete. In response to these results, three new locations were sampled in the original IHSS 163.2 area identified in the 1992 HRR (DOE 1992). Results for these samples indicated plutonium-239/240 and americium-241 were not present above background levels and uranium-234, uranium-235, and uranium-238 detected at maximum activities of 5.435, 0.347, and 5.435 pCi/g, respectively (DOE 2004). All radionuclide activities were well below RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA was recommended for IHSS 163.2 based on the following:

- All contaminant activities were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004) indicated that additional action was not necessary because erosion of soil at this location was not likely to affect surface water.

After review of the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 163.2 on February 6, 2004 (CDPHE 2004).

Comments

As explained above, the location of IHSS 163.2 was changed because of information received in 2003 from a past employee who recalled the burial of the americium-contaminated slab. The change was anticipated to be documented in the 2004 HRR Annual Update (DOE 2004), but is instead documented in this 2005 Update.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-185

IHSS Number: 185

Current Operable Unit: 16

Former Operable Unit: 16

IHSS Group: Not Applicable

Unit Name: Solvent Spill

This Final Update to the HRR for PAC 700-185 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 185 is summarized in this update. The following HRR volumes contain IHSS 185 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Date(s) of Operation or Occurrence

November 10, 1985

Historical Summary

The fork of a forklift punctured a 55-gallon drum of 1,1,1-trichloroethane on the southeastern dock of Building 707, causing approximately 4 gallons of the solvent to leak onto the loading dock and adjacent paved areas. The location of IHSS 185 is shown on Figure 21. Four bags of a commercial absorbent were used to clean up the spill. The absorbent was then placed in drums by the Fire Department and taken to a hazardous waste storage area (DOE 1992a).

The cleanup response action was immediate. Also, because of the high vapor pressure of 1,1,1-trichloroethane, any solvent remaining on the pavement would have volatilized rapidly. It is unlikely that solvent would have reached native soil material, and, therefore, it is unlikely that solvent could have been detected in soil samples. In addition, 1,1,1-trichloroethane was not detected in any of the eight groundwater samples collected between November 1989 and April 1992 from nearby downgradient monitoring well P218089 (DOE 1996).

IHSS Investigations

No IHSS 185-specific investigation was deemed necessary.

No Further Action Recommendation

An NFA was recommended because the solvent spill occurred on pavement and was cleaned up immediately. Because the vapor pressure of 1,1,1-trichloroethane is high, the transport pathways to soil were eliminated. In addition, analytical data for groundwater samples collected from monitoring well P218089 indicated no 1,1,1-trichloroethane contamination was present in groundwater.

Based on the above information, which was presented in the Final NFA Justification Document for OU 16, Low-Priority Sites (DOE 1992b), a CAD/ROD recommending No Action under

CERCLA for IHSS 185 was prepared (DOE 1994) and approved on October 28, 1994 (DOE et al. 1994).

Comments

CERCLA Five Year Review: The CAD/ROD for OU 16 (DOE 1994) indicates that a five-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final No Further Action Justification Document for Operable Unit 16, Low-Priority Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1994, Corrective Action Decision/Record of Decision for Operable Unit 16, Low-Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1994, Corrective Action Decision/Record of Decision Declaration, Rocky Flats Environmental Technology Site, Golden, Colorado, October 28.

PAC REFERENCE NUMBER: 700-194

IHSS Number:	194
Current Operable Unit:	16
Former Operable Unit:	16
IHSS Group:	Not Applicable
Unit Name:	Steam Condensate Leak – 700 Area

This Final Update to the HRR for PAC 700-194 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 194 is summarized in this update. The following HRR volumes contain IHSS 194 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 1996 Annual (DOE 1996).

Date(s) of Operation or Occurrence

September 26, 1979

Historical Summary

A steam condensate line break occurred in the Building 707 area on September 26, 1979. The location of IHSS 194 is shown on Figure 21. The water from the line break flowed into the surface water drainage through Pond B-4 (PAC NE-142.8) to Walnut Creek. The steam condensate contained tritium at approximately 1,000 pCi/L. The volume of condensate that leaked was not determined, and it is unknown whether the area was paved at the time of the incident. On September 27, surface water drainage was diverted to Pond B-1 PAC NE-142.5) and the valve to Pond B-5 (PAC NE-142.9) was closed.

The State of Colorado site-specific standard for tritium activity in surface water was 500 pCi/L. Based on the rapid decay of tritium, which has a half-life of 12.26 years, the tritium activities in RFETS surface water were determined to be below the site-specific standard at the time an NFA Justification was prepared (DOE 1992b).

Between September 26 and 29, 1979, surface water sampling results from Pond B-4 ranged in tritium activity from less than 524 pCi/L to approximately 926 pCi/L. A 24-hour composite sample collected from Walnut Creek at Indiana Street on September 26 contained 1,163 pCi/L of tritium. A grab sample collected the next day from the sampling location contained approximately 700 pCi/L. The maximum tritium background activity in surface water is 980 pCi/L.

Additional sampling confirmed that tritium present in surface water would decay rapidly. Surface water samples collected from Pond B-1 in 1989 yielded a tritium activity of 360 pCi/L ± 200 pCi/L. In addition, groundwater samples collected from a nearby monitoring well contained tritium activities ranging from 110 to 383 pCi/L, within the range of background activities (390 pCi/L maximum) reported for alluvial groundwater.

IHSS Investigations

No IHSS 194-specific investigation was deemed necessary.

No Further Action Recommendation

Because of the rapid decay rate of tritium and because tritium activities associated with this IHSS were within background levels and the site-specific standard, NFA was recommended for IHSS 194. Based on information presented in the Final NFA Justification Document for OU 16, Low-Priority Sites (DOE 1992b), a CAD/ROD recommending No Action under CERCLA for IHSS 194 was prepared (DOE 1994) and approved on October 28, 1994 (DOE et al. 1994).

Comments

CERCLA Five Year Review: The CAD/ROD for OU 16 (DOE 1994) indicates that a five-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final No Further Action Justification Document for Operable Unit 16, Low-Priority Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1994, Corrective Action Decision/Record of Decision for Operable Unit 16: Low-Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1994, Corrective Action Decision/Record of Decision Declaration, Rocky Flats Environmental Technology Site, Golden, Colorado, October 28.

PAC REFERENCE NUMBER: 700-214

IHSS Number: 214

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 700-8

Unit Name: 750 Pad – Pondcrete/Saltcrete Storage

This Final Update to the HRR for PAC 700-214 consolidates the information in the initial 1992 HRR with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 214 is summarized in this update. The following HRR volume contains IHSS 214 information:

Original Report – 1992 (DOE 1992a).

Date(s) of Operation or Occurrence

1969 to 2003

Historical Summary

The 750 Pad (RCRA Unit 25) was constructed in 1969 and was initially used as a parking lot for Building 750. The location of IHSS 214 is shown on Figure 21. According to the IASAP (DOE 2001), the 750 Pad was constructed of a 6-inch-thick aggregate layer overlain by a 2-inch-thick asphaltic concrete layer. The pad was located approximately at grade, and sloped 2 percent to the east. Of the original 220,000 ft^2, 104,000 ft^2 was used for waste storage.

Waste storage began on November 18, 1986. In 1986, prior to start of waste storage, 142,000 ft^2 of the 750 Pad was covered with Petromat and 3 inches of asphalt, and 8-inch-high asphalt berms were constructed along the east and portions of the northern and southern sides of the pad (DOE 2001).

Runoff from the 750 Pad was collected in seven stormwater inlets between 10th Street and the 750 Pad. The stormwater inlets were directly piped to a culvert that drained to South Walnut Creek. All runoff water storage behind the 8-inch berm occurred in the immediate vicinity of the stormwater inlets. Calculated storage potential behind the berm was approximately 500 ft^3. Any precipitation event that exceeded approximately 0.03 inch resulted in runoff flowing over the berms (DOE 2001).

Pondcrete and saltcrete were stored within the bermed area of the 750 Pad. Pondcrete was a LLMW composed of sludge or sediment from the SEP mixed with Portland cement. Saltcrete was a LLMW composed of process waste from Building 374 mixed with Portland cement. The material was placed in polyethylene-lined, 3/4-inch plywood boxes measuring 4 ft by 2.5 ft by 7 ft, and stacked three high on the pad. Metal boxes measuring 4 ft by 4 ft by 7 ft were also used (DOE 2001).

Production of pondcrete ceased on May 23, 1988, in response to spills on the 904 Pad. During a detailed inspection of waste stored on the 750 Pad, approximately 5 percent (440) of pondcrete boxes were identified as being of poor quality (that is, containing unhardened pondcrete).

Severely deformed boxes of waste were transferred to metal boxes or to Building 788 and stored for reprocessing.

Between November 1, 1988, and July 25, 1989, a total of 64 saltcrete boxes were identified as leaking during routine inspections. Approximately 113 pounds of saltcrete leaked or spilled on to the 750 Pad. The spill locations were cleaned by vacuuming until radiation levels measured below detection limits on the instruments being used for the cleanup. The quantity of saltcrete that was retrieved is unknown.

From November 18, 1986, to September 1, 1989, two spills of pondcrete occurred. The spills, totaling approximately 0.5 ft^3, were released to the asphalt pad. Both spills consisted of unhardened SEP sludge and cement. Following each incident, the entire contents of the failed container and spilled pondcrete were transferred to metal boxes. The spill locations were then cleaned using water and brooms to scrub the 750 Pad surface remove pondcrete from the crevices in the asphalt. Water was collected using wet vacuums. Cleaning continued until radiation levels measured below detection limits on the instruments being used for the cleanup.

In May 1990, wet and severely deformed cardboard boxes were observed being transported into storage tents. Torn boxes with exposed plastic inner liners were also observed (DOE 2001).

Portable air monitors were moved to the 750 Pad shortly after the spill incidents. Based on these air monitors, no releases exceeded the Site Screening Guide for plutonium (0.01 picocuries per cubic meter [pCi/m^3]). No soil monitoring was conducted at the 750 Pad to determine whether precipitation had transported contaminants to the soil (DOE 2001).

According to the HRR (DOE 1992), portable buildings were constructed to prevent precipitation from coming in contact with the waste. Pondcrete was being stored at the 750 Pad as late at 2001 (DOE 2001).

Beginning in the mid-1990s, SEP sludge was stored in tanks. Units 750.2A, B, and C were comprised of 82 10,000-gallon tanks. Each tank was double-walled and constructed of HDPE. Seventy-nine tanks were used to store sludge that was generated from the SEP remediation project. The remaining three tanks were never used, but they served as overfill protection. Twenty-seven of the tanks contained sludge generated from SEP Ponds A and B, and the remaining 52 tanks were filled with waste generated from SEP Pond C and the clarifier. The sludge was characterized with EPA hazardous waste codes F001, F002, F005, F006, F007, and F009. In addition, after the SEP sludge was removed from Tank 25.077, the tank was reused to process sludge from Building 374. The additional EPA hazardous waste codes for this tank were P030, P098, P099, P106, U003, U103, and U108.

The closure methods employed for these tanks were documented in PRO-1505-750Pad-PSTANK-DECON, Pond Sludge Tank Decontamination for 750 Pad Project. Tank decontamination methodology consisted of waste removal, high-pressure wash, size reduction, cleaning/decontamination, and verification of “clean debris surface” as defined in Part 268, Table 1, Note 3. The tank pieces and ancillary equipment were either packaged as sanitary waste, LLW, or LLMW. In general, tank pieces with no visible pond sludge material/debris or that had no contact with the sludge were managed as sanitary waste. Tank pieces with visible pond sludge material/debris that were verified clean after being rinsed and wiped down with a decontamination solution were managed as LLW. Tank pieces with visible pond sludge were

managed as LLMW. All waste was packaged and shipped offsite for disposal. The last tank was removed by December 18, 2003.

All pondcrete and saltcrete were removed from the Pad and disposed of offsite. The 750 Pad was removed during 2005 (DOE 2005). The top 0.6 to 1.0 centimeters (cm) of asphalt was removed and disposed of as hazardous waste. The remainder was removed and disposed of as sanitary waste.

The 750 Pad was a RCRA-permitted unit and was treatment, storage, and disposal (TSD)-compliant for secondary containment and enclosure to prevent runon and runoff. Responses to spills were conducted in accordance with the permit emergency response requirements, including implementing the Contingency Plan when required.

IHSS Investigations

Surface and subsurface soil and sediment samples were collected from 15 sampling locations around the 750 Pad in accordance with the Phase I RFI/RI Work Plan for OU 10 (DOE 1992b). Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Plutonium-239/240 and americium-241 activities, and cyanide, nitrite, and metal concentrations in soil were greater than MDLs or background at several locations. The maximum detected activities of americium-241 and plutonium-239/240 were 1.13 and 0.12 pCi/g, respectively. VOCs and PAHs were also detected at several locations (DOE 1995). All contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2004a, DOE et al. 2003).

Analysis of surface water samples collected in the area of IHSS 214 indicated the presence of gross alpha, gross beta, nitrate, cyanide, and cadmium. Analysis of groundwater samples collected from upgradient well P207389 indicated detections of metals and other inorganics including calcium, magnesium, manganese, and sulfate. Radionuclides detected include americium-241, tritium, uranium-233, uranium-235, and uranium-236 (DOE 2001). No downgradient analytical data were available.

Accelerated action characterization soil sampling was conducted from August 31, 2004, through September 28, 2004, in accordance with IASAP Addendum #IA-04-12 (DOE 2004b). Surface and subsurface soil samples were collected from 55 locations (statistical and biased). Statistical sampling locations were selected using a 22-meter sampling grid, and biased sampling locations targeted known spill areas, paved areas where the asphalt was cracked or failing, and paved areas that had been patched or repaired. Sediment samples were collected from the seven storm drain inlets located along the eastern perimeter of the 750 Pad. Samples were analyzed for radionuclides, metals (including beryllium and lithium), PCBs, and SVOCs. In addition, the 55 subsurface soil samples were analyzed for VOCs. No contaminant activities or concentrations in surface or subsurface soil at IHSS 214 were greater than the RFCA WRW soil ALs (DOE 2004a, DOE et al. 2003). Plutonium-239/240 and americium-241 activities did not exceed background levels in surface soil samples and americium-241 did not exceed background in subsurface soil samples. Plutonium-239/240 was detected in one subsurface soil sample at an activity of 0.051 pCi/g. Aroclor-1260 was detected in two surface and one subsurface soil sample at a maximum of 16 μg/kg in surface soil and 40 μg/kg in subsurface soil. Aroclor-1254 was detected at 38 μg/kg in one subsurface soil sample. Pentachlorophenol was detected in one subsurface soil sample at 470 μg/kg. A majority of the remaining detections were of uranium isotopes at levels

slightly above background, and PAH compounds at levels well below RFCA WRW soil ALs (DOE 2004a, DOE et al. 2003).

All waste was removed from the 750 Pad in 2005 and the Pad was removed (DOE 2005).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for IHSS 214 based on the following:

- Residual COC activities and concentrations in IHSS 214 were less than RFCA WRW soil ALs.
- Results of the SSRS presented in the Data Summary Report for IHSS Group 700-8 (DOE 2004a) indicated that additional action was not necessary because the soil was not in an area susceptible to erosion and did not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the Data Summary Report for IHSS Group 700-8 (DOE 2004a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 214 on December 17, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 700-8, December 17.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Other Outside Closures (Operable Unit No. 10), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Draft Technical Memorandum 1 Operable Unit No 10 Other Outside Closures, Rocky Flats Plant, Golden, Colorado, January

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004a, Data Summary Report for IHSS Group 700-8, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004b, Final Industrial Area Sampling and Analysis Plan FY04 Addendum #IA-04-12, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2005, Closure Summary Report for the 750 Pad, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-215

IHSS Number:	215
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-4
Unit Name:	Process Waste Tank Unit 55.13 (Tank T-40)

This Final Update to the HRR for PAC 700-215 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 215 is summarized in this update. The following HRR volumes contain IHSS 215 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1963 to September 1989

Historical Summary

The location of IHSS 215 is shown on Figure 21. The concrete mixed-waste storage tank (Tank T-40 also called Tank 13), adjacent to Room 103 of Building 771, was constructed in 1963. The roof of the tank served as the floor of Room 203. The tank held sludge from second-stage precipitation of liquid process waste from Building 771. Effluent from a silver recovery unit in Building 774 was also stored in the tank. Use of Tank T-40 ceased when the tank was replaced in September 1989.

IHSS Investigations

In accordance with IASAP Addendum #IA-03-01 for IHSS Group 700-4 (DOE 2003), five surface soil characterization samples targeting IHSS 215 were collected as part of accelerated action activities for IHSS Group 700-4 in fall 2003. Samples were analyzed for radionuclides, SVOCs, metals, and nitrate. Analytical results indicated americium-241 was present at an activity of 1.2 nCi/g and plutonium-239/240 was present at an activity of 1.69 nCi/g at the southeastern corner of the IHSS. In addition, americium-241 was present at an activity of 116 pCi/g and plutonium-239/240 at 943 pCi/g at the southwestern corner of the IHSS. All other analyte concentrations were less than RFCA WRW soil ALs. Analytical results from the characterization are presented in the ER RSOP Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b). Because the americium-241 and plutonium-239/240 were at depths greater than 6 ft beneath the surface, no action was required in accordance with RFCA (DOE et al. 1996, 2003).

During D&D of Building 774, Tank T-40 was removed.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA determination was justified for IHSS 215 in the ER Notification and Closeout Report for IHSS Group 700-4 (DOE 2004b). Migration of subsurface contaminants in IHSS 215 to surface water through erosion is unlikely because the locations with results greater than RFCA WRW soil ALs (DOE et al. 2003) will be well below the ground surface (at least 6 ft at Buildings 771 and 774) after D&D actions are complete.

After review of the ER RSOP Notification and Closeout Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 215 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774) - Approval, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado

PAC REFERENCE NUMBER: 700-1100

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-3
Unit Name:	French Drain North of Buildings 776/777

This Final Update to the HRR for PAC 700-1100 consolidates the information in the initial 1992 HRR with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1100 is summarized in this update. The following HRR volume contains PAC 700-1100 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

Approximately 1963 to 1972

Historical Summary

A French drain, which was in use from approximately 1963 until at least 1972 and then removed, ran north from Door 17 of Building 776, across the alleyway, then east where its effluent leached into the soil. The location of PAC 700-1100 is shown on Figure 21. Radioactive contamination at this site was the result of the June 1964 explosion and release of plutonium in Building 776 (see discussion under PAC 700-131, DOE 1992). The area was again contaminated at the time of the May 1969 fire in Building 776. This drain may have provided a pathway for the migration of radioactive contamination. Another source indicated the French drain ran north from Door 14 of Building 776 (three doors to the west). Plutonium contamination present at this site as a result of the 1964 and 1969 incidents was possibly redistributed below the ground surface, although no surface expression was noted.

No documentation was found that discusses removal of the French drain. The drain could not be located in the RFETS Utility Drawings. The drain was not encountered during the IHSS Group 700-3 characterization and remediation (DOE 2005a) or building demolition as documented in the Decommissioning Closeout Report for the 776/777 Closure Project (DOE 2005b).

PAC Investigations

Fifteen surface soil samples were collected from the IHSS 131 and PAC 700-1100 areas during the OU 8 Phase I RFI/RI in accordance with the Phase I RFI/RI Work Plan for OU 8, 700 Area (DOE 1994). Seven of these were within or immediately adjacent to PAC 700-1000. Soil samples were analyzed for radionuclides, metals, VOCs and SVOCs. Plutonium-239/240 and americium-241 were detected at maximum activities of 0.54 and 0.10 pCi/g. Uranium-238 was detected at a maximum activity of 1.79 pCi/g and uranium-234 and uranium-235 were not detected above background. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 1995, 2005a, DOE et al. 2003).

PAC 700-1100 was investigated as part of the accelerated action activities for IHSS Group 700-3 (DOE 2005a), which included soil characterization, as well as removal of Building 730, the Building 701 slab and associated radioactive hot spots, Tanks T-9 and T-10, waste lines, and soil contaminated with solvents, oil, fuel, and radionuclides. Surface and subsurface samples were collected from 10 sampling locations within and around PAC 700-1100 in accordance with IASAP Addendum #IA-03-04 for IHSS Group 700-3 (DOE 2003). Only one of the samples was within the exact footprint area of PAC 700-1100, but a majority were within several feet of it. Samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Plutonium-239/240 and americium-241 were not detected at activities greater than background in any samples. Uranium-234, uranium-235, and uranium-238 were detected in surface soil at maximum activities of 4.114, 0.235, and 4.114 pCi/g in surface soil and 3.986, 0.195, and 3.986 pCi/g in subsurface soil.

Benzo(a)pyrene concentrations exceeded the RFCA WRW soil AL (DOE et al. 2003) in two subsurface soil samples collected at depths of 2.5 to 4.5 ft bgs and 4.5 to 6.5 ft bgs at a sampling location within IHSS 131 approximately 12 ft south of the PAC 700-1100 boundary. Both samples had benzo(a)pyrene concentrations of 5,200 µg/kg, which exceeds the RFCA WRW soil AL of 3,490 µg/kg (DOE et al. 2003). Arsenic concentrations exceeded the RFCA WRW soil AL (DOE et al. 2003) in two samples from 4.5 to 6.5 ft bgs. The maximum concentration of arsenic was 44 mg/kg, while the RFCA WRW soil AL is 22.2 mg/kg (DOE et al. 2003). Chromium was detected at a concentration greater than the RFCA WRW soil AL (DOE et al. 2003) in one sample collected at 4.5 to 6.5 ft bgs. Chromium was detected at 11,000 mg/kg while the RFCA WRW soil AL is 268 mg/kg.

The arsenic and chromium exceedances occurred at locations in IHSS 131 within approximately 5 ft of the boundary of PAC 700-1100. These exceedances did not require remediation under RFCA, however, soil from IHSS 131 and PAC 700-1100 was excavated as part of a RFCA (DOE et al. 1996) accelerated action implemented in accordance with ER RSOP Notification #04-04 (DOE 2004). The excavation required to remove Tanks T-9, T-10, and Building 730 extended into the northeastern portions of IHSS 131 and PAC 700-1100. Details are provided in the IHSS Group 700-3 Closeout Report (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 700-1100 based on the following:

- Surface soil analytical results were less than RFCA WRW soil ALs (DOE et al. 2003). Subsurface soil analytical results were less than RFCA WRW soil ALs (DOE et al. 2003) with the exceptions noted above.
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005a) indicated that additional action was not necessary because the area is not erodable and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 700-1100 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Phase I RFI/RI Work Plan for Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995, Draft Data Summary, Operable Unit 8, 700 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, IHSS Group 700-3 Area, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-04, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005b, Decommissioning Closeout Report for the 776/777 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1101

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-10
Unit Name:	Laundry Tank Overflow – Building 732

This Final Update to the HRR for PAC 700-1101 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1101 is summarized in this update. The following HRR volumes contain PAC 700-1101 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

June 26, 1979

Historical Summary

PAC 700-1101 consisted of the following two parts of Building 732: a reinforced-concrete stairwell approximately 7 by 17.6 ft in area and 8 ft high, and an underground, reinforced-concrete room, 14 by 27.7 ft in extent. The location of PAC 700-1101 is shown on Figure 21. The stairwell descended to the south and then opened to the east into the concrete room. Undisturbed soil below the room was approximately 13.7 ft below existing grade. Within the room was a 1,000-gallon fiberglass holding tank (T-4), two pumps, and two banks of particulate filters. In the southeastern corner of the room was a sump that was 1.5 by 1.5 ft in area and 2 ft deep. There were no process lines or foundation drains under the building. At the time of construction, the walls of Building 732 were waterproofed on the inside and outside. In the early 1990s additional sealant was applied to all exterior-wall, ceiling, and floor joints (DOE 2004b).

Under normal operations, laundry water and water from floor drains in Building 778 were pumped to Building 732, filtered, and then passed on to Valve Vault 9, eventually reaching Building 374 for treatment. Water collected in the Building 732 sump was pumped back to a secondary containment sump in Building 778. From there it was returned to the tank in Building 732 (DOE 2004b).

In June 1979, laundry wastewater in Tank T-4 overflowed onto the room floor because of malfunctioning pumps that normally sent the wastewater through the filters. Records do not indicate whether the sump was able to pump the overflow back to Building 778 or whether additional secondary pumping was necessary. It is possible that laundry wastewater was released to the environment. Because of the nature of building activities, it is probable that any laundry water released to the environment could have been LLW (DOE 2004b).

PAC Investigations

Accelerated action characterization activities at PAC 700-1101 were conducted in accordance with IASAP Addendum #IA-04-07 (DOE 2004c). Twenty subsurface soil samples were collected from four soil boring locations and analyzed for radionuclides and VOCs. One sample of incidental water (categorized as groundwater) was analyzed for metals. The water was found covering the floor of the sump during field sampling. Uranium isotopes were detected at activities slightly exceeding background levels at each of the four subsurface soil sampling locations. The maximum detected concentrations of uranium-234, uranium-235, and uranium-238, respectively, were 5.674, 0.362, and 5.674 pCi/g (DOE 2004b). No other radionuclides were detected at levels exceeding background. A number of VOCs were detected at concentrations slightly above the detection limits, but four to seven orders of magnitude below the applicable RFCA WRW soil ALs (DOE et al. 2003). The most frequently detected VOC was trichloroethene, with a maximum concentration of 8.4 µg/kg (DOE 2004b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 700-1101 based on the following:

- Contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Data Summary Report for IHSS Group 700-10 (DOE 2004b) indicated that additional action was not necessary because the area is not erodable and does not contain enough contaminants and a sufficient pathway to cause an exceedance of surface water standards.

After review of the IHSS Group 700-10 Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status of PAC 700-1101 in a letter dated September 21, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 700-10, PAC 700-1101 Laundry Tank Overflow – Building 732, September 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 700-10, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004c, Industrial Area Sampling and Analysis Plan Addendum #IA-04-07, IHSS Group 700-10, PAC 700-1101 (Laundry Tank Overflow – Building 732), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1102

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformer Leak – 776-4

This Final Update to the HRR for PAC 700-1102 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1102 is summarized in this update. The following HRR volumes contain PAC 700-1102 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996);
Update Report – 1997 Annual (DOE 1997a);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to September 1986

Historical Summary

The location of PAC 700-1102 is shown on Figure 21. Prior to January 1986, Transformer 776-4 was located approximately 100 ft west of the northwestern corner of Building 776. The transformer pad at this location was positioned on an incline with drainage toward an access road 15 ft east. In January 1986, a Plant employee reported that a leak was observed from Transformer 776-4. In February 1986, the transformer was again reported to be leaking on the radiator and around the gauges, valves, and bushing compartment. There was an oily film on most of the transformer surfaces and the transformer pad. In an August 1986 photograph, staining was visible on the concrete pad beneath the transformer. Further leaking was reported in August and September 1986. Samples collected in November 1986 of the concrete under the transformer drain valve, as well as soil at the southern edge of the transformer pad, had elevated levels of PCBs (DOE 1992). The transformer was moved to a new pad several feet north in 1987 (DOE 1996).

In September 1976, the oil in Transformer 776-4 had a PCB concentration of approximately 5 percent (using a PCB test kit). Samples of the oil collected in November 1977 indicated the fluid in the transformer had a PCB concentration of approximately 3 percent. In October 1985, the oil was reported to have a PCB concentration greater than 500 ppm (test method unknown). In November 1986, wipe samples collected from a valve, sidewall, and the concrete pad were found to contain 29.8, 5.0, and 417.5 ppm PCBs, respectively. Also in November 1986, a wipe sample collected from the concrete pad beneath the drain valve was found to contain 498 $\mu g/cm^2$ PCBs. Soil samples collected in November 1986 from the southern edge of the original transformer pad indicated 14,900 ppm PCB contamination (DOE 1992).

In September 1976, Transformer 776-4 was documented as being drained and refilled with a non-PCB silicone oil. The transformer was scheduled for replacement under the PCB Fire Hazard Elimination Project in FY1988. The transformer was removed for retrofilling and relocated several feet north in 1987. The original transformer pad surface was partially removed (scabbled) to a depth of 4 inches and left in place. In March 1989, it was reported that Transformer 776-4 was replaced under the Environmental Hazards Elimination Project.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected in accordance with approved EPA sampling protocol and analyzed for PCBs using EPA Method 8080. The highest PCB concentration found in soil adjacent to the old PAC 700-1102 concrete transformer pad was 480 ppm Aroclor-1260; other Aroclors were not detected (DOE 1991).

In accordance with the agency-approved Final PAM for Remediation of PCBs (DOE 1995), additional samples were collected in 1995 and 1996 to verify the lateral and vertical extent of PCB migration. Soil samples were analyzed using EPA Draft Method 4020, and concrete samples were analyzed using EPA Method 8080. Based upon analytical results for the concrete samples, the highest PCB level on the concrete pad was 56 ppm.

In accordance with the PAM, approximately 177 cy of PCB-contaminated soil and 10.7 cy of PCB-contaminated concrete were excavated to a depth of 17 ft, containerized, and shipped offsite for disposal (DOE 1997b). A 20-ft^2 area of soil at the bottom of the excavation (17 ft), remained PCB-contaminated. Soil at the bottom of the excavation had a residual PCB concentration of 70 ppm using EPA Method 8080, as documented in the Closeout Report for the Source Removal of PCBs (DOE 1997b). Excavation was stopped because of equipment limitations and health and safety concerns. The excavation was filled with clean structural backfill in 1996.

PAC 700-1102 was recommended for NFA in the 1997 Annual Update to the HRR (DOE 1997a); however, comments received from the regulatory agencies on July 19, 1999, indicated that additional groundwater samples should be collected to ensure that PCB contamination was not mobilized in the subsurface. Groundwater samples were collected for PCBs during FY2001 at two downgradient locations: well 22696 and the Building 771/776 tunnel. The underground tunnel connecting Buildings 776 and 771 is immediately east of PAC 700-1102 and approximately 23 ft in depth. These locations are shown on Figure 2.11 of the 2001 HRR Annual Update (DOE 2001). Groundwater samples did not contain detectable concentrations of PCBs.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future

cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Although the residual Aroclor concentration at PAC 700-1102 was 70 ppm, well above the 10 ppm level noted above, the contamination is at a depth of 17 ft, which precludes direct human exposure to the soil. Therefore, there is no human health risk associated with the residual contamination.

Groundwater samples were collected and analyzed downgradient of PAC 700-1102, and PCBs were not detected. In accordance with RFCA (DOE et al. 1996), NFAA was recommended for PAC 700-1102 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c) based on the site data, groundwater data, and White Paper findings noted above.

After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1102 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action Justification for PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Reports for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1103

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Leaking Transformers – Building 707

This Final Update to the HRR for PAC 700-1103 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1103 is summarized in this update. The following HRR volumes contain PAC 700-1103 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

November 1986 to 1987

Historical Summary

The location of PAC 700-1103 is shown on Figure 21. Transformers 707-1 through 707-6 were located on the eastern side of the Building 707 roof. Concrete under several of the transformer drain valves was found contaminated with PCBs in November 1986 (DOE 1992). A leak from Transformer 707-1 was discovered in 1987 during routine maintenance when the transformer was found to be low in dielectric coolant oil. Visible evidence of the leak was observed around the valve area and weld seams. Analytical data of soil and swipe samples confirmed that the pad on the roof and soil on the ground immediately east of Building 707 were contaminated with PCBs. The soil contamination resulted from rainwater collecting on the rooftop where the transformers were located, then being released through a downspout to the ground (DOE 1992).

Wipe samples collected from the concrete under several of the transformer drain valves were analyzed in November 1986. PCB concentrations ranged from 135 to 7,200 ppm. The concentration of PCBs in the soil immediately under the downspout was 1,600 ppm (DOE 1992).

In March 1991, 13 surface and subsurface soil samples were collected to identify PCB concentrations. Results from a sample immediately east of Building 707, under a downspout suspected of being a migration pathway from the contaminated rooftop, indicated PCB concentrations of 1,600 ppm in the surface and 180 ppm between 1.0 and 1.5 ft in depth. PCB concentrations decreased with distance outward from the building to approximately 9.7 ppm in surface soil and less than 1.0 ppm in subsurface soil (DOE 1991).

PAC Investigations

In 1992, an extensive TSCA cleanup of PCB contamination on the 707 rooftop was performed that included removal of the leaking 707-1 transformer, repair of the transformer, cleanup of the concrete rooftop to achieve a cleanup standard of 100 milligrams per 100 centimeters

(mg/100 cm), and subsequent replacement of the repaired transformer. The 707-1 transformer was retrofilled with non-PCB dielectric oil and reenergized (DOE 1996).

Under the approved Final PAM for Remediation of PCBs (DOE 1995), further sample screening was completed in July and August 1995 using MRI methods (EPA 1986) to verify the lateral and vertical extent of PCB migration. Approximately 67 cy of PCB-contaminated soil was excavated from the site. The soil was containerized and shipped offsite for disposal in September 1995 (DOE 1997). PCB levels remaining in the soil were less than 10 ppm using EPA Method 4020 (Immunoassay Field Technique) and less than 12 ppm (5 ppm Aroclor-1260 and 7 ppm Aroclor-1254) using EPA Method 8080. Split samples were analyzed using EPA Method 8080 to provide confirmation of the Method 4020 Immunoassay Field Technique. The excavation was backfilled and regraded upon receipt of Method 8080 cleanup confirmation sampling results in August 1995.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

In accordance with RFCA (DOE et al. 1996), an NFAA was justified as appropriate for PAC 700-1103 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c) based on the site remediation and confirmation data, and the White Paper findings noted above.

After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1103 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action Justification for PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 1986, Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, Office of Toxic Substances, EPA-560/5-86-017, Washington, D.C., May.

PAC REFERENCE NUMBER: 700-1104

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Leaking Transformer – Building 708

This Final Update to the HRR for PAC 700-1104 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1104 is summarized in this update. The following HRR volumes contain PAC 700-1104 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

November 1986 through 1987

Historical Summary

The location of PAC 700-1104 is shown on Figure 21. Transformer 708-1 was located on the western side of Building 708. In February 1987, concrete under the Transformer 708-1 drain valve was found to be contaminated with PCBs. According to an interview with utility personnel, electrical equipment located west of Building 708 leaked PCB-contaminated oil prior to 1987 (DOE 1992).

Two wipe samples collected from the concrete under the Transformer 708-1 drain valve were analyzed and found to contain 1,035 and 3,750 ppm PCBs (DOE 1992).

PAC Investigations

Four transformers were removed and retrofilled in 1987. Rock and gravel fill were placed around the transformer pads prior to replacement with non-PCB transformers in 1987 or 1988.

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected in accordance with approved EPA sampling protocols and analyzed for PCBs. The highest PCB concentration of 860 ppm Aroclor-1254 was found in a soil sample collected adjacent to the concrete transformer pads; no other Aroclors were detected at this site (DOE 1991).

Under the approved Final PAM for Remediation of PCBs (DOE 1995), additional sample screening was completed in 1995 to verify the lateral and vertical extent of PCB migration. Soil samples were analyzed using EPA Method 4020. In accordance with the PAM (DOE 1995), approximately 21 cy of PCB-contaminated soil were excavated, containerized, and shipped offsite for disposal (DOE 1997). The cleanup verification analytical results for PCBs in the soil were less than 10 ppm using EPA Method 4020, and less than 3.2 ppm using EPA Method 8080. Split samples were analyzed using EPA Method 8080 to provide confirmation of the EPA

Method 4020 (Immunoassay Field Technique) analytical results. There were no detections of PCBs on the concrete transformer pad using EPA Method 8080.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

In accordance with RFCA (DOE et al. 1996), an NFAA was recommended as appropriate for PAC 700-1104 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c) based on the site remediation and confirmation data, and the White Paper findings noted above.

After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1104 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action Justification for PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1105

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-7
Unit Name:	Transformer Leak – 779-1 and 779-2

This Final Update to the HRR for PAC 700-1105 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1105 is summarized in this update. The following HRR volumes contain PAC 700-1105 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1957 to 1998

Historical Summary

Prior to 1987, dielectric fluid containing PCBs leaked from Transformers 779-1 and 779-2, formerly located on the northeastern side of Building 779 adjacent to the southern side of the 779 loading dock. The location of PAC 700-1105 is shown on Figure 21. In 1987, the transformers were retrofilled with non-PCB dielectric fluid and then moved several feet east and north (DOE 2004b). The transformers were removed during the FY00 facility demolition (DOE 2000).

PAC Investigations

A surface soil sample from sampling location SS481194 indicated the presence of PCBs at 21,000 µg/kg. Preaccelerated action surface soil samples were also collected at six locations around the transformer pads for PCB and isotopic analyses. Aroclor-1260 was detected in all six samples, from 15,000 to 680,000 µg/kg. Plutonium-239/240 was detected in all samples; the highest activity was 115 pCi/g (DOE 2004b).

Additional surface and subsurface soil characterization samples were collected from eight sampling locations during the IHSS Group 700-7 accelerated action in accordance with IASAP Addendum #IA-03-15 (DOE 2003a). Analytes included radionuclides and PCBs. Samples from one location were also analyzed for VOCs and SVOCs. PCB concentrations exceeded the RFCA WRW soil AL of 12,400 µg/kg (DOE et al. 2003) at six locations in surface and subsurface intervals located around the PCB transformer pads. Surface soil concentrations greater than the WRW soil AL ranged from 16,000 to 860,000 µg/kg. Subsurface soil concentrations greater than the WRW soil AL ranged from 19,000 to 24,000 µg/kg. Other contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2004b, DOE et al. 2003).

A RFCA (DOE et al. 1996) accelerated action was implemented in accordance with ER RSOP Notification #03-10 (DOE 2003b). Based on accelerated action characterization data, soil around

the transformers was removed, as well as the concrete pads that held the transformers and the associated trough. Removal of PCB-contaminated soil at four locations around the transformers required two rounds of soil removal. Grab samples were collected at the bottom of the initial excavations (5.0 to 5.3 ft below grade), and analytical results indicated PCB soil concentrations were still greater than the RFCA WRW soil AL (DOE et al. 2003). An additional 1 ft of soil was then removed from each location, and the bottom of each subsequent excavation was sampled. Approximately 81 cy of PCB-contaminated soil was removed from around and under the PCB transformer pads. The depth of the excavation was approximately 5 to 6 ft and covered an area approximately 20 by 20 ft. The soil was disposed of as low-level radioactive TSCA waste. The excavation was backfilled and rough-graded. Final grading and subsequent seeding occurred after Buildings 776 and 777 were removed and the associated UBC Sites were remediated (DOE 2005).

Nine confirmation samples were collected and analyzed for PCBs. Results indicated that all PCB concentrations were less than RFCA WRW soil ALs (DOE 2004b, DOE et al. 2003).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 700-1105 based on the following:

- Accelerated action confirmation data indicate that residual PCB concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 700-7 (DOE 2004b) indicated that additional action was not necessary.

After review of the Closeout Report for IHSS Group 700-7 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 700-1105 on October 1, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7 (B779) - Approval, October 1.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2000, Decommissioning Closeout Report for the 779 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-15, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Closeout Report for IHSS Group 700-3 UBCs, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1106

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-12
Unit Name:	Process Waste Spill – Portal 1

This Final Update to the HRR for PAC 700-1106 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1106 is summarized in this update. The following HRR volumes contain PAC 700-1106 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

November 1986

Historical Summary

The location of PAC 700-1106 is shown on Figure 21. Approximately 10 gallons of process wastewater spilled from a tank truck at the entrance to Portal 1. The truck was en route from the Valve Vault 12 leak area (PAC 300-186) to SEP Pond 207-A (Building 762A). The tank was overfilled, and the liquid splashed out of the top manhole when the truck was driven around a corner.

Process wastewater from the Valve Vault 12 leak was released onto the street. Analysis of water samples collected from Valve Vault 12 and a related process waste line leak indicated the total alpha activity was 170,000 pCi/L and uranium-238 activity was 120,000 pCi/L. It was determined at the time of the spill that there was no radioactivity on the street. No other historical documentation could be found which further detailed a response to the release.

PAC Investigations

In accordance with IASAP Addendum #IA-02-01 (DOE 2001), two surface soil characterization samples were collected on April 4, 2002, and analyzed for radionuclides. The only result exceeding background levels was uranium-235 at 0.11 pCi/g. No other radionuclides were present at levels exceeding background. Analytical results were well below RFCA Tier II soil (DOE et al. 1996) and WRW soil ALs (DOE et al. 2003). Analytical results from characterization samples for PAC 700-1106 are presented in the Data Summary Report for IHSS Group 700-12 (DOE 2003b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), NFAA status for PAC 700-1106 was justified in the Data Summary Report (DOE 2003b) for the following reasons:

- All contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).

- There was no identified potential to exceed surface water standards at a POC from this IHSS Group.

DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 700-1106 in a letter dated May 15, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Final Data Summary Report for IHSS Group 700-12, May 15.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 700-12, PAC 700-1106, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1107

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Compressor Waste Oil Spill – Building 776

This Final Update to the HRR for PAC 700-1107 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1107 is summarized in this update. The following HRR volumes contain PAC 700-1107 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

June 10, 1986, and June 12, 1986

Historical Summary

The location of PAC 700-1107 is shown on Figure 21. On June 10, 1986, an open oil drum filled with water from the Building 776 Compressor House roof. One or two gallons of oil flowed onto the road and were carried past Building 776 by rainwater. The oil originated from a sump trench in the Compressor House. On June 12, 1986, two to three gallons of compressor waste oil were spilled while transferring the oil from an overfilled drum. The spill occurred in the waste oil drum storage area north of Building 776 outside Door 15T (DOE 1992).

In response to the June 10th incident, "Oil-Dri®" was poured over the area to absorb the spilled oil and was subsequently disposed of in the Present Landfill (PAC NW-114). Two bags of oil absorbent were used on the June 12 spill (DOE 1992).

PAC Investigations

No further investigation was required because the PAC was dispositioned based on removal of the oil.

No Further Action Recommendation

PAC 700-1107 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 700-1108

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-11
Unit Name:	771/774 Footing Drain Pond (Bowman's Pond)

This Final Update to the HRR for PAC 700-1108 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1108 is summarized in this update. The following HRR volumes contain PAC 700-1108 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1999 Annual (DOE 1999a).

Dates(s) of Operation or Occurrence

1972 to November 2004

Historical Summary

The location of PAC 700-1108 is shown on Figure 21. PAC 700-1108 (Bowman's Pond) is part of IHSS Group 700-11, which also includes the Steam Condensate Tanks (PAC 700-139.1[N][a]). Both of these areas were located north of Building 774. Bowman's Pond consisted of a small, manmade depression approximately 3 to 4 ft deep with an area of approximately 28 by 33 ft. Bowman's Pond was constructed to retain water discharged from building foundation drains and storm drains in the 700 Area. The pond discharged to the east, saturating an area approximately 200 by 40 ft, resulting in a wetland environment. Generally, surface water drainage in the area flowed from southwest to northeast into North Walnut Creek (DOE 2005).

Leaks from tanks and perhaps other Building 774 processes affected Bowman's Pond. Underground process waste storage tanks, in use since the late 1950s (PACs 700-146.1 through 700-146.6) were removed from the southern side of Building 774 in 1972. Physical failure of these tanks resulted in chemical and radioactive contamination to the soil around Building 774. It was suspected that leakage from these tanks also seeped to the building footing drain tiles and was discharged into Bowman's Pond (DOE 1992).

Two steel 8,000-gallon aboveground condensate receiving tanks, located adjacent to and east of the Building 771/774 footing drain outfall (IHSS 139.1[N][a]), leaked. A storm drain north of IHSS 139.1(N)(a) may have conveyed water into Bowman's Pond.

A March 1971 report states that water coming from footing drains in the area contained as much as 500 dpm/L in gross alpha activity. Water samples collected from the Building 774 footing drain in April 1971 indicated 400 dpm/L plutonium and 800 ppm nitrate (DOE 1992).

On July 21, 1980, an 8-year-old process waste line was discovered leaking southeast of Building 774. Process wastewater was observed seeping up in the soil on the southern side of the

road southeast of Building 774. The leaking process wastewater flowed down slope and through a 30-ft culvert, along a chain-link fence, and under the fence at the corner. From this point, the liquid flowed under the unpaved access road into a boggy area (Bowman's Pond) north of Building 774. The vegetation in the boggy area was damaged where the spilled liquid formed a pool. It was estimated that approximately 1,000 gallons had leaked from the process waste line. Initial response to this incident was to stop the flow through the line thereby stopping the leak. When the soil dried, a FIDLER survey was conducted to determine the extent of resulting contamination. On July 24, 1980, the broken waste line was excavated and the problem was identified as a loose flange. Analysis of the spilled water indicated 2,500 pCi/L total alpha activity, 4,000 pCi/L gross beta activity, 10,000 mg/L nitrate, and a pH of 12 (DOE 1992).

A surface water and sediment sampling program identified PCB contamination within and around Bowman's Pond in summer 1991. The source of the PCBs was not determined; however, one employee recalled that a pole-mounted transformer north of Building 774 was hit by lightning and may have exploded (DOE 1991).

Results of a Biological Evaluation conducted by the U.S. Army Corps of Engineers in November 2001 determined that both Bowman's Pond and the condensate wetland near Bowman's Pond were not jurisdictional wetlands (K-H 2001).

PAC Investigations

In April 1999, an extensive characterization study was conducted at PAC 700-1108 and the adjacent steam condensate tanks (IHSS 139.1(N)(a)). The purpose of the investigation was to characterize the potential nature and extent of contamination in surface soil, subsurface soil/sediment, and surface water for the pond and surrounding depositional environments adjacent to the pond. Surface soil, subsurface soil, sediment, and surface water samples were collected from PAC 700-1108 and IHSS 139.1(N)(a) in April 1999 in accordance with an agency-approved SAP (DOE 1999b).

Accelerated action characterization activities for PAC 700-1108 were planned and executed in accordance with IASAP Addendum #IA-04-10 (DOE 2004a). Historical and accelerated action characterization data indicated that PCBs were present at concentrations in soil greater than RFCA WRW soil ALs (DOE et al. 2003) in four distinct locations around Bowman's Pond and associated drainages (western area, mid-western area, Bowman's Pond area, and eastern area). Each of the areas was located principally within the surface water drainage, or in the case of the eastern area, was impacted by the drainage. The western area coincided with the edge of Building 770, approximately 23 ft downstream of a storm drain outfall. The mid-western area coincided with a storm drain outfall, and the Bowman's Pond area coincided with a Building 771/774 foundation drain outfall. The eastern area hot spot consisted of one historical detection of PCBs greater than RFCA WRW soil ALs (DOE et al. 2003) and was located downstream of a storm drain and foundation drain. The limited areas where exceedances were found indicated that in all instances the contamination was associated with a drain or potential drain (DOE 2005).

Soil or sediment was collected from 32 characterization sampling locations. Several analytes were detected at concentrations greater than RFCA WRW soil ALs (DOE et al. 2003) including Aroclor-1254, arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene. The maximum concentrations in surface soil or sediment were 54,000 μg/kg Aroclor-1254, 11,000 μg/kg benzo(a)pyrene, and 4,000 μg/kg dibenz(a,h)anthracene. The maximum concentrations in subsurface soil or

subsurface sediment were 290,000 µg/kg Aroclor-1254 and 72,000 µg/kg benzo(a)pyrene. Arsenic was detected at one location at a concentration of 26 mg/kg. All other analytes, including radionuclides, were less than RFCA WRW soil ALs (DOE et al. 2003).

A RFCA (DOE et al. 1996) accelerated action was implemented at PAC 700-1108 in accordance with ER RSOP Notification #04-10 (DOE 2004b), which was approved by CDPHE on July 9, 2004 (CDPHE 2004). Accelerated action activities were conducted between May 24, 2004, and November 10, 2004. Soil and sediment were removed from the four affected areas discussed above. Approximately 376 cy of sediment and soil were excavated from the drainage area into Bowman's Pond, Bowman's Pond itself, and a small area (90 ft^2) 40 ft east of Bowman's Pond. Excavation history and boundaries are presented in the Closeout Report for IHSS Group 700-11 (DOE 2005). Forty-four confirmation samples were collected. Aroclor-1254 concentrations in the confirmation samples ranged from below the RL to 12,000 µg/kg. All were less than the RFCA WRW soil AL of 12,400 µg/kg (DOE et al. 2003). Radionuclides were sporadically detected in confirmation samples at activities exceeding background levels. Maximum detected activities of radionuclides in confirmation samples were as follows: americium-241, 0.583 pCi/g; plutonium-239/240, 3.321 pCi/g; uranium-234, 6.306 pCi/g; uranium-235, 0.452 pCi/g; and uranium-238, 6.306 pCi/g (DOE 2005). All contaminant activities and concentrations at the final confirmation sampling locations were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

After four rounds of excavations and associated confirmation sampling events, all residual contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). An SSRS performed for residual contamination in IHSS Group 700-11 did not indicated that residual contamination at the site would migrate into surface water causing an exceedance of surface water quality standards. In accordance with RFCA (DOE et al. 1996), NFAA status was recommended for PAC 700-1108 in the Closeout Report for IHSS Group 700-11 (DOE 2005), based on the confirmation sampling and the SSRS.

After review of the Closeout Report for IHSS Group 700-11 (DOE 2005) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 700-1108 on February 4, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-10, IHSS Group 700-11, Approval Letter, July 9.

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Approval, Draft Closeout Report, IHSS Group 700-11, PAC 700-1108 – Bowman's Pond and IHSS 139(N)(a) – Steam Condensate Tanks, February.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Draft Final Investigations of Foundation Drains and Other Data Compilation, Addendum to the Operable Unit 8 Work Plan, 700 Area, Technical Memorandum No. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Sampling Analysis Plan Site Characterization of Bowman's Pond (PAC 700-1108) and Steam Condensate Holding Tanks (IHSS 139.1N), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004a, Industrial Area Sampling and Analysis Plan Addendum #IA-04-10, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004b, Environmental Restoration RFCA Standard Operating Protocol Notification #04-10, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005, Closeout Report for IHSS Group 700-11, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

K-H, 2001, Trip Notes from COE Site Visit 11/20/01 (e-mail communication), Rocky Flats Environmental Technology Site, Golden, Colorado, November.

PAC REFERENCE NUMBER: 700-1109

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Uranium Incident – Building 778

This Final Update to the HRR for PAC 700-1109 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1109 is summarized in this update. The following HRR volumes contain PAC 700-1109 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

June 2, 1988

Historical Summary

The location of PAC 700-1109 is shown on Figure 21. A depleted uranium disk, one inch diameter and 0.5 inch thick, was found on the ground near a dumpster between Buildings 778 and 729.

PAC Investigations

The piece of uranium was transported to Building 776 where it was determined to be depleted uranium. It was then transported to a Building 779 Nuclear Material Control custodian where it was stored in a 55-gallon drum. The site where the uranium was found was surveyed and found to have counts within the background level. No documentation was found that further details response to this occurrence.

No Further Action Recommendation

PAC 700-1109 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA for PAC 700-1109 was verbally agreed to in the November 14, 2001, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 700-1110

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Nickel Carbonyl Burial West of Building 771

This Final Update to the HRR for PAC 700-1110 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1110 is summarized in this update. The following HRR volumes contain PAC 700-1110 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

September 11, 1957

Historical Summary

The location of PAC 700-1110 is shown on Figure 21. On September 11, 1957, a fire occurred in Building 771. The fire spread to the glovebox exhaust booster filters and the main filter plenum. Cylinders of nickel carbonyl were stored in the anteroom outside the exhaust filter plenum room of Building 771 at the time of the fire. During the fire, seven nickel carbonyl cylinders were moved from the anteroom to a storage position in the Pipe Shop area. Fourteen nickel carbonyl cylinders were found in the exhaust filter plenum room approximately 20 ft from the western end of the plenum. Several of these cylinders were found burning around the top. The burning cylinders were sprayed with water. The cylinders were loaded into four 55-gallon drums and one GI can. Four cylinders were placed in each drum and the drums were filled with vermiculite and water. The barrels were taken to the access shaft and lifted out with a crane. A burial pit was excavated north of the access shaft and the drums were lifted from the access shaft to the burial pit. Six cylinders were moved directly to the burial pit (DOE 1992).

Four 55-gallon drums, one GI can with two cylinders, and six loose cylinders of nickel carbonyl were removed from the burial pit west of Building 771 to a pit east of the SEP (PAC 000-101) (PIC 41). Explosive charges were used to destructively vent the cylinders and ignite any residual gas. No documentation was found that further detailed the fate of the constituents released to the environment (DOE 1992).

PAC Investigations

No additional investigation was required because the nickel carbonyl cylinders and gas were destroyed.

No Further Action Recommendation

PAC 700-1110 was addressed through the consultative process in NFA Working Group meetings on November 14, 2001, March 13, 2002, and April 3, 2002. Based on these discussions and additional information provided by DOE, agreement was reached that an NFA was justified. An NFA for PAC 700-1110 was verbally agreed to in the April 3, 2002, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 700-1111

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Leaking Transformer – Building 750

This Final Update to the HRR for PAC 700-1111 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1111 is summarized in this update. The following HRR volumes contain PAC 700-1111 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to 1987

Historical Summary

The location of PAC 700-1111 is shown on Figure 21. Transformer 750-1 was located on the northeastern side of Building 750, approximately 80 ft from a cafeteria entrance. In August 1985, Transformer 750-1 was reported as a potential PCB risk. The exposure risk was related to a small crack in the berm surrounding the transformer, and the proximity of the transformer to the cafeteria entrance. According to interviews with utility personnel, prior to 1987 this transformer leaked dielectric fluid containing PCBs (DOE 1992).

It was reported that Transformer 750-1 contained 465 gallons of PCB fluid weighing 2,533 kg. In October 1985, it was reported that Transformer 750-1 contained PCB fluid exclusively.

In August 1985, it was recommended that the concrete berm surrounding the transformer be sealed. In January 1986, it was anticipated that Transformer 750-1 would be removed and replaced under the FY1986 Environmental Hazards Elimination Project. In 1987, the transformer was retrofilled and relocated on a new concrete pad several feet east of its previous location (DOE 1992). The transformer was removed during the D&D of Building 750, which was completed on August 28, 2004.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs (DOE 1991) conducted in July 1991, soil samples were collected in accordance with approved EPA sampling protocol and analyzed for PCBs using EPA Method 8080. The highest PCB concentration was detected in a soil sample collected adjacent to the old concrete transformer pads (160 ppm) (DOE 1995).

Under the approved Final PAM for Remediation of PCBs (DOE 1995), additional sample screening was completed in 1995 to verify the lateral and vertical extent of PCB migration. Soil

samples were analyzed using EPA Method 4020 and concrete samples were analyzed using EPA Method 8080.

In accordance with the PAM (DOE 1995), approximately 26 cy of PCB-contaminated soil were excavated, containerized, and shipped offsite for disposal (DOE 1997). Cleanup verification analytical results for PCBs in the soil were less than 10 ppm using EPA Method 4020, and less than 5.9 ppm using EPA Method 8080. Split samples were analyzed using EPA Method 8080 to provide confirmation of the EPA Method 4020 (Immunoassay Field Technique) analytical results. There were no detections of PCBs on the concrete transformer pad using EPA Method 8080 (DOE 1996).

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

In accordance with RFCA (DOE et al. 1996), NFAA was recommended as appropriate for PAC 700-1111 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c), based on the site remediation and confirmation data, and the White Paper findings noted above.

After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1111 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), Colorado, May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1112

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Leaking Transformer – Building 776-5

This Final Update to the HRR for PAC 700-1112 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1112 is summarized in this update. The following HRR volumes contain PAC 700-1112 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

June 1986 to August 1989

Historical Summary

The location of PAC 700-1112 is shown on Figure 21. Transformer 776-5 was located west of Building 714 within the PA. The 1500 KVA transformer was manufactured in 1969 and was reported as leaking coolant oil in June 1986 (DOE 1992). This transformer was retrofilled in 1986. The 308 gallons of dielectric fluid in Transformer 776-5 contained 807 ppm PCBs at one point prior to 1989 (DOE 1992). Transformer 776-5 was scheduled for cleanup on August 12, 1989. No documentation could be found to verify what cleanup was performed at this site if any.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991 (DOE 1991), soil samples were collected in accordance with approved EPA sampling protocols and analyzed for PCBs using EPA Method 8080 (DOE 1995). The highest PCB detection in soil samples collected adjacent to the concrete transformer pad was 0.088 ppm (DOE 1996). Remediation was not conducted at this transformer; however, the transformer was removed as part of D&D activities, which were completed at Building 776 on June 17, 2005.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup

of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

In accordance with RFCA (DOE et al. 1996), an NFAA was recommended for PAC 700-1112 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c), based on the site data and White Paper findings noted above. After review of the NFAA justification by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1112 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1113

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Water Released from the SEP Pond 207-C

This Final Update to the HRR for PAC 700-1113 consolidates the information in the Eleventh Quarterly HRR Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1113 is summarized in this update. The following HRR volumes contain PAC 700-1113 information:

Original Report – Eleventh Quarterly (DOE 1995); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

February 2, 1995

Historical Summary

The location of PAC 700-1113 is shown on Figure 21. On February 2, 1995, Plant personnel proceeded to pump snowmelt and rinse water that had accumulated in SEP Pond 207-C (PAC 000-101) to Building 374 for treatment after the pond had been emptied of contaminated sludge and water. Between 9:30 A.M. and 10:00 A.M. immediately after starting the small pump, a pinhole-sized leak was noticed in the pressurized hose. By the time the worker could turn off the pump (approximately 6 seconds later) the pinhole had expanded to approximately 2 cms. The release occurred at the southeastern corner of the pond in a radiologically controlled area (RCA). An estimated 5 gallons of low-level mixed wastewater were released back into the pond and on to soil across a bermed area outside of the pond. Several workers were sprayed during the release from the pressurized hose (DOE 1995).

The water released from this occurrence consisted of snowmelt and rinse water that had accumulated in the pond. The rinse water was used during the Phase 1 environmental remediation plan to empty the SEP and prepare the pond liner for a coating process. The SEP was previously used to hold RCRA-regulated hazardous waste that included listed hazardous wastes from nonspecific sources, such as spent halogenated solvents and electroplating waste. Pond 207-C also received radioactive waste from process waste lines. Samples of the liquid remaining in the pond were collected on February 2 and 3, 1995, to determine the level of hazardous waste constituents present. Based on historical usage of the pond, the following EPA waste codes were assigned to the pond water: F001, F002, F003, F005, F006, F007, F009, and F039 (DOE 1995).

The liquid released to the pond and the liquid remaining in the hose was drained back into the sump area located in the northeast corner of the pond. On February 6, 1995, the water was pumped to Building 374 for treatment. No radioactive contamination was detected on the

workers when they were monitored. The area of wetted soil on the southeastern berm was visually inspected and estimated to be 1.5 by 4 ft in size. Approximately 15 lbs of soil was removed from the wetted area on February 2, 1995, and managed as LLM waste. Samples of the liquid remaining in the pond were collected that afternoon and again on February 3, 1995, to determine the level of hazardous waste constituents present. Operations personnel removed the hose from service and replaced it with a new hose on February 3, 1995 (DOE 1995).

PAC Investigations

No further investigation was required because the soil was removed.

No Further Action Recommendation

PAC 700-1113 was addressed through the consultative process in an NFA Working Group meeting on March 13, 2002. Based on these discussions, agreement was reached that an NFA was justified. An NFA for PAC 700-1113 was verbally agreed to in the March 13, 2002, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995, Eleventh Quarterly Update for Historical Release Report, January 1, 1995 to March 31, 1995, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBERS: 700-1114a and 700-1114b

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Releases During Liquid Transfer Operations from B774

This Final Update to the HRR for PACs 700-1114a and 700-1114b consolidates the information in the 1997 HRR and subsequent HRR updates with information gained through the disposition of these PACs in accordance with the RFCA accelerated action process. The dispositions of PACs 700-1114a and 700-1114b are summarized in this update. The following HRR volumes contain PACs 700-1114a and 700-1114b information:

Original Report – 1997 Annual (DOE 1997); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

October 10 and 11, 1996

Historical Summary

The locations of PACs 700-1114a and 700-1114b are shown on Figure 21. On October 10 and 11, 1996, transfer of liquid mixed-waste PCB-containing oils from Building 774 to a tanker truck resulted in reportable/incidental releases at two separate locations. The first incident was identified when the tanker was temporarily staged west of Building 765 near the Portal 1 entrance (PAC 700-1114b). Personnel observed liquid dripping from the vacuum pump apparatus through the exhaust/demister unit onto the pavement. After responding to the incident at Building 765, workers involved in the liquid transfer operation immediately walked down the area near Building 774 where the pumping operation had taken place earlier. Approximately the same amount of liquid was released to soil at that location (PAC 700-1114a). The liquid was condensate from the vacuum pump apparatus. It was estimated that approximately 1 cup of liquid was released at each location (DOE 1996).

Laboratory analyses of the liquid indicated that both F001 and F002 waste codes were applicable and, therefore, waste generated during cleanup was identified as hazardous. Analysis for PCBs indicated less than 2 ppm PCBs. The following compounds were positively identified: trichloroethene (250 ppm), methylene chloride (33 ppm), and 1,1,1-trichloroethane (930 ppm). No radioactivity was identified (DOE 1996).

After the first two incidents on October 10, 1996, a plastic bag was placed under and around the exhaust condensate line to collect any residual release. Site personnel performed a thorough cleanup of the liquid using rags (for the asphalt surfaces) and partially filled one 55-gallon drum with soil contaminated by the October 11, 1996 release. The release was categorized and reported as an “incidental release,” in accordance with 29 CFR 1910.120, Incidental Response.

A third release to the soil occurred at the Building 774 (PAC 700-1114a) location the following day (October 11, 1996) involving approximately 1 gallon of the same type of liquid. The release

was due to the failure of a plastic bag affixed under the exhaust condensate line after the previous day's experience with the apparatus (DOE 1996).

All associated wastes were containerized and managed in accordance with Site requirements. The releases (at both locations) were reported in the 1997 Annual Update to the HRR as PACs 700-1114a and 700-1114b for the Building 774 location and the Building 765 location respectively (see Comments below).

PAC Investigations

No further investigation was required.

No Further Action Recommendation

PACs 700-1114a and 700-1114b were addressed through the consultative process in an NFA Working Group meeting on February 27, 2002. Based on these discussions, agreement was reached that an NFA was justified. An NFA for PACs 700-1114a and 700-1114b was verbally agreed to in the November 14, 2001, meeting and was formally approved by CDPHE (the LRA) and EPA in a letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

During the NFA Status meeting on February 27, 2002, it was agreed that the narrative for PACs 700-1114a and 700-1114b in the 2002 Annual Update for the HRR (DOE 2002) would be rewritten to clarify where and how the specific locations occurred and how they are numbered (that is, 1114a and 1114b). Although the 1997 HRR Annual Update, Plate 2, shows where the specific incidents occurred and properly assigned the PAC numbers, the text narrative did not specify the separate location numbers.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA designation for IHSSs, PACs, and PICs, September 26.

DOE, 1996, Occurrence Report (RFO-KHLL-LIQWASTE-1996-0004), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 700-1115

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-1
Unit Name:	Identification of Diesel Fuel in Subsurface Soil

This Final Update to the HRR for PAC 700-1115 consolidates the information in the 1997 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1115 is summarized in this update. The following HRR volumes contain PAC 700-1115 information:

Original Report – 1997 Annual (DOE 1997); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Discovered May 31, 1997

Historical Summary

The location of PAC 700-1115 is shown on Figure 21. PAC 700-1115 is a subsurface diesel fuel spill of unknown origin that was discovered near the northeastern corner of Building 708. On May 31, 1997, diesel fuel was observed in the soil dug from a 2-ft-deep trench (DOE 1997). Soil samples were collected from the trench and analyzed for BTEX, and TRPH. None of the BTEX constituents were detected at concentrations greater than RFCA Tier II subsurface soil ALs (DOE 1997, DOE et al. 1996). TRPH was detected at a concentration of 2,435.9 ppm, less than one-half of the 5,000 ppm cleanup threshold outlined in the RFCA Attachment 13, UST Closure Letter Agreement (DOE et al. 1996).

PAC Investigations

Accelerated action activities were conducted at IHSS Group 700-1 (PAC 700-1115) to characterize the nature and extent of contamination in soil. Characterization activities were conducted in accordance with IASAP Addendum #IA-04-15 (DOE 2004b). A total of 12 surface and subsurface soil samples were collected at six locations: five along the storm sewer line located in PAC 700-1115, and one in the center of the PAC. VOCs were identified as PCOCs for this PAC. No VOCs were detected at any of the sampling locations. Accelerated action characterization activities at PAC 700-1115 are discussed in detail in the Data Summary Report for IHSS Group 700-1 (DOE 2004c).

No Further Action Recommendation

NFAA was recommended for PAC 700-1115 in the Data Summary Report for IHSS Group 700-1 (DOE 2004c) based on the following:

- PCOCs were not detected at any of the sampling locations for IHSS Group 700-1.

- Migration of contaminants to surface water through erosion is unlikely because IHSS Group 700-1 is not located in an area prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because COCs were not detected in soil at any of the sampling locations for IHSS Group 700-1.

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 700-1115 on September 14, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 700-1 PAC 700-1115 – Identification of Diesel Fuel in Subsurface Soil, dated August 2004, September 14.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Industrial Area Sampling and Analysis Plan Addendum #IA-04-15, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004c, Data Summary Report for IHSS Group 700-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 700-1116

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-3
Unit Name:	Transformer Leak South of Building 776

This Final Update to the HRR for PAC 700-1116 consolidates the information in the 1998 Annual Update to the HRR with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1116 is summarized in this update. The following HRR volume contains PAC 700-1116 information:

Original Report – 1998 Annual (DOE 1998).

Dates(s) of Operation or Occurrence

1957 to 1998

Historical Summary

The location of PAC 700-1116 is shown on Figure 21. On January 19, 1998, while conducting a surveillance audit in the 700 Building area, it was discovered that Transformer T-776-2 was leaking small amounts of dielectric fluid from a weep hole near the bushing/seal area. Additionally, staining of the concrete transformer pad and some of the adjacent rock/soil surrounding the pad was observed. It is not known how long the transformer had been leaking, and it was estimated that approximately 2 gallons were released. The oil leak was reportedly repaired on March 30, 1998 (DOE 1998).

The transformer went into service in April 1957 and was located within PAC 700-150.7. It is unclear whether the transformer underwent retrofilling in the late 1980s or at what other locations the transformer was used. The dielectric oil sampled contained Aroclor-1260 at 21 and 23 ppm. Documents reviewed do not reference the analytical method used, or whether leaks were detected or the soil was sampled. It is believed that the transformer and stained soil were inadvertently excluded from the Preliminary Assessment/Site Assessment of PCBs Site study (DOE 1998). Transformer 776-2 was removed during D&D of the 700 Area.

PAC Investigations

Surface and subsurface soil samples were collected from two locations situated north and east of the transformer, and were analyzed for radionuclides, metals, VOCs, and PCBs in accordance with IASAP Addendum #IA-03-04 (DOE 2003). Aroclor-1260 was estimated below the detection limit in one subsurface soil sample at a concentration of 14 µg/kg. No other Aroclors were detected in any of the samples. The maximum detected activities of americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238 were 0.993, 5.662, 2.296, 0.171, and 2.417 pCi/g, respectively. All contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2005, DOE et al. 2003).

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW soil AL of 12.4 ppm, adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

In accordance with RFCA (DOE et al. 1996), NFAA status was recommended for PAC 700-1116 in the Closeout Report for IHSS Group 700-3, Volume I (DOE 2005), based on the site data and White Paper findings noted above.

After review of the White Paper and the Closeout Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 700-1116 on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S.H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3, Volume I, April 19.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Dioxin-Like Compounds in Transformer Oil: An Evaluation of Their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2005, Closeout Report for IHSS Group 700-3, Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 700-1117

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 701 Water Line Soil Put-back

This Final Update to the HRR for PAC 700-1117 consolidates the information in the 1998 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 700-1117 is summarized in this update. The following HRR volumes contain PAC 700-1117 information:

Original Report – 1998 Annual (DOE 1998a); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

October 9, 1997

Historical Summary

The location of PAC 700-1117 is shown on Figure 21. On October 9, 1997, Building 776 management reported that water was surfacing at an area immediately south of Building 701. Upon further investigation, it was suspected that the Building 776 cooling tower return line was the source of the water and a work order was submitted for excavation and repair. The line was located and repaired; however, due to the urgency of the work, sampling for the required RCRA hazardous waste determination was done after the excavation spoils were generated. In the interim, the spoils (approximately 5 cy) were protected from the elements utilizing heavy plastic with bermed containment and a tarp cover (DOE 1998a).

PAC Investigations

An environmental assessment was conducted as part of the Soil Disturbance Permit and sampling was required because of the close proximity of the occurrence to PACs 700-118.1, 000-121, and 700-131. Work to repair the line proceeded on December 17, 1997, and the line was repaired several days later.

Samples were collected at 10 sampling locations in January 1998 and analyzed for VOCs, metals, and radionuclides. Upon receipt of the analytical data in February 1998, the excavation spoils were held outside the excavation because 100 ppb of carbon tetrachloride was detected in one sample. This decision was consistent with Plant practice under existing Site procedures for non-RFCA-related construction/maintenance activities.

There were no metals detected above background in any of the samples; however, plutonium-239/240 was detected at 10.4 pCi/g and americium-241 at 2.29 pCi/g. Both isotopic results were above background levels and were likely attributable to the 1969 fire associated with Building 776 (DOE 1992).

Because of the low detection of carbon tetrachloride and permissible put-back levels approved for RFCA environmental projects (230 ppb), it was decided to seek approval from the regulatory agencies for site-specific soil put-back at this location (DOE 1998b). Approval from the regulatory agencies to replace the spoils into the excavation was granted on July 8, 1998 (CDPHE 1998). The excavation was backfilled on August 12, 1998 (DOE 1998a).

No Further Action Recommendation

After consultation, CDPHE agreed that the soil (contaminated environmental media) could be managed as nonhazardous waste and replaced into the excavation if concentrations were below values in Table 1, Soil Cleanup Table Value Standards for Residential/Unrestricted Land Use in CDPHE's Soil Remediation Objectives Policy (CDPHE 1997). The carbon tetrachloride standard is 230 ppb.

DOE granted permission on July 8, 1998, to apply the values in the Soil Cleanup Table Value Standards from the CDPHE's Soil Remediation Objectives to the soils generated from the specific project (DOE 1998b). In addition, it was agreed that the RFCA Tier II soil ALs could be applied as put-back levels for the plutonium-239/240 and americium-241 (DOE et al. 1996). Based on these agreements, the spoils were returned to the site on August 12, 1998, and NFA was justified for PAC 700-1117.

After review of the 1998 Annual Update to the HRR (DOE 1998a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFA status for PAC 700-1117 on July 9, 1999 (CDPHE 1999).

Comments

Carbon tetrachloride releases are known to have occurred in this area (see IHSS 118.1). It has not been determined whether this occurrence is related.

Analytical data for samples collected in January 1998 show carbon tetrachloride at 100 ppb and chloroform at 63 ppb from one sampling location. Chloroform is commonly detected in this range due to the addition of chlorine for domestic water use.

References

CDPHE, 1997, CDPHE Proposed Soil Remediation Objectives Policy Document, Rocky Flats Environmental Technology Site, Golden, Colorado, December 31.

CDPHE, 1998, Excavated Soils Adjacent to Building 701 (cc mail from C. Spreng to L. Brooks), July.

CDPHE, 1999, Correspondence to J. Legare, DOE RFFO, from S.H. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report (September 1998), July 9.

DOE, 1998a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998b, Request to Apply Soil Cleanup Table Value Standards in CDPHE Soil Remediation Objectives to Building 701 Spoils, 98-DOE-03757, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

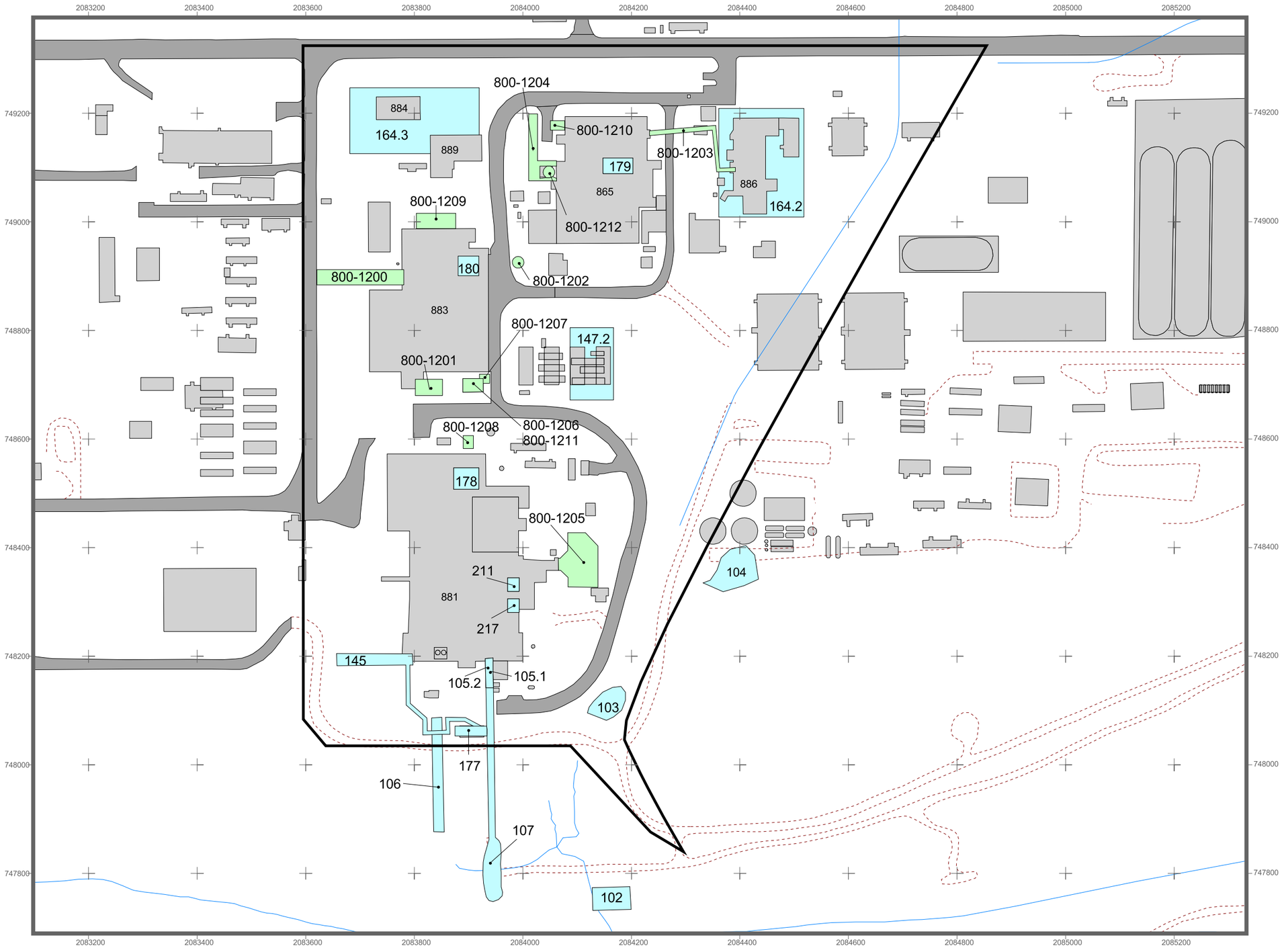

Figure 22
HRR 800 Area
IHSSs and PACs

KEY

- Stream
- Dirt road
- PAC
- IHSS
- HRR area
- Lake
- Asphalt
- Building

N
W E
S

150 0 150 Feet

Scale = 1: 2650

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_800.apr

PAC REFERENCE NUMBER: 800-102

IHSS Number: 102

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Oil Sludge Pit

This Final Update to the HRR for PAC 800-102 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 102 is summarized in this update. The following HRR volumes contain IHSS 102 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

1955 to 1963

Historical Summary

In 1958, 30 to 50 drums of nonradioactive materials were dumped in a pit south of Building 881. As shown on Figure 22, IHSS 102 is approximately 475 ft south of Building 881 with dimensions of 40 ft by 70 ft. The sludge pit was visible in a 1955 aerial photograph and appears to be closed in a 1963 photograph (DOE 1994). The pit was filled with material consisting of oil sludge from tank cleanouts. It is not known if one tank was involved or several, although one of the tanks involved may have stored No. 6 fuel oil. It is possible that the tanks were the USTs discussed in PACs 800-105.1 and 800-105.2.

IHSS Investigations

IHSS 102 was studied in accordance with the Final Phase III OU1 RFI/RI Work Plan (DOE 1991). The Final Phase III RFI/RI Report for OU 1 was issued in 1994 (DOE 1994). Eight boreholes were drilled adjacent to and downgradient of IHSS 102. The only VOCs detected were trichloroethene at 3 μg/kg and toluene at 270 μg/kg. The only SVOCs detected were naphthalene, phenanthrene, and pyrene with concentrations estimated below the detection limit. Radionuclide activities were very low with a maximum detected plutonium-239/240 activity of 0.024 pCi/g and a maximum detected americium-241 activity of 0.023 pCi/g. The report concluded that the nature and distribution of detected analyte concentrations at IHSS 102 was indicative of background.

No Further Action Recommendation

Based on the low levels of contamination in IHSS 102 and correspondingly low risk, IHSS 102 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

IHSS 102, while part of OU 1, is geographically in the BZ OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to ensure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-103

IHSS Number: 103

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Chemical Burial

This Final Update to the HRR for PAC 800-103 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 103 is summarized in this update. The following HRR volumes contain IHSS 103 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

Unknown

Historical Summary

IHSS 103 is an area south of Building 881 that was reportedly used to bury unknown chemicals. Based on 1963 aerial photographs, the area is described in the CEARP as a circular pit located approximately 150 ft southeast of Building 881, approximately 50 ft in diameter, and apparently filled with liquid. The location of IHSS 103 is shown on Figure 22.

IHSS Investigations

IHSS 103 was studied in accordance with the Final Phase III OU1 RFI/RI Work Plan (DOE 1991). The Final Phase III RFI/RI Report for OU 1 was issued in 1994 (DOE 1994). Five boreholes were drilled and sampled in and adjacent to IHSS 103. Of these, one was drilled within the approximate boundary of the IHSS, one downslope, and three upslope. Subsurface soil samples were analyzed for VOCs, SVOCs, and radionuclides. The only VOCs detected were trichloroethene and tetrachloroethene at 12 μg/kg each, and toluene at 150 μg/kg. The only SVOCs detected were fluoranthene, phenanthrene, and pyrene at concentrations near the detection limit. Plutonium-239/240 was detected at a maximum activity of 0.062 pCi/g and americium-241 was not detected at levels exceeding background (DOE 1994).

No Further Action Recommendation

Based on low level of contamination in IHSS 103 and correspondingly low risk, IHSS 103 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

No documentation was found that verifies the existence of the site. Personnel who were employed by Rocky Flats during the time frame related to this site were interviewed. They could

not recall any incidents of dumping close to Building 881. It is possible that previous reports may have confused this site with Trench T-2, which is farther east (PAC 900-109). Trench T-2 is believed to have been used for the dumping of liquid chemicals.

IHSS 103, while part of OU 1, is geographically in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-104

IHSS Number: 104

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Liquid Dumping

This Final Update to the HRR for PAC 800-104 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 104 is summarized in this update. The following HRR volumes contain IHSS 104 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

Prior to 1969

Historical Summary

The CEARP Phase 1 Report indicated that an area east of Building 881 was used for disposal of unknown liquids and drums. The location of IHSS 104 is shown on Figure 22.

IHSS Investigations

IHSS 104 was studied in accordance with the Final Phase III OU1 RFI/RI Work Plan (DOE 1991), and results were reported in the Final Phase III RFI/RI Report for OU 1 (DOE 1994). One borehole was drilled within the boundaries of IHSS 104. Plutonium-239/240 was detected at a maximum activity of 0.0315 pCi/g. Toluene was the only VOC detected, with a maximum concentration of 150 µg/kg. Several PAHs were detected at concentrations similar to the detection limits. Based on these results, the investigation concluded that IHSS 104 was not a source of radionuclide contamination (DOE 1994).

No Further Action Recommendation

Based on low amounts of contamination in IHSS 104 and correspondingly low levels of risk, IHSS 104 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

No documentation was found that verifies the existence of the site. Personnel employed by Rocky Flats during this time could not recall any incidents of dumping close to Building 881. It is possible that previous reports may have confused this site with Trench T-2 farther east (PAC 900-109). Trench T-2 is believed to have been used for the dumping of liquid chemicals (DOE 1992). Results of the Phase III RFI/RI suggest that waste disposal at IHSS 104 did not occur or cause subsurface contamination (DOE 1994).

IHSS 104, while part of OU 1, is geographically in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-105.1 and 800-105.2

IHSS Number: 105.1 and 105.2

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Building 881 East and West Out-of-Service Fuel Tanks

This Final Update to the HRR for PACs 800-105.1 and 800-105.2 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of IHSSs 105.1 and 105.2 is summarized in this update. The following HRR volumes contain IHSS 105.1 and 105.2 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

1958 to 1976

Historical Summary

Interviewees for the CEARP Phase 1 document mentioned that asbestos was placed in two underground, out-of-service diesel fuel tanks located south of Building 881. The tanks were later filled with concrete (DOE 1992). The locations for IHSSs 105.1 and 105.2 are shown on Figure 22.

IHSS Investigations

IHSSs 150.1 and 150.2 were studied in accordance with the Final Phase III OU1 RFI/RI Work Plan (DOE 1991). Six boreholes were drilled in the vicinity of IHSSs 105.1, 105.2, 106, 107, and 145. Trichloroethene was detected once in a borehole near IHSSs 105.1 and 105.2 at a concentration estimated below the detection limit. Americium-241 was detected at 0.10 pCi/g, plutonium-239/240 ranged from 0.0197 to 0.05 pCi/g, and uranium-238 ranged from 1.01 to 1.4 pCi/g (DOE 1994).

No Further Action Recommendation

Based on the low contaminant concentrations in IHSSs 150.1 and 150.2 and correspondingly low risk, IHSSs 150.1 and 150.2 were approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

IHSSs 105.1 and 105.2, while part of OU 1, are geographically in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-106

IHSS Number: 106

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Building 881, Outfall

This Final Update to the HRR for PAC 800-106 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 106 is summarized in this update. The following HRR volumes contain IHSS 106 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

Early 1950s to December 1977 (Date of last documented discharge)

Historical Summary

In the 1950s and 1960s, the intermittent discharging of untreated sanitary waste took place in an area south of Building 881. The location of IHSS 106 is shown on Figure 22. Although this practice was halted, the outfall continued to be used for discharges of cooling water blowdown into the late 1970s. The outfall was originally described as a 6-inch-diameter vitrified clay pipe; however, a site visit conducted on November 21, 1991, revealed that the pipe was made of iron. The pipe originated from Building 887 and was the cleanout pipe for an overflow line from the Building 881 cooling tower. Effluent was found discharging from this outfall onto the hillside on December 22, 1977. No liquid was discharging from the pipe in 1991 (DOE 1992).

Discharges occurring in the 1950s consisted of untreated sewage and any other waste that may have entered the sanitary system of Building 881. It is uncertain when these discharges began or ended. In 1955, sampling indicated the presence of high bacteria counts in Woman Creek below Building 881 east to the cattle fence. Radioactivity was not found above background levels. Sampling at the outfall in 1971 (known at that time as the sewage lift station) indicated activities of 1.05 and 0.30 dpm/g (DOE 1992).

The Draft RI Report for High-Priority Sites (881 Hillside Area) (DOE 1987) indicated there was a small pond below the outfall. (No pond was present in 1991.) A sample collected from the pond on May 26, 1987, indicated plutonium and americium levels of 0.69 and 0.18 pCi/L, respectively. No other hazardous substances were found in the sample (DOE 1992).

Concern was raised about the outfall because the discharge was allowed to enter Woman Creek. Several small retention ponds were built in 1955 (PACs SE-1600, SE-1601.1, and SE-1601.2), and an interceptor ditch was built in 1979 which carried the outfall water to Pond C-2 (PAC SE-142.11). Surface water samples were collected at all of these locations in addition to groundwater samples from monitoring wells in the vicinity (DOE 1992).

IHSS Investigations

IHSS 106 was studied in accordance with the Phase III OU 1 RFI/RI Work Plan (DOE 1991). Six boreholes were drilled in the vicinity of IHSSs 106, 105.1/105.2, 107, and 145. Sampling results were summarized in the Final Phase III RFI/RI Report for OU 1 (DOE 1994). Americium-241 was detected at a maximum activity of 0.84 pCi/g, plutonium-239/240 at 0.10 pCi/g, uranium-233/234 at 1.04 pCi/g, and uranium-238 at 1.188 pCi/g. Trichloroethene was detected at a maximum concentration of 120 μg/kg and tetrachloroethene was detected at a maximum concentration of 190 μg/kg.

No Further Action Recommendation

Based on the low concentrations of contaminants at IHSS 106 and the correspondingly low risk associated with the contamination, IHSS 106 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

IHSS 106, while part of OU 1, is geographically in the BZ OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1987, Draft Remedial Investigation Report for High Priority Sites (881 Hillside Area), Rocky Flats Plant, Golden, Colorado, July.

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-107

IHSS Number: 107

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Building 881 Hillside Oil Leak

This Final Update to the HRR for PAC 800-107 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 107 is summarized in this update. The following HRR volumes contain IHSS 107 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

1973

Historical Summary

On May 29, 1973, oil was discovered flowing from the slope south of Building 881. An investigation was initiated to discover the source of and stop the flow of oil to Woman Creek. Oil was also found in a 60-inch-diameter standpipe that was located just south of the security fence. The water on which the oil was floating was traced back to an outfall culvert 300 ft south of the security fence which was later found to be the footing drain from Building 881 (DOE 1992). The location of IHSS 107 is shown on Figure 22. The oil was soaked up with straw that was later deposited in the Present Landfill (PAC NW-114).

It was first thought that the oil was coming from leaks in two diesel fuel storage tanks (IHSS 105.1 and IHSS 105.2) because the footing drain passed directly under the tanks. The tanks and lines were tested and no leaks were detected. The pipes that carried the oil from the tanks to the building's furnace lay within a concrete-lined trench that had a drain hole in it. It was postulated that oil spills occurred during the filling of the tanks and flowed out the drain hole into the underlying gravel. After 20 years of use an underground reservoir of waste oil developed to the extent that it started seeping out of the hillside (DOE 1992). The tanks were in use from 1958 through 1976. After 1976, they were filled with ACM and then later with concrete (DOE 1994).

Another theory is that the oil may have originated from the oil sludge pit that is also located in this area (PAC 800-102). Groundwater data indicated the presence of VOCs in monitoring wells along the hillside. There have also been known releases and burial along this hillside including plutonium-contaminated soil, multiple solvent spills, and other unknown chemicals (DOE 1992).

A concrete "skimming pond" was constructed to contain the oil flowing from the footing drain and an interceptor ditch was constructed to prevent the water from reaching Woman Creek. The Phase III RI/RFI Report for OU 1 (DOE 1994) indicated the skimming pond was removed during construction of the French drain. The French drain was installed to collect potentially

contaminated groundwater for treatment. Groundwater monitoring wells were installed to identify the extent of contamination.

The Draft RI Report for High Priority Sites (881 Hillside Area) (DOE 1987) indicated that elevated levels of tetrachloroethene (128 ppb) and trichloroethene (14 ppb) were found in water samples collected from the northern end of a skimming pond (DOE 1992). Wells to the west have indicated the presence of VOCs and radionuclides (DOE 1992).

IHSS Investigations

IHSS 107 was studied in accordance with the Final Phase III OU 1 RFI/RI Work Plan (DOE 1991). Sampling results were summarized in the Final Phase III RFI/RI Report for OU 1 (DOE 1994). Samples were collected from boreholes located within the skimming pond portion of IHSS 107. Plutonium-239/240 was detected at a maximum of 0.019 pCi/g, uranium-234 at 1.195 pCi/g, uranium-235 at 0.08 pCi/g, uranium-238 at 1.07 pCi/g, and toluene at 170 µg/kg.

No Further Action Recommendation

Based on the low contaminant concentrations in IHSS 107 and correspondingly low risk, IHSS 107 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

IHSS 107, while part of OU 1, is geographically in the BZ OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1987, Draft Remedial Investigation Report for High Priority Sites (881 Hillside Area), Rocky Flats Plant, Golden, Colorado, July.

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-145

IHSS Number: 145

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: Sanitary Waste Line Leak

This Final Update to the HRR for PAC 800-145 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 145 is summarized in this update. The following HRR volumes contain IHSS 145 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

January 1981

Historical Summary

The location of IHSS 145 is shown on Figure 22. On January 21, 1981, the 6-inch sanitary sewer line that originated at the Building 887 lift station leaked on the hillside south of Building 881. The line had conveyed sanitary wastes and low-level radioactive laundry effluent to the sanitary treatment plant from approximately 1969 to 1973 (DOE 1992). A review of construction drawings for the 1992 HRR indicated the only sanitary waste lines located south of Building 881 are the 6-inch cast-iron sanitary sewer line that originated at the Building 887 lift station and a 6-inch vitrified clay pipe that runs east-west into Building 887.

The January 1981 leak was contained by an earthen dike to prevent drainage to the SID and Woman Creek. The waste line was repaired January 30, 1981 (DOE 1992).

IHSS Investigations

IHSS 145 was studied in accordance with the Final Phase III OU 1 RFI/RI Work Plan (DOE 1991). The Final Phase III RFI/RI Report for OU 1 (DOE 1994) summarized the sampling data. Toluene was detected at a maximum of 160 µg/kg in two boreholes near IHSS 145 and plutonium-239/240 was detected at activities ranging from 0.028 to 0.044 pCi/g.

No Further Action Recommendation

Based on the low concentrations of contaminants in IHSS 145 and correspondingly low risk, IHSS 145 was approved for NFA by the regulatory agencies as documented in the CAD/ROD Declaration for OU 1, 881 Hillside Area (DOE 1997b).

Comments

IHSS 145, while part of OU 1, is geographically in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

OU 1 CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-147.2

IHSS Number: 147.2

Current Operable Unit: IA

Former Operable Unit: 12

IHSS Group: Not Applicable

Unit Name: Building 881 Conversion Activity Contamination Area

This Final Update to the HRR for PAC 800-147.2 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 147.2 is summarized in this update. The following HRR volumes contain IHSS 147.2 information:

Original Report – 1992 (DOE 1992a);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

1964 to 1966

Historical Summary

The Building 881 Conversion Activity Contamination Area – IHSS 147.2 is shown on Figure 22. No documentation was found that detailed when items were first stored in an area northeast of Building 881. Interviews with former Rocky Flats employees indicated miscellaneous equipment was stored in this area, such as lathe parts and rolling mill parts. The equipment may have been stored there during the conversion activities that took place in Building 881 in 1964 (DOE 1992a). Interviews with former Rocky Flats employees also indicated it was possible that some of this equipment may have been contaminated with beryllium and/or enriched or depleted uranium; however, the activity levels would not have been high (DOE 1992a).

Aerial photographs show items in this area as early as 1964 and again in 1966. By 1969, the area had been covered by a parking lot. The site is located about 250 ft east of Building 883 and 450 ft south of Central Avenue. It measures approximately 50 ft by 150 ft (DOE 1992a).

IHSS Investigations

IHSS 147.2 was investigated in accordance with the Final RFI/RI Work Plan for OU 12 (DOE 1992b). Investigation results are documented in the OU 12 Technical Memorandum No. 2 (DOE 1995). IHSS 147.2 surface soil was sampled in nine locations for radionuclides and metals. The only positive detections of metals were for calcium (31,500 mg/kg) and zinc (251 mg/kg). Plutonium-239/240 was detected at a maximum activity of 0.49 pCi/g and americium-241 was detected at a maximum activity of 0.114 pCi/g.

No Further Action Recommendation

Based on OU 12 analytical data (DOE 1995), IHSS 147.2 poses no threat of adverse health effects to human receptors. Therefore, in accordance with RFCA (DOE et al. 1996), IHSS 147.2

was proposed for NFA in the 1997 annual update to the HRR (DOE 1997). DOE received approval of NFA status for IHSS 147.2 from CDPHE (the LRA) on July 9, 1999 (CDPHE 1999).

References

CDPHE, 1999, Letter to J. Legare, DOE, from S. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report (September 1997), July 9.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final RFI/RI Work Plan – 400-800 Area – Operable Unit No. 12, Rocky Flats Plant, Golden, Colorado, September.

DOE, 1995, Technical Memorandum No. 2, Operable Unit 12, 400/800 Areas, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-164.2

IHSS Number:	164.2
Current Operable Unit:	IA
Former Operable Unit:	14
IHSS Group:	800-4
Unit Name:	Radioactive Site 800 Area, Site No. 2, Building 886 Spills

This Final Update to the HRR for PAC 800-164.2 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 164.2 is summarized in this update. The following HRR volumes contain IHSS 164.2 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1965 to 1989

Historical Summary

The Radioactive Site 800 Area, Site No. 2, Building 886 Spills shown on Figure 22, surrounds former Building 886. Building 886 was a facility for Nuclear Safety Research and Development (R&D). A Summary of Events, provided in Appendix F of the original HRR (DOE 1992), indicated a contamination release on June 9, 1969; however, no details were provided. On September 26, 1989, a 500-gallon stainless steel portable tank (T-27) was found leaking a colorless liquid from its drain valve onto the concrete, creating a wet spot approximately 5 inches in diameter.

In response to the 1989 incident, a radiation monitoring survey of the area resulted in direct counts of 650 cpm, and 12 to 24 dpm on a smear. This was considered low-level contamination. At that time, the valves were tightened, decontaminated, and bagged, and the tank was shipped to the size reduction facility in Building 776. The concrete was decontaminated and sealed with acrylic paint. Soil samples indicated contamination from uranium.

IHSS Investigations

IHSS 164.2 was investigated in accordance with the Phase I RFI/RI Work Plan for OU 14 (DOE 1992b). Twenty-five surface soil samples were collected and analyzed for radionuclides and metals. Americium-241and plutonium-239/240 were detected at activities greater than background, but less than RFCA Tier II surface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). The maximum detected activity of americium-241 was 0.18 pCi/g and the maximum detected activity of plutonium-239/240 was 0.92 pCi/g (DOE 1995).

Accelerated action soil sampling at IHSS 164.2 was conducted in November 2002 in accordance with IASAP Addendum #IA-02-03 (DOE 2002). Sixteen surface soil samples and 24 subsurface soil samples were collected in IHSS 164.2. Samples were analyzed for radionuclides, metals, SVOCs, and VOCs. Surface soil results indicated aluminum, barium, beryllium, calcium,

chromium, cobalt, copper, iron, lead, lithium, manganese, nickel, selenium, and strontium were detected at concentrations slightly greater than background for at least one location. All results were less than RFCA Tier I surface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). Beryllium, detected at a maximum of 1.2 mg/kg, was the only metal reported at a concentration greater than the RFCA Tier II surface soil AL (1.04 mg/kg [DOE et al. 1996]), but less than the RFCA WRW soil AL (921 mg/kg [DOE et al. 2003]) at one location. The maximum detected activity of americium-241 in surface soil was 4.43 pCi/g. Plutonium-239/240 was not detected in surface soil at levels exceeding background.

Only eight subsurface soil samples had detections of any analytes and most of these were associated with the OPWL (PAC 000-121) locations. Barium, chromium, copper, mercury, and strontium were detected in subsurface soil at concentrations slightly greater than background, but less than RFCA Tier II subsurface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). Plutonium-239/240, uranium- 233/234, and uranium-235 were detected at activities greater than background but well below RFCA Tier II subsurface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). The maximum detected activities of radionuclides in subsurface soil were as follows: plutonium-239/240, 0.07 pCi/g; uranium-234, 11.9 pCi/g; uranium-235, 0.92 pCi/g; and uranium-238, 1.57 pCi/g. Americium was not detected in subsurface soil in excess of background levels. VOCs were rarely detected, and at concentrations several orders of magnitude below RFCA WRW soil ALs (DOE et al. 2003). Several PAHs were detected and all results were less than RFCA Tier II subsurface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). Sampling locations and analytical data are presented in the Final Closeout Report for IHSS Group 800-4 (DOE 2003b).

No Further Action Recommendation

Based upon sampling results, no current or potential contaminant source was identified for IHSS 164.2. As described in the Final Closeout Report for IHSS Group 800-4 (DOE 2003b), analytical results from the previous and the most recent sampling events indicated all COCs were less than RFCA WRW soil ALs. DOE received approval of NFAA status for IHSS 164.2 from CDPHE (the LRA) on May 15, 2003 (CDPHE 2003).

Comments

Building 886 was demolished in 2002.

References

CDPHE, 2003, Gunderson, S.H., Letter to R. DiSalvo, Approval of IHSS Group 800-4 Closeout Report, May 15.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Operable Unit 14 Radioactive Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Data Summary 1 Operable Unit No. 14 Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-03, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 800-4, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-164.3

IHSS Number:	164.3
Current Operable Unit:	IA
Former Operable Unit:	14
IHSS Group:	800-6
Unit Name:	Radioactive Site 800 Area Site No. 2, Building 889 Storage Pad, including Tank 40

This Final Update to the HRR for PAC 800-164.3 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 164.3 is summarized in this update. The following HRR volumes contain IHSS 164.3 information:

Original Report – 1992 (DOE 1992a); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1958 to the early 2000s

Historical Summary

The Radioactive Site 800 Area Site No. 2, Building 889 Storage Pad is north and west of former Building 889, and surrounds part of former Building 889 and all of former Building 884. Its location is shown on Figure 22. Building 889 was a decontamination facility that was first occupied in 1969. A storage pad north of the building, and an area to the west, were used to store uranium-contaminated equipment and contaminated drums prior to decontamination. A radioactive survey supports that there was contamination at this western location.

Two incidents occurred at Building 889 that involved contaminated drums. On June 16, 1982, uranium chips in a waste drum spontaneously ignited, and on July 20, 1984, a uranium chip fire started in an improperly packed drum. Another incident occurred in September 1983, when nine machine tools were stored outside waiting for decontamination. The plastic sheeting that was covering the equipment had blown off, possibly allowing contamination to spread.

Building 884 was constructed in 1958 as a storage facility for Building 883, and was later used as a mixed-waste storage building. In September 1966, drums were reported to be leaking in the drum storage area outside of this building. Approximately 700 ft^2 of soil and rock were contaminated. It is thought that this information refers to a storage area east of Building 884 that was used prior to the construction of Building 889. Building 884 was demolished in 2003.

Tank 40 was associated with the OPWL and was located in the 800 Area west of Building 889. Tank 40 was reportedly installed in the mid-1950s and was abandoned in 1981 or 1982. The tank consisted of two 400-gallon underground concrete tanks located in a concrete vault. The top of the vault was approximately 7 ft below grade.

IHSS Investigations

IHSS 164.3 was investigated in accordance with the Phase I RFI/RI Work Plan for OU 14 (DOE 1992b). Results are presented in Data Summary No. 1 OU 14 Radioactive Sites (DOE 1995). Surface soil samples were collected at 44 locations in IHSS 164.3 and analyzed for radionuclides. Americium-241 and plutonium-239/240 activities were greater than background levels in a southwest to northeast band across the IHSS. The maximum detected americium-241 activity was 0.36 pCi/g, and the maximum detected plutonium-239/240 activity was 2.2 pCi/g. These activities are well below RFCA WRW soil ALs (DOE et al. 2003).

Accelerated action characterization samples were collected for IHSS 164.3 in accordance with IASAP Addendum #IA-02-01 (DOE 2001). PCOCs at IHSS 800-164.3 and Tank 40 were determined based on process knowledge and data collected prior to the accelerated action during 2002 and included radionuclides, metals, VOCs, and SVOCs (DOE 2001). Nineteen surface soil and 21 subsurface soil samples were collected at IHSS 164.3. Only metals were analyzed in surface soil, as the OU 14 RFI/RI data were considered adequate for radionuclide characterization. Aluminum, barium, calcium, chromium, cobalt, copper, lithium, strontium, and vanadium were detected at least once at concentrations greater than background, but less than RFCA Tier II surface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003).

Subsurface soil samples were analyzed for radionuclides, metals, and VOCs. Uranium-235 was the only radionuclide detected at activities greater than background and was well below RFCA Tier II subsurface soil ALs (DOE et al. 1996) and RFCA WRW soil ALs (DOE et al. 2003). The maximum activity of uranium-235 in subsurface soil was 0.35 pCi/g. VOCs were rarely detected, and then at concentrations very close to the RL.

A RFCA (DOE et al. 1996) accelerated action was implemented in accordance with ER RSOP Notification #02-02 (DOE 2002). Activities were conducted between May 8 and July 18, 2002, and involved the removal of process waste lines and Tank 40, site grading and vegetation, and characterization. Surface and subsurface soil samples were collected and analyzed after the removal activities. Following the accelerated action, residual contaminant concentrations in soil were less than RFCA WRW soil ALs (DOE et al. 2003). Details and analytical results are provided in the Final Closeout Report for IHSS Group 800-6 (DOE 2003b).

No Further Action Recommendation

Based on the actions taken and residual concentrations of contaminants in soil (DOE 2003b), an NFAA was justified for IHSS 164.3. DOE received approval of NFAA status for IHSS 164.3 from CDPHE (the LRA) on March 25, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 800-6, March 25.

DOE, 1992a, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992b, Final Phase I RFI/RI Work Plan Operable Unit 14 Radioactive Sites, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995, Data Summary No. 1 Operable Unit No. 14 Radioactive Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol (ER RSOP) Notification #02-02, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-177

IHSS Number: 177

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 800-5

Unit Name: Building 885 Drum and Paint Storage

This Final Update to the HRR for PAC 800-177 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 177 is summarized in this update. The following HRR volumes contain IHSS 177 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1953 to 2001

Historical Summary

The location of IHSS 177 is shown on Figure 22. The Building 885 Drum Storage Area was first used in 1953 when Building 881 was first occupied. Since 1986, the area was used as a 90-day accumulation area and a satellite collection station until 2001. The storage area occupied two sections of Building 885, located south of Building 881. The western portion of the building was exposed to the north, and the eastern section was exposed to the north and east. A completely enclosed area used for paint storage was located between the two sections. The two exposed sections measured approximately 20 ft by 10 ft. Both had concrete floors; however, there were no berms around the storage areas. Both sections had drums stored on pallets and were used as satellite collection stations (DOE 1992).

Several circumstances that may have resulted in releases include the following:

- In 1972, the drain water from the sump that drains the floor of Building 885 was found to have a temperature of 150 degrees Fahrenheit. The cause of the elevated temperature was unknown as was the source and destination of the liquid (DOE 1992).
- Building 885 was known to have “poor housekeeping” conditions. Paint cans and drums were stored haphazardly, and rainwater was allowed to flow through the building. Any spilled organics would have been carried outside of the building (DOE 1992).
- Inadvertent dumping of radioactively contaminated oil sludge into an open top dumpster located at Building 885 was reported. It is not clear whether there was a release to the environment (DOE 1992).
- Drums contained waste oil, waste paints, waste solvents, and low-level radioactive waste. Radionuclides, metals, SVOCs, and VOCs were considered PCOCs for IHSS 177.

There have been no documented releases (DOE 1992). Building 885 was demolished in 2003.

IHSS Investigations

IHSS 177 was investigated in accordance with the Final Phase III RFI/RI Work Plan (DOE 1991). One borehole was placed downgradient of IHSS 177 to analyze for VOCs, radionuclides, and metals in subsurface soil. The following analytes were detected: americium-241 at 0.0053 pCi/g, plutonium-239/240 at 0.0197 pCi/g, uranium-233/234 at 1.099 pCi/g, uranium-235 at 0.1136 pCi/g, uranium-238 at 1.099 pCi/g, and toluene at 300 µg/kg (DOE 1994).

IHSS 177 was further characterized in accordance with IASAP Addendum #IA-02-04 for IHSS Groups 800-2 and 800-5 (DOE 2002). Two locations were sampled specific to IHSS 177, targeting VOCs, SVOCs, radionuclides, and metals in surface and subsurface soil. Analytical results from the characterization are presented in the Data Summary Report for IHSS Group-800-5 (DOE 2004b). All analytes in surface soil were either not detected or present at concentrations less than background levels. Benzo(a)pyrene was detected at concentrations greater than the RFCA WRW soil AL (DOE et al. 2003) at one subsurface soil location in IHSS 177. This 3,700 µg/kg concentration was determined to be an anomaly, most likely due to asphalt pavement in the area. Other SVOCs were detected at this location, but all were less than RFCA WRW soil ALs (DOE et al. 2003). Uranium-234, uranium-235, and uranium-238 were detected at activities greater than background in subsurface soil at both boreholes, but at activities less than RFCA WRW soil ALs (DOE et al. 2003). Uranium-234 was detected at maximum activities of 2.787 pCi/g, uranium-235 at 0.247 pCi/g, and uranium-238 at a maximum activity of 2.787 pCi/g.

No Further Action Recommendation

Based on analytical results and the SSRS presented in the IHSS Group 800-5 Data Summary Report (DOE 2004b), an NFAA determination was justified for IHSS 177. After review of the IHSS Group 800-5 Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 177 on June 21, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Data Summary Report IHSS Group 800-5 (B887 and B885), NFAA - Approval, June 21.

DOE, 1991, Final Phase III RFI/RI Work Plan 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, March.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-04, IHSS Groups 800-2 and 800-5, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 800-5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-178

IHSS Number: 178

Current Operable Unit: 15

Former Operable Unit: 15

IHSS Group: Not Applicable

Unit Name: Building 881 Drum Storage Area

This Final Update to the HRR for PAC 800-178 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 178 is summarized in this update. The following HRR volumes contain IHSS 178 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1996 Annual (DOE 1996).

Dates(s) of Operation or Occurrence

1953 to 1993

Historical Summary

The Building 881 Drum Storage Area, shown on Figure 22, was first used in 1953 when Building 881 operations began. It was subsequently designated for use as RCRA 90-day accumulation area. The storage area was located in Room 165 and measured 5 ft by 5 ft. A maximum number of five 55-gallon drums were stored at this location. The drums were stored directly on the floor with no surrounding berms (DOE 1992, 1995a).

The drums stored in the IHSS contained waste solvents (VOCs) and possibly low-level radioactive waste. There have been no documented releases or visual evidence of a release (DOE 1992, 1995a). Building 881 was demolished in 2004.

IHSS Investigations

Although no documentation was found to indicate a release to the environment, IHSS 178 was studied as part of OU 15, Inside Building Closures (DOE 1995a), in accordance with the Final Phase I RFI/RI Work Plan for OU 15 (DOE 1993). Thirty radiological smear samples were collected from the IHSS and three hot-water rinsate samples were obtained from the IHSS and associated perimeter and pathway areas. Final radiological surveys were conducted at each of the 30 initial smear sample locations.

No RCRA-regulated constituents of regulatory concern were identified in the IHSS 178 sampling. In addition, none of the data collected during the CERCLA evaluation with respect to radionuclides and beryllium exceeded the screening criteria. IHSS 178 met the federal occupational radiation protection standards, and posed no unacceptable risk to workers.

No Further Action Recommendation

Because IHSS 178 met the clean closure requirements of the Rocky Flats RCRA Permit and the Federal occupational radiation protection standards (DOE 1995a), a CAD/ROD was prepared

recommending clean closure under RCRA and NFA under CERCLA for IHSS 178 (DOE 1995b). The CAD/ROD received final agency approval on October 18, 1995.

Comments

While this is an OU 15 IHSS, it is also geographically situated in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

The CAD/ROD for OU 15 (DOE 1995b) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Final Phase I RFI/RI Work Plan RFP Inside Building Closures (OU 15), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995a, Phase I RFI/RI Report for OU 15, Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1995b, Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-179

IHSS Number: 179

Current Operable Unit: 15

Former Operable Unit: 15

IHSS Group: Not Applicable

Unit Name: Building 865 Drum Storage Area

This Final Update to the HRR for PAC 800-179 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 179 is summarized in this update. The following HRR volumes contain IHSS 179 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

1970 to 1998

Historical Summary

The Building 865 Drum Storage Area was first used in 1970 and was used as a RCRA 90-day accumulation area until late 1998 (exact date unknown). The storage area was in Room 145 and measured 12 ft by 8 ft and its location is shown on Figure 22. The maximum number of 55-gallon drums stored in the unit was 10. The drums were stored directly on a concrete floor with no berms or floor drains (DOE 1992).

The drums contained VOCs, beryllium, and radioactive waste. In the past, chlorinated solvents were also stored at this location. There have been no documented releases and, based on a visual inspection in November 1986, there was no visual evidence of spills (DOE 1992). Building 865 was demolished in 2003.

IHSS Investigations

A review of the inspection records and Room 145 (IHSS 179) was completed on July 11, 2001. No documentation could be found regarding a release or spill from this accumulation area. Moreover, there was no evidence of staining on the concrete floor.

IHSS 179 was studied as part of OU 15 in accordance with the Final Phase I RFI/RI Work Plan for OU 15 (DOE 1993). No releases were identified; however, upon signing of the CAD/ROD for OU 15, IHSS 179 was called out as “deferred” until D&D operations began (DOE 1995).

No Further Action Recommendation

Based upon the review of inspection records, a walk down of the area, and interpretation of the regulations as stated in Comments below, no current or potential contaminant source could be

identified in Room 145; therefore, consistent with criteria set forth in RFCA (DOE et al. 1996), IHSS 179 was proposed for NFA in the 2001 Annual Update to the HRR (DOE 2001).

IHSS 179 was addressed through the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified for IHSS 179 because investigations did not identify any evidence of a release associated with this PAC. An NFA for IHSS 179 was verbally agreed to in the December 19, 2001 meeting and formally approved by CDPHE (the LRA) in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

IHSS 179 was above grade within Building 865 and considered part of the building "structure" removed under D&D programs. Building 865 was demolished to its main foundation slab during 2003. Characterization and removal of concrete slabs and other features associated with Building 865 was conducted during the RFCA (DOE et al. 1996) accelerated action implemented at IHSS Group 800-1 in accordance with ER RSOP Notification #03-02 (DOE 2003). Details are provided in the Closeout Report for IHSS Group 800-1 (DOE 2004).

While this is an OU 15 IHSS, it is also geographically situated in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

The CAD/ROD for OU 15 (DOE 1995) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, Rocky Flats Environmental Technology Site, Golden, Colorado, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Final Phase I RFI/RI Work Plan RFP Inside Building Closures (OU15), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Corrective Action Decision/Record of Decision for OU15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-02 IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-180

IHSS Number: 180

Current Operable Unit: 15

Former Operable Unit: 15

IHSS Group: Not Applicable

Unit Name: Building 883 Drum Storage Area

This Final Update to the HRR for PAC 800-180 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 180 is summarized in this update. The following HRR volumes contain IHSS 180 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

1981 to 1998

Historical Summary

The Building 883 Drum Storage Area was first used in 1981 and continued its use as a RCRA 90-day accumulation area until late 1998 (exact date unknown). The storage area was in Room 104 and measured 16 ft by 10 ft. The location of IHSS 180 is shown on Figure 22. The maximum number of 55-gallon drums stored in the unit was 30. The drums were stored directly on a concrete floor with no berms or floor drains (DOE 1992).

The drums contained waste oils that were usually contaminated with solvents and uranium. Analytical results indicated the presence of VOCs, beryllium, and radioactivity. There have been no documented releases and, based on a visual inspection in November 1986, there was no evidence of spills or leakage (DOE 1992).

IHSS Investigations

A review of the inspection records and Room 104 (IHSS 180) was completed on July, 2001. No documentation could be found regarding a release or spill from this accumulation area. Moreover, there was no evidence of staining on the concrete floor.

IHSS 180 was studied in accordance with the Final Phase I RFI/RI Work Plan for OU 15 (DOE 1993). No releases were identified (DOE 1995).

No Further Action Recommendation

Based upon the review of inspection records, walk down of the area, and interpretation of the regulations as stated in Comments below, no current or potential contaminant source could be identified in Room 104; therefore, consistent with criteria set forth in RFCA (DOE et al. 1996), IHSS 180 was proposed for NFA status in the 2001 Annual Update to the HRR (DOE 2001).

IHSS 180 was addressed through the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified for IHSS 180 because investigations did not identify any evidence of a release associated with this IHSS. An NFA for IHSS 180 was verbally agreed to in the December 19, 2001 meeting and formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

IHSS 180 was above grade within Building 883 and was considered part of the building "structure" removed under D&D programs. A RFCA (DOE et al. 1996) accelerated action was implemented at IHSS Group 800-3 in accordance with ER RSOP Notification #04-06 (DOE 2003). The action was conducted between August 2004 and April 2005 and included removal of the Building 883 foundation slab and other associated features. These activities are described in the Closeout Report for IHSS Group 800-3 (DOE 2005).

While this is an OU 15 IHSS, it is also geographically situated in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

The CAD/ROD for OU 15 (DOE 1995) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, Rocky Flats Environmental Technology Site, Golden, Colorado, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Final Phase I RFI/RI Work Plan RFP Inside Building Closures (OU15), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995, Corrective Action Decision/Record of Decision for OU15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-06, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005, Closeout Report for IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 800-211

IHSS Number:	211
Current Operable Unit:	15
Former Operable Unit:	15
IHSS Group:	Not Applicable
Unit Name:	Building 881 Drum Storage Area, Unit 26

This Final Update to the HRR for PAC 800-211 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 211 is summarized in this update. The following HRR volumes contain IHSS 211 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1996 Annual (DOE 1996).

Dates(s) of Operation or Occurrence

1981 to 1993

Historical Summary

The Building 881 Drum Storage Area was first used as a RCRA 90-day accumulation area in 1981. The storage area was located in Room 266B and measured 20 ft by 10 ft and its location is shown on Figure 22. Building 881 was demolished in 2004. The maximum number of 55-gallon drums stored there was 29 (DOE 1992, 1995a).

The wastes stored in IHSS 211 historically included low-level radioactive combustibles (for example, rags and wipes), metals, glass, and materials that contained solvents and/or metals generated by laboratories in the building. There have been no documented releases or visual evidence of a release (DOE 1992, 1995a).

IHSS Investigations

Although no documentation was found to indicate a release to the environment, IHSS 211 was studied in accordance with the Final Phase I RFI/RI Work Plan for OU 15 (DOE 1993). Thirty-two radiological smear samples were collected from IHSS 211 and three hot-water rinsate samples were obtained from the IHSS, perimeter, and pathway areas. Final radiological surveys were performed at each of the 32 initial smear sample locations.

No RCRA-regulated constituents of regulatory concern were identified in the IHSS 211 sampling. In addition, none of the data collected during the CERCLA evaluation exceeded the screening criteria with respect to radionuclides.

No Further Action Recommendation

Because IHSS 211 met the clean closure requirements of the Rocky Flats RCRA Permit and the Federal occupational radiation protection standards (DOE 1995a), a CAD/ROD was prepared, recommending clean closure under RCRA and NFA under CERCLA for IHSS 211 (DOE 1995b). The CAD/ROD received final agency approval on October 18, 1995.

Comments

While this is an OU 15 IHSS, it is also geographically situated in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

The CAD/ROD for OU 15 (DOE 1995b) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Final Phase I RFI/RI Work Plan RFP Inside Building Closures (OU15), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995a, Phase I RFI/RI Report for OU 15, Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1995b, Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-217

IHSS Number:	217
Current Operable Unit:	15
Former Operable Unit:	15
IHSS Group:	Not Applicable
Unit Name:	Building 881 Cyanide Bench-Scale Treatment, Unit 32

This Final Update to the HRR for PAC 800-217 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 217 is summarized in this update. The following HRR volumes contain IHSS 217 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1996 Annual (DOE 1996).

Dates(s) of Operation or Occurrence

1986 through September 1988

Historical Summary

IHSS 217 was a hazardous waste treatment unit located in Room 131C in Building 881. The location of IHSS 217 in Building 881, which was demolished in 2004, is shown on Figure 22. IHSS 217 consisted of a 4-ft by 5-ft painted metal fume hood and laboratory table, three 4-liter polyethylene bottles, a glass beaker, and a chlorine-specific ion electrode. The bench-scale treatment that occurred at this location involved the analysis of the laboratory wastes for cyanide content by using a cyanide still. Wastes from the analysis were collected in 4-liter polyethylene bottles that usually took approximately 2 months to fill. The contents of the bottles were reacted with sodium or calcium hypochlorite to oxidize the cyanide to cyanate. After neutralization was complete, the contents of the bottles were poured down the process waste drain for transport to Building 374 for further treatment (DOE 1992, 1995a).

The wastes involved laboratory waste containing cyanide. There have been no documented releases or visual evidence of a release (DOE 1992, 1995a).

IHSS Investigations

Although no documentation was found to indicate a release to the environment, IHSS 217 was studied in accordance with the Final Phase I RFI/RI Work Plan for OU 15 (DOE 1993). Thirteen radiological smear samples were collected from IHSS 217, along with one hot-water rinsate sample. Final radiological surveys were performed at each of the 13 initial smear sampling locations.

No RCRA-regulated constituents of regulatory concern were identified in the IHSS 217 verification sampling. In addition, none of the data collected during the CERCLA evaluation, with respect to radionuclides, exceeded the screening criteria.

No Further Action Recommendation

Because IHSS 217 meets the clean closure requirements of the Rocky Flats RCRA Permit and the federal occupational radiation protection standards (DOE 1995a), a CAD/ROD was prepared recommending clean closure under RCRA and No Action under CERCLA for IHSS 217 (DOE 1995b). The CAD/ROD received final agency approval on October 18, 1995.

Comments

While this is an OU 15 IHSS, it is also geographically situated in the IA OU for purposes of approval of the Final Remedy CAD/ROD as delineated in RFCA Part 8.

The CAD/ROD for OU 15 (DOE 1995b) indicates that a 5-year review is not required for this IHSS/PAC because hazardous substances, pollutants, or contaminants do not remain above levels that allow for unlimited use and unrestricted exposure.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1993, Final Phase I RFI/RI Work Plan RFP Inside Building Closures (OU 15), Rocky Flats Plant, Golden, Colorado, May.

DOE, 1995a, Phase I RFI/RI Report for Operable Unit 15, Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1995b, Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-1200

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-3
Unit Name:	Valve Vault 2

This Final Update to the HRR for PAC 800-1200 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1200 is summarized in this update. The following HRR volume contains PAC 800-1200 information:

Original Report – 1992 (DOE 1992).

Dates(s) of Operation or Occurrence

April 25, 1989

Historical Summary

The location of PAC 800-1200 is shown on Figure 22. During a routine inspection of Valve Vault 2 on April 25, 1989, a leak in the south process transfer line (NPWL) was discovered. The line consisted of a 3-inch PVC Schedule 80 pipe inside a 6-inch polyethylene chase (containment) pipe and originated from the waste tanks in Building 883. Process waste consisted of nitric acid and/or rinsate water contaminated with depleted uranium. The waste was partially neutralized with KaOH before being discharged to Building 374 through Valve Vault 2. Total alpha activity measured 39,000,000 pCi/L (DOE 1992).

Upon detection of the leak, discharge valves from the waste tanks in Building 883 were closed and locked out. Plumbing changes took place within 2 days after the leak was detected to ensure that no more transfers were made through the line. Hydrostatic testing of the inner line began on May 8, 1989, and continued through the month. Removal of the inner line began on May 29 and continued through June 2, 1989. Salt encrustations were found at the elbow where the process waste line exited the nitrad (a combination of HFl and ammonium) pickling operation room (DOE 1992).

During the week of June 5 to 9, 1989, the secondary chase pipe was hydrostatically tested. When it was found to be leaking, the line was inspected by electronic visual imaging on June 15, 1989, to locate the leak (DOE 1992).

Because the release amounts exceed the reportable quantity, the event was reported to the National Response Center on June 15, 1989. RCRA CPIR No. 89-007 was submitted in compliance with 6 CCR 1007-3, 265.56(j).

PAC Investigations

PAC 800-1200 was characterized between August 5, 2004 and April 19, 2005, in accordance with IASAP Addendum #IA-04-06 (DOE 2004). Subsurface soil samples were collected from

eight sampling locations associated with PAC 800-1200, Valve Vault 2, and the NPWL (DOE 2005a). PCOCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). Among these samples, the maximum plutonium-239/240 activity was 0.13 pCi/g, the maximum uranium-235 activity was 0.148 pCi/g, and the maximum uranium-238 activity was 1.675 pCi/g.

A RFCA (DOE et al. 1996) accelerated action was implemented at IHSS Group 800-3 in accordance with ER RSOP Notification #05-04 (DOE 2005b) and the Closure Description Document for Partial Closure of Unit 374.3; 700 and 800 Area Process Waste Transfer System (DOE 2003). As a result, Valve Vault 2 and associated NPWL within PAC 800-1200 were remediated. However, soil remediation was not required for PAC 800-1200 because all accelerated action sampling results were less than RFCA WRW soil ALs (DOE et al. 2003).

Remediation of PAC 800-1200 included removal of the top 4 ft of Valve Vault 2. The remainder of the vault was flow filled. Total uranium-233/234/235 in rinsate from the vault was 0.3.86 g, total plutonium/americium was $6.90E^{-07}$ g. The NPWL line segment from Valve Vault 1 to Valve Vault 2 was completely removed as was the segment from Building 883 to Valve Vault 2. The line from Valve Vault 2 to Valve Vault 3 was RCRA clean closed and left in place. Rinsate from this segment had a combined gross alpha/gross beta of 37.2 pCi/L (DOE 2005c).

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for PAC 800-1200 based on the following:

- Accelerated action data indicate all residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the IHSS Group 800-3 Closeout Report did not indicate additional action was necessary (DOE 2005a).

After review of the Closeout Report for IHSS Group 800-3 (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1200 on June 7, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-3, June 7.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Closure Description Document for Partial Closure of Unit 374.3; 700 and 800 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004, Industrial Area Sampling and Analysis Plan Addendum #IA-04-06, IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005a, Closeout Report for IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-04, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005c, Closeout Report for IHSS Group 000-4, New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1201

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-3
Unit Name:	Radioactive Site South of Building 883

This Final Update to the HRR for PAC 800-1201 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1201 is summarized in this update. The following HRR volume contains PAC 800-1201 information:

Original Report – 1992 (DOE 1992).

Dates(s) of Operation or Occurrence

1958 to 1981

Historical Summary

The location of PAC 800-1201 is shown on Figure 22. Contamination in the area between Buildings 883 and 881 was documented as early as 1958. After the plutonium fire in 1957, studies were initiated to determine the spread of contamination. This study was extended to research the impact of Rocky Flats operations on the environment. One particular spot in the 800 Area with significant plutonium contamination was located 500 ft east of the Building 881 road and 500 ft north of Building 881 (prior to construction of Building 883) (DOE 1992).

In 1978, while conducting radiological soil surveys during excavation for a telephone line, readings above background were found approximately 30 ft south of Building 883. Radiological soil surveys found two other spots, one at the northwestern corner of Building 889 and the other at the southeastern corner of Building 865 (DOE 1992).

In 1958, soil samples were collected at the northwestern corner of Building 881 and 20 ft west of the building. Analysis indicated total activities of 4.5×10^4 and 1.5×10^5 dpm/kg, respectively, with some plutonium. During the excavation in 1978, the soil samples were found to contain uranium-235 (DOE 1992).

No documentation of cleanup activities was found in response to the 1958 incident. Removal of contaminated soil in two small areas near Building 883 was completed in April 1981. It is not known whether these are the contaminated areas mentioned in 1978 (DOE 1992).

PAC Investigations

PAC 800-1201 was characterized between August 5, 2004 and April 19, 2005 as part of IHSS Group 800-3 in accordance with IASAP Addendum #IA-04-06 (DOE 2004). Surface soil samples were collected from seven sampling locations and analyzed for radionuclides (DOE 2005a). Analytical results indicated all radionuclide activities were less than the RFCA WRW soil ALs (DOE et al. 2003). Uranium-234, uranium-235, and uranium-238 were detected

at maximum activities of 4.276, 0.268, and 4.276 pCi/g, respectively. No other radionuclides were detected above background levels.

A RFCA (DOE et al. 1996) accelerated action was implemented at IHSS Group 800-3 in accordance with ER RSOP Notification #05-04 (DOE 2005b). Although PAC 800-1201 did not require remediation, storm drain and sewer lines were removed from the PAC 800-1201 area as part of the accelerated action (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 800-1201 based on the following:

- Accelerated action data indicate all radionuclide activities were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 800-3 did not indicate additional action was necessary (DOE 2005a).

After review of the Closeout Report for IHSS Group 800-3 (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1201 on June 7, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-3, June 7.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2004, Industrial Area Sampling and Analysis Plan Addendum #IA-04-06, IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005a, Closeout Report for IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-04, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1202

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Sulfuric Acid Spill – Building 883

This Final Update to the HRR for PAC 800-1202 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1202 is summarized in this update. The following HRR volumes contain PAC 800-1202 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

October 21, 1985

Historical Summary

The location of PAC 800-1202 is shown on Figure 22. On October 21, 1985, a battery fell from a forklift or truck. Acid was spilled in the middle of the roadway outside Door No. 11 of Building 883. Approximately 1 quart to 0.5 gallon of sulfuric acid was spilled on the roadway. Sodium bicarbonate was applied to the spill and the area was washed down. No radioactive contamination was involved. The battery was disposed of in the Present Landfill (PAC NW-114) (DOE 1992).

PAC Investigations

No other investigation was required because the spill was cleaned up.

No Further Action Recommendation

PAC 800-1202 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 800-1202 because the spill was cleaned up. An NFA for PAC 800-1202 was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-1203

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Sanitary Line Break between Buildings 865 and 886

This Final Update to the HRR for PAC 800-1203 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1203 is summarized in this update. The following HRR volumes contain PAC 800-1203 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

June 1982

Historical Summary

The location of PAC 800-1203 is shown on Figure 22. In June 1982, construction crews broke the sanitary sewer line between Buildings 865 and 886. An unknown quantity of sanitary sewage waste was released. The sewage did not reach the Central Avenue ditch; therefore, it was considered at the time that no impact was made to the downstream ponds. No documentation was found that indicated the line was repaired or replaced (DOE 1992).

PAC Investigations

No other investigation was required because there was no environmental impact.

No Further Action Recommendation

PAC 800-1203 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 800-1203 because the spill did not reach the local surface water drainage. An NFA for PAC 800-1203 was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-1204

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: 800-1

Unit Name: Building 866 Spills

This Final Update to the HRR for PAC 800-1204 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1204 is summarized in this update. The following HRR volumes contain PAC 800-1204 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1978 to 1998

Historical Summary

As shown on Figure 22, PAC 800-1204 is located west of Building 866. Building 866 contained five process waste tanks that serviced Buildings 865 and 889. Three documented contamination releases associated with filling these tanks are listed below (DOE 1992).

January 1978 - Vent Pipe Overflow

A faulty vacuum breaker for a process waste line vent pipe between Buildings 864 and 881 allowed liquid to be released to the environment. Apparently gravel caused the vent line to stick open, and approximately 2 gallons spilled onto the ground, affecting approximately 16 ft^2 of ground area near the 865 Guard Post. The day following the incident 3 inches of moist gravel were removed (DOE 1992).

Laboratory analysis of the liquid indicated 410,000 dpm/L alpha activity, which consisted predominately of depleted uranium activity. A FIDLER survey of the soil did not indicate any above-background readings (DOE 1992).

1984 - Tank Overflow

A valve was left open while pumping decontamination water to a fill tank in Building 889. When the tank overfilled, the water ran into the sump pump and was then pumped to the process waste tanks in Building 865. These tanks also overfilled, and the water passed up through the vent to the roof where it drained to the ground through the downspouts. The drainage ditch west of Building 866 was dammed with gravel to contain the liquid. Surface gravel from the area of the overflow was supposed to have been removed and shipped as waste. Forty to 45 gallons of liquid were vacuumed up and taken to the Building 889 waste drains (DOE 1992).

The interiors of Buildings 866 and 889 were reportedly decontaminated, and radiation monitoring indicated no contamination. Water samples collected from the northern and southern

ditch revealed 2.2 x 10^3 µg/L total uranium, and a maximum of 7.9 x 10^2 and 5.8 x 10^2 pCi/L for total beta activity and tritium, respectively (DOE 1992).

A similar incident occurred in 1983; however, the water apparently ran into Building 866 instead of outside the building.

1986 - Tank Overflow

The filling of the process waste tanks in Building 866 resulted in an overflow of process waste through the roof vent and out the downspout, releasing approximately 20 gallons to the ground. No contamination was found on the ground or in the building. Liquid-level alarms were installed for each tank (DOE 1992).

The tanks in Building 866 were closed pursuant to RCRA and removed prior to building demolition, which occurred during 2003 (DOE 2004b).

PAC Investigations

PAC 800-1204 was characterized between August 14, 2003 and December 12, 2003 as part of IHSS Group 800-1 in accordance with IASAP Addendum #IA-03-01 (DOE 2003a). Surface and subsurface soil samples were collected from five sampling locations (DOE 2004c). COCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). The maximum activities of uranium isotopes in surface soil were as follows: uranium-234 at 4.59 pCi/g; uranium-235 at 0.28 pCi/g, and uranium-238 at 4.59 pCi/g. Maximum activities observed in subsurface soil were slightly lower. Plutonium-239/240 and americium-241 did not exceed background levels in any of the PAC 800-1204 samples (DOE 2004c).

Remediation of soil in PAC 800-1204 was not necessary because all sampling results were less than RFCA WRW soil ALs (DOE et al. 2003). However, other portions of IHSS Group 800-1 were remediated in a RFCA (DOE et al. 1996) accelerated action implemented in accordance with ER RSOP Notification #03-12 (DOE 2003b). NPWL was removed from the PAC 800-1204 area as part of RFCA accelerated actions (DOE 2004c, 2005a). OPWL was grouted and left in place (DOE 2005b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 800-1204 based on the following:

- Accelerated action data indicate all residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 800-1 indicated additional action is not necessary (DOE 2004c).

After review of the Closeout Report for IHSS Group 800-1 (DOE 2004c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1204 on March 19, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1, March 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY03 Notification #03-12 IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Final Project Closeout Report for Building 865 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004c, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005a, Closeout Report for IHSS Group 000-4 New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1205

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-2
Unit Name:	Building 881 – East Dock

This Final Update to the HRR for PAC 800-1205 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1205 is summarized in this update. The following HRR volumes contain PAC 800-1205 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1953 (date Building 881 occupied) to 2001

Historical Summary

The location of PAC 800-1205 is shown on Figure 22. Building 881's east dock was an area of potential concern because of the production activities that took place in the building. The Draft CEARP Phase I Report indicated the dock was contaminated in February 1960; however, there is no mention of what caused the contamination. The only documented incident occurred on January 7, 1990. Fire Department personnel found a large puddle on the dock. The SOE identified the source as overflow from a condensate pan.

PAC Investigations

PAC 800-1205 was characterized between July 16, 2002 and September 5, 2002 in accordance with IASAP Addendum #IA-02-04 (DOE 2002). Soil samples were collected from five sampling locations and analyzed for radionuclides and metals (DOE 2003b). Radionuclide activities did not exceed background in any of the samples. Metal concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), with two exceptions:

- The arsenic concentration at sampling location CG34-016 (0 - 2 ft bgs) was 28.1 mg/kg, and the AL is 22.2 mg/kg.
- The barium concentration at sampling location CG34-016 (0 - 2 ft bgs) was 44,500 mg/kg, and the AL is 26,400 mg/kg.

Both concentrations were less than three times their ALs. The arsenic concentration was also very close to its AL and was within its background range. In the case of barium, the 95% UCL of the mean concentration within the AOC was considerably less than the barium WRW soil AL. Based on these findings, soil remediation was not warranted. Characterization results are presented in the Data Summary Report for IHSS Group 800-2 (DOE 2003b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 800-1205 based on the following:

- Accelerated action data indicate all residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with the two exceptions noted above, which did not require remediation because they were isolated detections less than three times the RFCA WRW soil AL (DOE et al. 2003).
- Results of the SSRS presented in the Data Summary Report for IHSS Group 800-2 did not indicate additional action was necessary (DOE 2003b).

After review of the Data Summary Report for IHSS Group 800-2 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1205 on July 16, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-2, July 16.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-02-04, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 800-2, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1206

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Fire, Building 883

This Final Update to the HRR for PAC 800-1206 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1206 is summarized in this update. The following HRR volumes contain PAC 800-1206 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

October 27, 1982

Historical Summary

The location of PAC 800-1206 is shown on Figure 22. A contaminated trash container fire occurred in Building 883 because of grinding operations. Maintenance personnel placed the container outside the building and left it unattended. The Fire Department responded and spread the contents on the ground. No documentation was found that detailed constituents released, except that the container contained contaminated trash. No documentation was found that detailed the fate of constituents released to the environment (DOE 1992).

PAC Investigations

No further investigation was necessary because the spill was trash.

No Further Action Recommendation

PAC 800-1206 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 800-1206. An NFA for PAC 800-1206 was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-1207

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformer 883-4

This Final Update to the HRR for PAC 800-1207 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1207 is summarized in this update. The following HRR volumes contain PAC 800-1207 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1985 to 1987

Historical Summary

The location of PAC 800-1207 is shown on Figure 22. Transformer 883-4 was located at the southeastern corner of Building 883. The transformer was found leaking during an inspection on November 7, 1985. Leaks were also found on January 30, 1986, during an EPA TSCA compliance inspection. This transformer was on the list for cleanup and/or repair on February 11, 1986, because of oil leaks around the top and bottom valves, and the presence of oil on the surface of the concrete transformer pad and the transformer wall (DOE 1992). It was reported that it may have leaked prior to being drained and refilled with non-PCB dielectric oil in either 1986 or 1987 as part of the Rocky Flats Environmental Hazard Elimination Program (Appendix I of 1992 HRR). By 1991, the original pad had been partially removed, and the top was scarified to make room for a new pad that was constructed several feet west (DOE 1991). After retro-filling, the transformer was relocated on the new pad.

Historical records indicate Transformer 883-4 contained dielectric oil with greater than 500 ppm PCBs prior to 1986 (DOE 1992); however, another document indicates the transformer oil was sampled in 1992 and found to contain 6 ppm PCBs. No documentation could be found as to whether smear samples were ever collected at this location (DOE 1996).

The boundaries of the original PAC location were estimated. The boundaries for PAC 800-1207 were revised in the 2004 Annual Update to the HRR, based on sampling location surveys and field reconnaissance.

D&D of Building 883 and associated structures was completed on April 7, 2005.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected and analyzed (DOE 1991). The results indicated PCB contamination existed in the soil surrounding the old transformer pad. PCB concentrations were identified at 160 ppm immediately east of the pad, and 12 ppm immediately north of the pad (DOE 1991).

Under the approved Final PAM for Remediation of PCBs (DOE 1995), further sampling was completed in July and August 1995 to verify the lateral and vertical extent of PCB migration. Approximately 28 cy of PCB-contaminated soil were excavated from the old transformer site. The soil was containerized and shipped offsite for disposal (DOE 1997). PCB levels remaining in the soil following the 1995 excavation were less than 10 ppm using EPA Method 4020 and less than 3.1 ppm using EPA Method 8080. Analytical results from the concrete sampling were less than 2.5 ppm PCBs, and the old pad was disposed of in the Present Landfill (PAC NW-114). The excavation site was backfilled and resurfaced with asphalt in August 1995.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site remediation and confirmation data, and the White Paper findings noted above, NFAA was recommended as appropriate for PAC 800-1207 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of site data and the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1207 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997, Closeout Report for the Source Removal of PCBs, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in the 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1208

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transformer 881-4

This Final Update to the HRR for PAC 800-1208 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1208 is summarized in this update. The following HRR volumes contain PAC 800-1208 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Unknown through 1987

Historical Summary

The location of PAC 800-1208 is shown on Figure 22. Transformer 881-4 was located on the northern side of Building 881. Utilities personnel reported the transformer may have leaked prior to being retrofilled in September 1986 as part of the Rocky Flats Environmental Hazard Elimination Program (Appendix I of 1992 HRR). Visual inspection of the transformer on February 11, 1986, revealed a leak on the top and bottom valves, tap changer, and pad. Another document indicates that residual stains existed on the concrete in January 1987 and that the oil in transformer 881-4 contained 8.4 ppm total PCBs (DOE 1991). In 1992, the transformer was located in a gravel-filled berm with no indication of leaks. The previously mentioned concrete may have existed beneath the gravel. There were no drains in the vicinity (DOE 1992).

Transformer 881-4 contained 435 gallons of dielectric coolant oil while in service. Historical records indicate the oil contained 110 ppm PCBs prior to being retrofilled (DOE 1992).

D&D of Building 881 and associated structures was completed on July 17, 2004.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, soil samples were collected in accordance with approved EPA sampling protocols and analyzed for PCBs using EPA Method 8080 (DOE 1995). Based on the analytical results, PCB contamination levels in the soil were less than 4.5 ppm (DOE 1996).

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain

dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site data and White Paper findings noted above, NFAA was recommended as appropriate for PAC 800-1208 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of site data and the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1208 on May 6, 2004 (CDPHE 2004).

Comments

The boundaries of the original PAC 800-1208 location were estimated. For the 2004 Annual Update to the HRR, the boundaries were revised based on sample location surveys and field reconnaissance.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1209

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Leaking Transformers, 800 Area

This Final Update to the HRR for PAC 800-1209 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1209 is summarized in this update. The following HRR volumes contain PAC 800-1209 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Unknown to 1991

Historical Summary

The location of PAC 800-1209 is shown on Figure 22. Three transformers (883-1, 883-2, and 883-3) and a switchgear apparatus were located on the northern side of Building 883. Utilities personnel reported that all components within this complex may have leaked prior to being retrofilled in 1987 as part of the Rocky Flats Environmental Hazard Elimination Program (Appendix I of 1992 HRR). Oil stains were visible at the valve on one of the transformers. The area was bermed, with rock and gravel placed inside and outside of the berm. There were no drains at this site (DOE 1992).

The boundaries of the original PAC location were estimated. For the 2004 Annual Update to the HRR, the boundaries were revised based on sampling location surveys and field reconnaissance.

Analytical results obtained in 1985 for PCBs in the oil of transformers 883-1, 883-2, and 883-3 were 84, 42, and 17 ppm, respectively. The transformers were retrofilled in 1987 (DOE 1996). Based on 1992 analytical results, PCB contamination levels in the oil of transformers 883-1, 883-2, and 883-3 were 3, 35, and 16 ppm, respectively.

D&D of Building 883 and associated structures was completed on April 7, 2005.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted July of 1991, soil samples were collected in the vicinity of these transformers and analyzed for PCBs using EPA Method 8080. Based on the analytical results, PCB levels in the soil were less than 6.8 ppm (DOE 1991, DOE 1995).

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the RFCA WRW soil AL of 12.4 ppm (DOE et al. 2003), adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site data and White Paper findings noted above, NFAA was recommended as appropriate for PAC 800-1209 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of site data and the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1209 on May 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1210

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-1
Unit Name:	Transformers 865-1 and 865-2

This Final Update to the HRR for PAC 800-1210 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1210 is summarized in this update. The following HRR volumes contain PAC 800-1210 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Unknown to 1987

Historical Summary

The location of PAC 800-1210 is shown on Figure 22. Transformers 865-1 and 865-2 were located north of Building 886 and west of Building 865. Utilities personnel indicated the transformers had leaked in the past. In 1987, the transformers were removed, retrofilled, and placed on a new pad, with berms, several feet to the north as part of the Rocky Flats Environmental Hazard Elimination Program (Appendix I of 1992 HRR). The old pad was partially removed to make room for the new pad. It is unknown whether the old pad had a secondary containment berm (DOE 1996).

That these transformers were retrofilled indicates PCBs may have been involved, but no historical data could be found on PCB concentrations of dielectric coolant oils at PAC 800-1210.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991, surface soil samples were collected and analyzed in accordance with approved EPA protocols (DOE 1991, DOE 1995). PCBs were analyzed using EPA Method 8080 (DOE 1996). PCB results were less than 1.3 ppm in the soil.

PAC 800-1210 was characterized between August 14, 2003 and December 12, 2003 in accordance with IASAP Addendum #IA-03-01 (DOE 2003a). Surface soil samples were collected from seven sampling locations (DOE 2004b). COCs for PAC 800-1210 included radionuclides and PCBs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). Aroclor-1016, Aroclor-1254, and Aroclor-1260 were detected at the following maximum concentrations: 2.6, 39, and 29 μg/kg, respectively (DOE 2004b).

A RFCA (DOE et al. 1996) accelerated action was implemented at IHSS Group 800-1 in accordance with ER RSOP Notification #03-12 (DOE 2003b). Although soil removal at PAC 800-1210 was not required, the transformer slabs were removed as part of the accelerated action (DOE 2004b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for PAC 800-1210 based on the following:

- Accelerated action data indicate all residual COC concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 800-1 did not indicate additional action was necessary (DOE 2004b).

After review of the Closeout Report for IHSS Group 800-1 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1210 on March 19, 2004 (CDPHE 2004).

Comments

The boundaries of the original PAC 800-1210 location were estimated. For the 2004 Annual Update to the HRR, the boundaries were revised based on sampling location surveys and field reconnaissance (DOE 2004a).

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1 (B865) - Approval, March 19.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Proposed Action Memorandum for Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-12, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 800-1211

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Capacitor Leak, Building 883

This Final Update to the HRR for PAC 800-1211 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1211 is summarized in this update. The following HRR volumes contain PAC 800-1211 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

July 5, 1988

Historical Summary

The location of PAC 800-1211 is shown on Figure 22. A capacitor was found leaking at the south entrance of Building 883. The spill involved approximately one pint of oil. A smear sample revealed negative results for PCBs. No documentation was found that detailed the fate of constituents released to the environment.

A smear sample was collected from the concrete where the leak occurred. A glass bottle was placed under the leak and absorbent pads were put on the spill and the area was barricaded.

PAC Investigations

No other PAC 800-1211-specific investigation was deemed necessary.

No Further Action Recommendation

PAC 800-1211 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 800-1211 because of the response action taken after the leak was discovered. An NFA was verbally agreed to in the November 14, 2001 meeting and formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA; RE: Approval of NFA Designation for IHSSs and PACs, Rocky Flats Environmental Technology Site, Golden, Colorado, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 800-1212

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-1
Unit Name:	Building 866 Sump Spill

This Final Update to the HRR for PAC 800-1212 consolidates the information in the Fifth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 800-1212 is summarized in this update. The following HRR volumes contain PAC 800-1212 information:

Original Report – Fifth Quarterly (DOE 1993); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1992

Historical Summary

The location of PAC 800-1212 is shown on Figure 22. In 1992, liquid and sludge waste was found in a Building 866 concrete sump pit within the secondary containment system for the waste collection tanks (RCRA Units 40.17, 40.18, 40.19, 40.32, and 40.33). Approximately 35 gallons of liquid waste and sludge were retrieved from the pit and determined to contain gross alpha and beryllium contamination. After visual inspection of the sump, it appeared groundwater was seeping into the sump along the northwestern wall, and seepage was especially evident in the northwestern corner. It was concluded that the sump had a visible pathway for waste to enter the environment. Based on noted groundwater seepage into the sump, the possibility also existed that the material in the sump may have been contamination from past spills documented in PAC 800-1204 (DOE 1993).

Responses to the occurrence included the following:

- The associated waste generating processes in Buildings 865 and 889 were shut down.
- The tanks in Building 866 were emptied, with the exception of a very small amount of steam condensate.
- The sump in Building 866 was emptied, the sludge removed, and the sump cleaned.

Secondary containment for the tanks in Building 866 was provided with adequate epoxy sealing of the 2-ft curb surrounding the tanks, as well as the floor and walls of the building. The sump was sealed off from the activities of the building with a steel plate containing a glass window to monitor water levels in the sump pit (DOE 1993).

The tanks in Building 866 were closed pursuant to RCRA, and removed prior to building demolition, which occurred during 2003 (DOE 2004b).

PAC Investigations

PAC 800-1212 was characterized between August 14, 2003 and December 12, 2003 in accordance with IASAP Addendum #IA-03-01 (DOE 2003a). Surface and subsurface soil samples were collected from three sampling locations (DOE 2004c). COCs included radionuclides, metals, and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003).

Remediation of soil in PAC 800-1212 was not necessary because all sampling results were less than RFCA WRW soil ALs (DOE et al. 2003). However, other portions of IHSS Group 800-1 were remediated in a RFCA (DOE et al. 1996) accelerated action implemented in accordance with ER RSOP Notification #03-12 (DOE 2003b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996) an NFAA was justified for PAC 800-1212 based on the following:

- Accelerated action data indicate all residual COC activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).
- Results of the SSRS presented in the Closeout Report for IHSS Group 800-1 did not indicate additional action was necessary (DOE 2004c).

After review of the Closeout Report for IHSS Group 800-1 (DOE 2004c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for PAC 800-1212 on March 19, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1 (B865) - Approval, March 19.

DOE, 1993, Fifth Quarterly Update for Historical Release Report, July 1, 1993 to October 1, 1993, Rocky Flats Plant, Golden, Colorado, October.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-12, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Final Project Closeout Report for Building 865 Cluster, Draft, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2004c, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

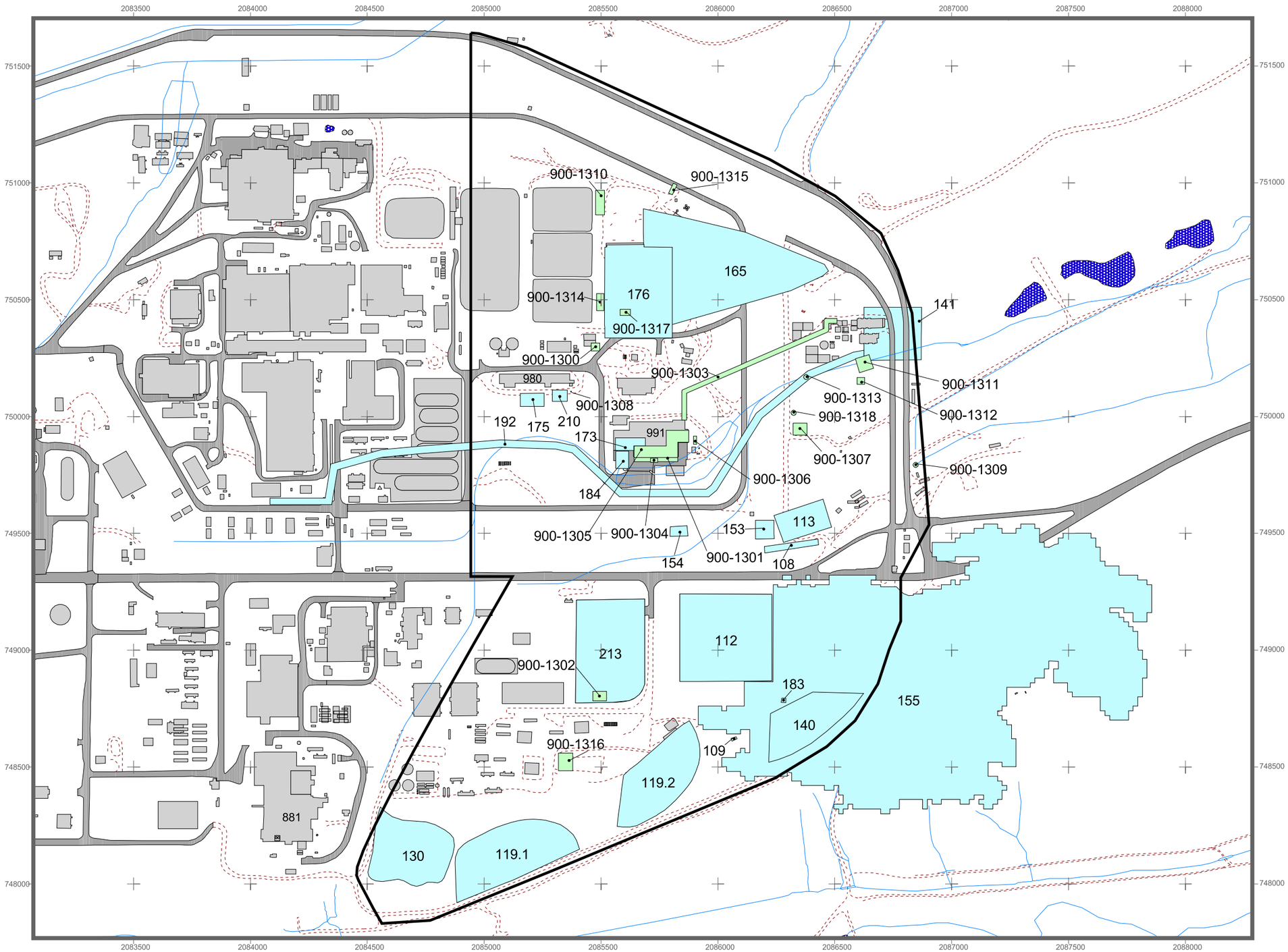

Figure 23
HRR 900 Area
IHSSs and PACs

KEY

- Streams
- Dirt roads
- PAC
- IHSS
- HRR area
- Lakes
- Asphalt
- Building

N
W E
S

300 0 300 Feet

Scale = 1: 6800

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_900.apr

PAC REFERENCE NUMBER: 900-108

IHSS Number:	108
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Trench T-1

This Final Update to the HRR for PAC 900-108 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 108 is summarized in this update. The following HRR volumes contain IHSS 108 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998a);
Update Report – 1999 Annual (DOE 1999a);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November 1954 to December 1962

Historical Summary

Trench T-1 is located northwest of the former inner east gate, about 40 ft south of the southeastern corner of the former PA fence. The location of Trench T-1 is shown on Figure 23. Historical documents indicated at least 125 drums of depleted uranium chips (lathe and machine turnings) from Building 444 were packed with lathe coolant and buried in the western and possibly eastern ends of Trench T-1. It was estimated that approximately 25,000 kg of depleted uranium chips were contained in the 125 drums.

Ten drums of cemented cyanide and one drum of still bottoms (recovered waste solvents or evaporated lathe coolant sludge) were also reported buried in Trench T-1. Drums were reportedly double stacked end-on-end and covered with 1-2 ft of soil. Interviews with Site workers suggested that the eastern two-third of the trench was likely to contain trash consisting of pallets, paper, and other debris. The original Trench T-1 dimensions were approximately 200 ft long, 15 ft wide, and 5 ft deep; however, the trench was extended in 1955. Drum packing methods were unclear and varied.

In October 1982, a metal drum was punctured during routine weed cutting. The drum contained a mixture of water and oil. The liquid was pumped into a new drum to await disposal. Another account of a 1982 event may describe the same or a similar incident involving two drums uncovered by weed cutting activities. One drum reportedly contained an oily sludge with 4.3 pCi/g plutonium and 1.2 microcuries per gram (μCi/g) uranium (DOE 1992).

Site inventory lists and receipts indicated the following material may have been placed in the trench:

- Thirty-eight drums of metal turnings and still bottoms were disposed in the trench from November 17, 1954 to June 1, 1956, 10 of which contained cemented cyanide waste. Some of the drums contained copper alloy.
- Eighty-five drums listed in inventories from April 1954 through April 1966 with the exception of a gap from August 1957 through August 1958.
- Two drums of "special" wastes from Building 444, which were placed in Trench T-1 in 1955, were removed and returned to Building 444 in 1956.
- In 1958, authorization was granted for additional disposal in the trench of over 15,000 lbs of depleted uranium chips from Building 444.
- In 1962, authorization was granted for the disposal of approximately 7,500 lbs of depleted uranium chips.

A radiological survey was conducted in the area in October 1977 and an additional radiometric survey was conducted in June 1980. Both identified suspected depleted uranium hot spots. In the summer of 1995, electromagnetic and GPR surveys confirmed the presence of drums and/or metallic objects in the Trench T-1 location. The surveys indicate a majority of the metallic objects were located in the westernmost half of the trench (DOE 1997).

IHSS Investigations

A PAM (DOE1998b), that described proposed RFCA (DOE et al.1966) accelerated action activities at Trench T-1, was developed as part of a CERCLA Accelerated Source Removal Action. The action included the excavation of buried drums and containers, soil, and debris.

The excavation phase of the source removal action was initiated on June 10, 1998 and completed on August 20, 1998. The excavated trench length was 230 ft with 160 drums of depleted uranium, 10 drums of cemented cyanide, and one cardboard carton containing depleted uranium removed from the excavation.

One hundred and seventy-one drums or containers were removed from Trench T-1. Intact drums containing depleted uranium and cemented cyanide were removed, characterized, and overpacked, if possible. If drums did not have sufficient structural integrity, they were place in 1.6 yd^3, B-12 type waste boxes. Debris, including drum fragments, lids, and rings; pipe; cardboard cartons; and sandpaper type material were verified free of depleted uranium and placed in waste containers.

After the removal action was completed, verification samples were collected from the excavation bottom and side-walls. Forty-eight samples were analyzed for radionuclides and VOCs, 38 for PCBs, and 6 for cyanide. Radionuclide results were less than RFCA Tier II soil ALs (DOE et al. 1996), but greater than background values. Americium-241 ranged from 0.38 to 0.54 pCi/g, plutonium-239/240 ranged from 1.69 to 2.36 pCi/g, uranium-234 ranged from1.49 pCi/g to 11.88 pCi/g, uranium-235 ranged from 0.13 to 0.32 pCi/g, and uranium-238 ranged from 1.49 to 11.88 pCi/g in excavation floor and sidewalls. VOC concentrations were very low, and most were below detection levels. Acetone was detected from 35 to 60 µg/kg and all other VOC concentrations were estimated or nondetections. All PCB concentrations were nondetections.

Cyanide results were not compared to RFCA WRW soil ALs (because one does not exist); however, concentrations ranged from nondetection to 29,000 μg/kg (DOE 1999b).

Sampling of the clean soil stockpile (segregated using a FIDLER and organic vapor analyzers during excavation) was conducted and results indicated ALs specified in the PAM were met. This soil stockpile was therefore returned to the excavation. In addition, soil from 1,434 drums of investigation-derived material (IDM) was returned to Trench T-1 as part of the trench backfilling operations. Approval for placement of this material was given by EPA with concurrence by CDPHE. Trench T-1 activities are documented in the Closeout Report for the Source Removal at Trench 1 Site, IHSS 108 (DOE 1999b).

No Further Action Recommendation

No further action was recommended for Trench T-1 (IHSS 108), because a source removal action was completed and verification sampling results indicated all residual concentrations were less than RFCA Tier II soil ALs. Because the source of contamination was successfully removed, IHSS 108 meets the criteria set forth in RFCA (DOE et al. 1996) for NFA.

DOE received approval from EPA (the LRA) and CDPHE of the NFAA status for IHSS 108 on February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE, RFFO, from T. Rehder, EPA Region VIII, S. Gunderson, CDPHE, RE: Approval of NFA Designation for IHSSs & PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998b, Final Proposed Action Memorandum for the Source Removal at Trench 1, IHSS 108, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Closeout Report for the Source Removal at the Trench 1 Site IHSS 108, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-109

IHSS Reference Number: 109

Current OU: BZ

Former OU: 2

IHSS Group: NE-2

Unit Name: Trench T-2 (Ryan's Pit)

This Final Update to the HRR for PAC 900-109 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 109 is summarized in this update. The following HRR volumes contain IHSS 109 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996a);
Update Report – 1997 Annual (DOE 1997a); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

Approximately 1969 to 1971

Historical Summary

IHSS 109 (PAC 900-109), a disposal trench located south of the 903 Pad (PAC 900-112), was generally referred to as Ryan's Pit. The location of IHSS 109 is shown on Figure 23. The area was primarily used for disposal of solvents, paint thinners, diesel fuel, and other construction related chemicals/materials (DOE 1992). The waste solvents were reportedly screened for radioactivity and then disposed of in Ryan's Pit if identified as nonradioactive. The trench is referred to as Ryan's Pit (DOE 1996a).

After a review of the information gathered in preparation of the original HRR (DOE 1992), it is believed that Ryan's Pit was not used in the same manner as the East Trenches as previously indicated in the RCRA 3004(u) report (DOE 1987). Based on a review of historical documents, an evaluation of many historical photographs, and interviews with former Plant personnel who were directly involved with Plant waste disposal activities, it is probable that Ryan's Pit was used from approximately 1969 to 1971 for the disposal of supposedly nonradioactive liquid chemical wastes. Previously, Ryan's Pit was believed to have been used similarly to the East Trenches because of discussion in a 1970 document entitled "A Summary of On Site Radioactive Waste Disposal."

Aerial and low-angle oblique photographs dated 1953, 1955, 1957, 1964, 1969, 1970, and 1971 were evaluated. Activities involving on-site burial of sludge from the sanitary wastewater treatment plant occurred from July 1954 through August 1968. These photographs clearly indicate the existence of the East Trenches in various stages of development. Yet none of the photographs from 1953 through 1968 provides any indication of ground disturbances in the area of Ryan's Pit. In 1969 and 1970, there clearly is an open trench in the area south of the 903 Pad

and in the general area as located in the 1970 report. In a May 1971 photograph, the trench is backfilled and graded, but still visible (DOE 1996a).

Solvents that may have been disposed in Ryan's Pit included tetrachloroethane, trichloroethene (TCE), and possibly carbon tetrachloride. These were the solvents typically used at the Plant during 1969 through 1971. Paint thinner, diesel fuel (used as a brush softener), and small quantities of construction-related chemicals were also reportedly disposed. Waste disposal at Ryan's Pit was discontinued in 1971 and the trench was backfilled.

IHSS Investigations

OU2 RFI/RI Activities

IHSS 109 was investigated as part of the Phase II OU 2 RFI/RI in accordance with the OU 2 Phase II Work Plans for alluvium and bedrock (DOE 1991a, 1991b). Soil samples were collected from four boreholes at IHSS 109 and were analyzed for VOCs and radionuclides. trichloroethene and tetrachloroethane were detected at concentrations up to 16,000 µg/kg and 10,000 µg/kg, respectively. BTEX compounds were also detected at elevated levels. Plutonium-239/240 and americium-241 were present in samples at activities up to 83 pCi/g and 12 pCi/g, respectively. Radionuclide contamination was attributed to wind dispersion from the 903 Pad (DOE 1995a).

Trench and Mound Site Characterization Activities

Ryan's Pit characterization was conducted in accordance with the Trench and Mound Site Characterization Work Plan (DOE 1995b). Geophysical surveys determined the exact location of Ryan's Pit. Subsurface samples from four boreholes were analyzed for VOCs. trichloroethene and tetrachloroethane were detected at maximum concentrations of 20,000 µg/kg and 470,000 µg/kg. A groundwater plume of VOCs appeared to be emanating from the Ryan's Pit area (DOE 1996b).

Accelerated Action Activities

Based on the characterization data discussed above, an accelerated action was conducted at IHSS 109 to remediate VOC-contaminated soil and debris. The IHSS 109 Accelerated Action Project was initiated in September of 1995 as a source removal in accordance with the Final PAM approved by the agencies on August 28, 1995 (DOE 1995c). Approximately 180 cy of contaminated soil and debris (primarily crushed drums) were excavated from IHSS 109 and treated by low temperature thermal desorption to eliminate the volatile organic component of contamination in the soil. Treatment of the soil required a CDPHE-approved modification to the existing RCRA Part B permit (DOE 1995d). The removal of contaminated soil from Ryan's Pit was completed in September 1995 and treatment completed in February 1996 in accordance with the RAOs set forth in the approved PAM.

Following excavation, 10 confirmation samples were collected around the periphery of the excavation. All confirmation sampling results were well below the August 1995 construction worker subsurface soil PPRGs (DOE 1997b). Following thermal desorption soil was sampled and analyzed for VOCs to confirm that thermal desorption treatment had reduced VOC concentrations to the performance standards established in the PAM. All results were well within the acceptable range. Treated soil was also analyzed for radionuclides to determine whether or not it met the regulatory requirements to be returned to the excavation. Thirty-three samples were analyzed by HPGe-detection gamma spectroscopy and radionuclide SORs were computed

using RFCA Tier I and Tier II subsurface soil ALs (DOE et al. 1996), and the 95% UCL of uranium-234, uranium-235, uranium-238, americium-241, and plutonium-239/240. The resulting Tier I SOR was 0.11 and the resulting Tier II SOR was 0.6, indicating that soil could be returned to the excavation based on the requirements agreed upon by the agencies and DOE (DOE 1997b).

No Further Action Recommendation

Radiological samples showed plutonium-239, americium-241, uranium-233/234, uranium-235 and uranium-238 at levels above background in the excavated soils; however, these radiological levels were below RFCA Tier II soil ALs and less than the 15 millirem (mrem) hypothetical future resident scenario, the most restrictive scenario for the future land use of the site (DOE 1996a).

Following the accelerated action, on April 3, 2002, during an NFA Status Meeting, EPA and CDPHE concurred with the recommendation for NFA submitted in the 1997 Annual Update to the HRR (DOE 1997). The agencies however requested that the PAC Narrative for PAC 900-109 be amended in the Annual Update to reflect that contaminants in a nearby downgradient groundwater monitoring well(s) (specifically well 07391) had not shown evidence of plume degradation. These comments were incorporated into the narrative and PAC 900-109 was granted NFA status as agreed (CDPHE and EPA 2002).

Comments

The post-treatment levels of VOCs in the treated soils returned to Ryan's Pit were less than the thermal desorption unit performance standards specified in the PAM Permit Modification (DOE 1995d) as documented in the completion report (DOE 1997b).

Potential impacts to surface water were evaluated from existing groundwater data. One un-named seep location near the Woman Creek drainage, that potentially could be related to Ryan's Pit, was sampled in FY2000 and showed tetrachloroethane concentrations at the groundwater Tier II groundwater AL (actual results were 4 ppb) for VOCs. In accordance with RFCA Attachment 5, Section 3, groundwater with contaminant concentrations greater than Tier II groundwater ALs must be evaluated by modeling to determine whether surface water ALs will be exceeded in surface water. In this case, a detection at or just below the Tier II groundwater AL from a seep with nearly zero flow rates could not result in an exceedance of RFCA surface water ALs. Analytical results for the verification samples are presented in the completion report for the project (DOE 1997b).

In accordance with the IM/IRA for Groundwater (DOE 2005) HRC® and HRC-X™ was inserted at 10 locations within an area along the southern wall of the previous source removal action at the southern wall of the former Ryan's Pit excavation. This is the area where the highest residual contamination was present. The 10 insertion points were completed to a depth of 9 ft. This activity was completed on July 6, 2005.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1987, Appendix 1, Resource Conservation and Recovery Act 3004 (u) Waste Management Units, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1991a, Final Phase II RFI/RI (Alluvial) Work Plan, 903 Pad, Mound, and East Trenches Area, Rocky Flats Plant, Golden, Colorado, August.

DOE, 1991b, Final Phase II RFI/RI (Bedrock) Work Plan, 903 Pad, Mound, and East Trenches Area, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Final OU 2, Phase II RFI/RI Report, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1995b, Final Trenches and Mound Site Characterization Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1995c, Final Proposed Action Memorandum for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 1995d, Proposed Action Memorandum and Draft Modification of the Corrective Action Section for the Operating Permit for the Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1996a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1996b, Trench and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Closeout Report for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit, July.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-112

IHSS Number:	112
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	900-11
Unit Name:	903 Pad

This Final Update to the HRR for PAC 900-112 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 112 is summarized in this update. The following HRR volumes contain IHSS 112 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000)

Date(s) of Operation or Occurrence

1958 to 1968

Historical Summary

Releases from drums stored at the 903 Pad (IHSS 112), shown on Figure 23, were considered the primary source of radiological contamination in the surficial soil in this part of RFETS. Drums that contained hydraulic fluids and lathe coolant contaminated with plutonium and uranium were stored at this location from the summer of 1958 to January 1967. Approximately three-fourths of the drums contained plutonium-contaminated liquids while most of the remaining drums contained uranium-contaminated liquids. Of the drums containing plutonium, the liquid was primarily lathe coolant and carbon tetrachloride in varying proportions. Also stored in the drums were vacuum pump oils, trichloroethene, perchloroethylene, silicone oils, and acetone still bottoms (DOE 1995a).

Leaking drums were noted in 1964 during routine handling operations. The contents of the leaking drums were transferred to new drums, and the area was fenced to restrict access in November 1964. Air samplers at the east fence detected contamination following high winds (DOE 1992). Building 903A was constructed in 1966 to filter and transfer contaminated oil from leaking drums. The building was used to pre-filter the oil from the drums on the 903 Pad that could not be safely moved to Building 774. Oil filtered in Building 903A was also transferred to Building 774 for final processing. The pre-filtering process was considered too time consuming, and the step was eliminated several months after it began (DOE 1992).

In 1967 a total of 5,237 drums were at the 903 Pad. Approximately 420 drums leaked to some degree. Of these, an estimated 50 drums leaked their entire contents. The total amount of leaked material was originally estimated at around 5,000 gallons of contaminated liquid containing approximately 86 g of plutonium (DOE 1995a). Drum removal from the area began in

January 1967 and included drums that were in the storage area for 6 months or less. Soil and rock contaminated by rainwater runoff from the fenced area (east and downgradient of the 903 Pad) were shoveled up and deposited inside the 903 Pad fence.

In June 1968, the drums and pallets were cleared from the area and shipped offsite in waste boxes. The 100,000-ft^2 area was contaminated with activities ranging from 2,000 to 300,000 dpm/100 cm^2. Depth of contamination was to 8 inches or more, possibly up to 18 inches. From 1968 through 1970, some of the radiologically contaminated material was removed, the surrounding area was regraded, and approximately 148,104 ft^2 was covered by an imported fill material, soil sterilant, and an asphalt cap in November 1969. However, during drum removal and remedial activities, wind and rain spread plutonium-contaminated soil to the east and southeast from the 903 Pad area resulting in IHSS 155 (903 Lip Area [PAC 900-155]). Modification to the topography in and around the 903 Pad was completed in April 1971 to allow runoff to flow into Pond C-1 (PAC SE-142.10) on Woman Creek (DOE 1992).

Historic soil removal areas are shown in the Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone, Figure 1-4 (DOE 1999b).

IHSS Investigations

Seven groundwater wells and boreholes were installed in the 903 Pad in 1987. Soil samples from the boreholes indicated VOC concentrations in subsurface soil were equal to or greater than RFCA Tier I subsurface soil ALs (DOE et al. 1996). Monitoring in the alluvial groundwater system indicated elevated concentrations of trichloroethene, tetrachloroethane, and carbon tetrachloride.

Twenty-five surface and subsurface soil samples were collected at the 903 Pad in 1998. Soil samples were analyzed for radionuclides. In the soil horizon directly beneath the asphalt, results at 11 locations were greater than RFCA Tier I soil ALs and results at eight locations were greater than RFCA Tier II soil ALs. In the second soil interval, 0.5 to 1.0 ft, results from one sampling location were greater than RFCA Tier I soil ALs and results from three sampling locations were greater than RFCA Tier II soil ALs. There were no RFCA Tier I or Tier II soil AL radionuclide exceedances in samples collected in the third interval (1.0 to 1.5 ft) (DOE 1999b).

Sixteen boreholes were completed in 1998 in the 903 Pad, and the soil was sampled for the presence of VOCs. Carbon tetrachloride, tetrachloroethane, trichloroethene, and 1,2-cis-dichloroethylene were detected at several boreholes. Detections of VOCs ranged from 1.1 µg/kg to 6,100 µg/kg. All VOCs were less than RFCA Tier I soil ALs. Most VOCs were detected in the northeastern quadrant of the 903 Pad (DOE 1999b).

Based on these data, RFCA (DOE et al. 1996) accelerated actions to remove radionuclide-contaminated soil were conducted at the 903 Pad in accordance with ER RSOP Notification #02-09 (DOE 2002). The accelerated action consisted of the following activities:

1. The asphalt (approximately 6 inches thick) was removed.
2. The gravel base and a minimum of 1 ft of native soil were excavated.
3. A confirmation sample was collected from the bottom of each excavation cell and analyzed at an on-site laboratory.

4. If the result was less than 50 pCi/g between 0 and 3 ft in depth, the cell was backfilled with imported, clean soil.
5. If the result was greater than 50 pCi/g between 0 and 3 ft in depth, additional soil was excavated from the entire excavation cell, and another confirmation sample was collected and analyzed. In many instances, the excavations extend beyond 3 ft in depth.
6. If plutonium-239/240 activities were greater than 1 nCi/g based on confirmation sampling, between 3 and 6 ft in depth, additional soil was excavated and another confirmation sample was collected. There were no plutonium-239/240 activities greater than 1 nCi/g.
7. Removed approximately 4,467 cy of asphalt for disposal as LLW.
8. Removed and characterized fill material for appropriate disposal (including 43 cy of concrete associated with a concrete slab on the western side of the 903 Pad).
9. Removed and disposed of approximately 20,213 cy of soil with contaminant concentrations greater than RFCA WRW soil ALs (DOE et al. 2003). Some of the soil contained VOCs and was disposed of as mixed waste.
10. Collected confirmation samples in accordance with ER RSOP Notification #02-09 (DOE 2002).
11. Backfilled with clean soil, regraded, and revegetated the disturbed area, and added erosion matting to the disturbed area (DOE 2005a).

Confirmation sampling was conducted throughout the removal activity in accordance with ER RSOP Notification #02-09 (DOE 2002). One confirmation sample was collected in each of the 225 grid cells covering the 3.4 acres of the 903 Pad.

Based on the WRW soil ALs, RFCA SORs were calculated for IHSS 112 sampling locations down to 3 ft. SOR calculations were based on accelerated action analytical data for the radionuclides of concern, and all SORs for radionuclides in surface soil from 0 to 3 ft were less than 1. Plutonium-239/240 activities from 0 to 3 ft ranged from 0.08 pCi/g to 44.16 pCi/g. Cell K-2 with plutonium-239/240 activity of 3,463.1 pCi/g in the top 3 ft of soil was remediated as part of the 903 Lip Area (PAC 900-155) accelerated action. All sampling locations within 3 ft of the surface had plutonium-239/240 activities less than 50 pCi/g (DOE 2005a).

Plutonium-239/240 activities between 3 and 6 ft in depth ranged from 1.1 to 297.35 pCi/g. All sampling locations within 6 ft of the surface had plutonium-239/240 activities less than 1 nCi/g. Plutonium-239/240 activities at depths greater than 6 ft ranged from 45.6 to 423.40 pCi/g.

Additional accelerated action analytical data for the 903 Pad were collected during 2005 in accordance with IABZSAP Addendum #IABZ-05-02 (DOE 2005b) to evaluate VOCs in the subsurface. Soil samples were collected from the shallow subsurface (3 to 6 ft) and near the bedrock interface (approximately 15 to 25 ft depending on location). All samples were analyzed for VOCs. Most VOCs were not detected, however, the maximum concentration of the detected VOCs are 1,1,1-trichloroethane at 34.5 μg/kg, acetone at 12.99, carbon tetrachloride at 429.68 μg/kg, chloroform at 43.8 μg/kg, tetrachloroethane at 210 μg/kg, and trichloroethene at 33.7μg/kg.

In accordance with the Groundwater IM/IRA (DOE 2005c), HRC® and HRC-X™ were inserted at 36 points at the 903 Pad. The insertion points were placed along a series of three arcs along the

major groundwater flow path. A combined 5,710 lbs of HRC® and HRC-X™ were used (RCR dated September 9, 2005).

No Further Action Recommendation

Results of the accelerated action justify NFAA. Justification is based on:

- Soil removal based on previous investigation results;
- Soil removal based on confirmation sampling results;
- Removal of soil with contaminant concentrations greater than WRW ALs to a depth of 3 ft;
- Final confirmation sampling results;
- Results of the SSRS; and
- Results of the stewardship evaluation.

After review of the Closeout Report for IHSS Group 900-11, IHSS 112, 903 Pad (DOE 2005a) by regulatory agencies, DOE received approval from EPA (the LRA) of the NFAA status for IHSS 112 on January 13, 2005 (EPA 2005).

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995a, Final OU 2 Phase II RFI/RI Report, Rocky Flats Plant, Golden, Colorado, October.

DOE, 1995b, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-09, Rocky Flats Environmental Technology Site, Golden, Colorado, October

DOE, 2005a, Closeout Report for IHSS Group 900-11, IHSS 112-903 Pad (903 Drum Storage Area), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005b, Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #BZ-05-02, 903 Pad Volatile Organic Compounds, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005c, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE, from Mark Aguilar, EPA RE: Closeout Report for IHSS Group 900-11, IHSS 112-903 Pad (903 Drum Storage Area), January 13.

PAC REFERENCE NUMBER: 900-113

IHSS Reference Number: 113

Current Operable Unit: Not Applicable

Former Operable Unit: 2

IHSS Group: Not Applicable

Unit Name: Mound Area

This Final Update to the HRR for PAC 900-113 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 113 is summarized in this update. The following HRR volumes contain IHSS 113 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997a); and
Update Report – 1999 Annual (DOE 1999a).

Date(s) of Operation or Occurrence

August 1954 to September 1958

Historical Summary

In April 1954, the mounding of contaminated combustible wastes from Building 444 was suggested as a method of disposal. The Mound was developed by scraping a shallow trench, aligning drums in rows, and covering them with soil with the resulting burial site extending above initial ground level. The location of the Mound Area (IHSS 113 is shown on Figure 23. Plant photographs from April 21, 1954, show the mounding of the first 869 drums of contaminated wastes from Building 444. The drums were shipped to the Mound area between April 12, 1954, and April 21, 1954. Several drums had pinhole leaks at the time of burial (DOE 1992).

Mounding activities continued until September 1958. Drums from Building 444, Building 869, Building 883, Building 771, and Building 776 were placed in the Mound. Different sides of the Mound were opened periodically for the placement of additional drums. After September 1958, drums were moved to the Mound area but not placed in the mound. In July 1959, they were moved to the 903 Pad area. The burning of uranium-contaminated oil at PAC 900-153 became an acceptable method of disposal in 1959 and mounding was discontinued (DOE 1992).

On February 9, 1959, one drum of liquid waste from Building 776 was punctured at the Mound. Two trucks were contaminated to a level greater than 100,000 cpm and were cleaned at Building 774. Soil contaminated as a result of the punctured drum was removed to a level of 1,000 cpm. One drum of liquid waste from Building 881 leaked at the Mound in April 1960 (DOE 1992), causing contamination greater than 100,000 cpm to the ground and pallets. The area was roped off to be cleaned, but no documentation was found detailing the results of the cleaning effort.

During the construction of the PSZ in 1981, solvent odors were observed at the water table in the Mound area and several areas of uranium-contaminated soil were detected and removed from the Mound area (DOE 1992).

Soil and groundwater contamination resulted from the release of organic liquid wastes from drums stored in the Mound. Radioactive elements of the waste included depleted uranium and enriched uranium with lesser quantities of plutonium.

Beginning on April 14, 1970, the Mound was excavated and all drums were removed by the end of May 1970. Approximately 10 percent of the drums were thought to have holes. No detectable alpha contamination was found in the soil at the time of removal. Solid material was shipped offsite for burial and drums with liquids were sent to Building 774 for processing. Those that were leaking at the time of excavation were pumped into sound drums before processing in Building 774. Empty drums were boxed with absorbent material and shipped for off-site burial. No personnel or equipment contamination resulted from the excavation of the mound and no airborne contamination was detected. Soil from the excavation was graded and excess was placed in the Present Landfill (PAC NW-114). Four wells were drilled in the four corners of the Mound area for groundwater monitoring (DOE 1992).

IHSS Investigations

Phase II OU 2 RFI/RI Activities

The Mound Site (IHSS 113) was investigated in accordance with the Final Phase II RFI/RI Work Plans (Alluvial and Bedrock) (DOE 1991a, 1991b). Six boreholes were sampled within IHSS 113 to characterize the Mound site. VOCs detected in subsurface soil samples were acetone, methylene chloride, tetrachloroethane , trichloroethene, and cis-1,3-dichloropropene. tetrachloroethane was detected at a maximum of 180 µg/kg and trichloroethene was detected at a maximum concentration of 20 µg/kg. In general, VOC concentrations increased with depth to approximately 30 ft bgs, and then decreased. Aroclor-1254 was detected in 2 of 16 samples at a maximum concentration of 21 µg/kg at 0 to 5 ft bgs. Cadmium was detected in 7 of 21 samples at a maximum concentration of 3.3 mg/kg, and arsenic was detected in 2 of 21 samples at a maximum concentration of 20 mg/kg.

Tetrachloroethane was detected in Mound site groundwater at up to 13,000 µg/L. This value exceeds 1 percent of the solubility (150,000 µg/L), indicating that DNAPL may be present (DOE 1995).

Trench and Mound Site Characterization Activities

IHSS 113 was characterized in accordance with the Trench and Mound Site Characterization Work Plan (DOE 1995). The exact location of the Mound site was determined in the field using aerial photographs and by recognizing disturbed soil. Geophysical surveys were not appropriate because all buried material had been previously removed from the site. The Mound Site had been disturbed during the construction of the PA fence, and the Central Avenue Ditch.

Subsurface soil samples were collected from four boreholes at IHSS 113. Methylene chloride was detected at a maximum concentration of 44 µg/kg, tetrachloroethane was detected at a maximum concentration of 760 µg/kg, plutonium-239/240 was detected at a maximum activity of 2.6 pCi/g, and americium-241 was detected at a maximum activity of 0.36 pCi/g (DOE 1996).

Groundwater downgradient from the Mound site contained elevated levels of VOCs, metals, and radionuclides.

Accelerated Action Activities

In accordance with the Agency-approved PAM for the Source Removal at the Mound Site, IHSS 113 in February 1997 (DOE 1997b), a RFCA (DOE et al. 1996) source removal action was initiated at IHSS 113 on March 21, 1997 and completed on April 8, 1997. Contaminated soil was excavated to a depth of 17 ft, approximately 2 ft below the alluvium-bedrock contact. A sampling grid was established whereby 25 nodes were identified along the sidewalls and bottom of the excavation to confirm that the cleanup criteria were met. Two of the excavation bottom samples indicated VOC contamination in excess of the cleanup standard (DOE 1997b). However, the PAM specified that alluvium and highly weathered bedrock would be removed, and did not foresee the removal of unweathered bedrock, which is significantly more difficult to excavate. CDPHE and EPA were consulted and it was agreed to discontinue excavation. There was no radiological contamination identified during removal of the contaminated soils.

Excavated soil from the Mound Site (IHSS 113) was temporarily staged and managed in an area designed for this purpose until treatment could begin. Treatment began on August 5, 1997, using (LTTD) and was completed by August 22, 1997. Treated soil was placed back into the Mound excavation by September 8, 1997. VOC concentrations in treated soils met the treatment goals specified in the PAM, but tetrachloroethane was detected in two confirmation samples in unweathered bedrock from the bottom of the excavation at a maximum concentration of 86,000 µg/kg, exceeding the tetrachloroethane cleanup target of 11,500 µg/kg.

The Mound Site Plume Treatment System was installed in 1998 pursuant to the Final Mound Site Plume Decision Document: A Major Modification to the Final Surface Water IM/IRA Plan/Environmental Assessment and Decision Document for South Walnut Creek (Mound Site Plume Decision Document) (DOE 1997c). System installation is documented in the Final Mound Site Completion Report (DOE 1999b).

The system was installed to prevent contaminated groundwater from the Mound Site from reaching surface water. trichloroethene and tetrachloroethane were the major COCs in groundwater at this site. The Mound Site Plume Treatment System collects and treats contaminated groundwater from the Mound Site and Oil Burn Pit No. 2 (PAC 900-153) area. Installation of the 220-ft-long collection system and two treatment cells containing reactive iron was completed in 1998. Treated water is discharged back into the groundwater on the downgradient side of the treatment cells through a discharge gallery designed to overflow to the surface when the surrounding soils are saturated. Overflow discharges to the surface immediately downgradient of the treatment cell near South Walnut Creek.

<u>No Further Action Recommendation</u>

No further action was recommended for IHSS 113 following the completion of the Mound Source Removal project in 1997, which involved excavating VOC-contaminated soil and treating it with LTTD. The cleanup criteria and objectives as set forth and approved by the regulatory agencies in the PAM for this project (DOE 1997b) were met. Two confirmation samples indicated that VOCs in soil were higher than the cleanup standard. However, because the exceedances were in unweathered bedrock, the agencies agreed to discontinue excavation.

DOE received approval from CDPHE and EPA (the LRA) of the NFA status of IHSS 113 on July 9, 1999 (CDPHE and EPA 1999).

There is groundwater contamination in the IHSS 113 area, which was addressed in the Groundwater IM/IRA (DOE 2005).

Comments

Many references document that the Mound was no longer used for the burial of waste materials after 1959; however, several documents indicate activities at the Mound at later dates. A request was made and approval was given in December 1962 for the burial of 14 drums of depleted uranium waste in the Mound burial area. No documentation was found stating that the burial occurred; yet, documents indicate that Trench T-1 (PAC 900-108), located adjacent to the mound, accepted these drums. Therefore it is assumed that activities occurring at the Mound after September 1958 related to storage activities and not burial (DOE 1992).

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA, RE: Annual Update for the Historical Release Report (September 1997), July 9.

DOE, 1991a, Final Phase II RFI/RI Work Plan (Alluvial), 903 Pad, Mound, and East Trenches, Operable Unit No. 2, Rocky Flats Plant, Golden Colorado, August.

DOE, 1991b, Final Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches, Operable Unit No. 2, Rocky Flats Plant, Golden Colorado, June.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Trenches and Mound Site Characterization Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1996, Trench and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Proposed Action Memorandum for the Source Removal at the Mound Site IHSS 113, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997c, A Major Modification to the Final Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document for South Walnut Creek (Mound Site Plume Decision Document), Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Final Mound Site Completion Report Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005, Groundwater Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-119.1

IHSS Number: 119.1

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: West Scrap Metal Storage and Solvent Spill Area

This Final Update to the HRR for PAC 900-119.1 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 119.1 is summarized in this update. The following HRR volumes contain IHSS 119.1 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996);
Update Report – 1997 Annual (DOE 1997a);
Update Report – 1998 Annual (DOE 1998); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

September 1968 to November 1971

Historical Summary

The location of IHSS 119.1 is shown on Figure 23. This area was one of two sites used for scrap metal storage. IHSS 119.1 was the western site located on a flat area just north of the Southeast Perimeter Road. In September 1968, arrangements were made to move a scrap metal pile (PAC 900-119.2) from its location near the lithium disposal pit (PAC 900-140) to a new area 200 yds to the west. Aerial photographs reveal material in piles and rows in 1969 and 1970. Some of the material stored may have been in drums. The scrap metal was stored for eventual recycle offsite (DOE 1992).

Residual oils and/or hydraulic coolants may have been present on pieces of scrap metal, which could have dripped off into the soil. Higher than normal air samples in November 1971 were attributed to bulldozing the area during scrap metal cleanup activities. Three radiological "hot spots" were found during a routine radiological survey in August 1981 (DOE 1992). Two additional radiological "hot spots" were identified during OU 1 Phase III Final RFI/RI investigations in 1994 (DOE 1994a).

Further investigation during source removal activities indicated the hot spot dimensions were approximately 10 inches in diameter and 12 inches deep, with plutonium-239/240 activities ranging from 10 nCi/g (surface) to 50 pCi/g (at 1 ft) (DOE 1994a).

IHSS Investigations

Groundwater samples collected from monitoring wells installed in the area in 1974 had anomalous concentrations of uranium and nitrate. Additional test holes were drilled in April 1982 to attempt to locate buried materials that might have been contributing leachate into the

well water. No buried debris was located, but several of the test holes were maintained as test sites for water sampling during the three subsequent months (DOE 1992).

The OU 1 881 Hillside groundwater collection and treatment system was installed in 1992. It consisted of a 1,435-ft-long French drain and a separate upgradient collection well within IHSS 119.1. The recovered groundwater was sent to the Building 891 water treatment system, which used ultraviolet light with the addition of hydrogen peroxide to catalyze the breakdown of contaminants to innocuous chemicals (DOE 1995a). The French drain was decommissioned in 2000. Data are no longer collected at this location.

As a result of declining contaminant concentrations at the collection well, the Final Major Modification to the OU 1 CAD/ROD, signed in January 2001 (DOE 2001), included continued extraction and treatment of groundwater from the collection well for an additional 1-year period to verify this downward trend. In accordance with the terms of the Final Major Modification, water recovery and treatment from the collection well were terminated in April 2002, because of the continued decline in contaminant concentrations

In 1994, an Accelerated Response Action (ARA) (DOE 1994b) consisting of the removal of radionuclide contaminated soil at five specific locations within IHSS 119.1 and one location within IHSS 119.2 was conducted. The areas were localized, shallow, contaminated soil that contained substantial activities of either plutonium-239/240, americium-24,1 or uranium, as well as traces of several organic compounds. The ARA included excavation, containerization, storage, and disposal of twenty-one 55-gallon drums of radionuclide-contaminated soil. The drums were disposed of as LLM wastes. The source removal of contaminants from these hot spot areas reduced potential risks by several orders of magnitude (DOE 1995b).

In addition to the ARA, a proposed remedial action for IHSS 119.1 was agreed upon with the regulatory agencies in 1995 as part of the OU 1 CAD/ROD (DOE 1997b). The selected remedial alternative for IHSS 119.1 was to excavate soil with VOC concentrations greater than RFCA Tier I subsurface soil ALs (DOE et al. 1996), treat the soil with thermal desorption, and return the treated soil to the excavation. Additional sampling within IHSS 119.1 was conducted in June 1997 to support implementation of the selected remedial alternative (RMRS 1997). Eleven Geoprobe boreholes were placed downgradient of IHSS 119.1 and an additional 11 Geoprobe boreholes were place in other portions of IHSS 119.1 tentatively identified in the CAD/ROD for excavation. No significant VOC contamination was observed in any of the samples from these borings. Only one contaminant (tetrachloroethane) exceeded the detection limit and none of the sample results were greater the RFCA Tier I subsurface soil ALs (RMRS 1997). As a result, no soil remediation was required or performed. The Final Major Modification to the OU 1 CAD/ROD was signed in January 2001, which eliminated soil excavation as a remedy (DOE 2001).

In accordance with the IM/IRA for IHSS Group 900-11 (903 Lip Area) (DOE 2004), radionuclide hot spots with RFCA radionuclide SORs (DOE et al. 2003) greater than 1 in surface soil were excavated as a RFCA (DOE et al. 1996) accelerated action. Soil was removed, from two locations, in a 10-meter-diameter circle centered on the location of the original sampling point. Excavation continued until confirmation sampling results at the center of the circle was less than RFCA WRW soil ALs (DOE 2005). Residual plutonium-239/240 activities were 4.61 and 5.52 pCi/g.

No Further Action Recommendation

A no further action determination was justified for this IHSS because of the following:

- This IHSS was extensively evaluated as part of OU 1 and is documented in the Final Phase III RFI/RI Report for OU 1, issued in 1994 (DOE 1994a). Removal of the OU 1 radiological "hot spots" within IHSS 119.1 further reduced potential risk to human health and the environment by removing known "source areas" (DOE 1996). The June 1997 sampling demonstrated that subsurface soil at IHSS 119.1 did not serve as a source for groundwater contamination in the vicinity of IHSS 119.1. Additional hot spot removal was conducted as part of the 903 Lip Area IM/IRA (DOE 2004).
- Based upon the June 1997 sampling (RMRS 1997) and observed declining contaminant (trichloroethene) concentrations in the collection and downgradient monitoring wells, an amended remedy for IHSS 119.1 was agreed upon by the Agencies and documented in the Final Major Modification to the OU 1 CAD/ROD (DOE 2001). The amended remedy focused on continued extraction of groundwater from the collection well for a period of one year, coupled with monitoring of groundwater during and after groundwater extraction is discontinued. The remainder of the IHSS was designated for NFA.
- The French drain was decommissioned in 2000. In accordance with the terms of the Final Major Modification to the OU 1 CAD/ROD, water recovery and treatment from the collection well were terminated in April 2002. Groundwater quality in this area continues to be monitored as described in the IMP.

DOE received approval from CDPHE and EPA (the LRA) on the NFA status of IHSS 119.1 (contingent upon implementation of the amended remedy) on July 9, 1999 (CDPHE and EPA 1999). The amended remedy, removal of hot spots, was completed as part of the 903 Lip Area remediation and was approved by EPA (the LRA) on January 13, 2005 (EPA 2005).

Comments

CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to ensure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU 1 is protective and

that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Annual Update for the Historical Release Report (September 1997), Colorado, July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994a, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994b, Proposed Action Memorandum, Hot Spot Removal, Operable Unit No. 1, Rocky Flats Environmental Technology Site, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1995a, Operable Unit No. 1, 881 Hillside Area, Corrective Measures Study/Feasibility Study, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1995b, Accelerated Response Action Completion Report, Hot Spot Removal, Rocky Flats Environmental Technology Site (Operable Unit No. 1), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Final Major Modification to the Operable Unit 1 CAD/ROD, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Interim Measure/Interim Remedial Action (IM/IRA) for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in Operable Unit 1 [881 Hillside]), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS Group 900-11, IHSS 900-155, 903 Lip Area, IHSS 900-140, Hazardous Disposal Area Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE, from M. Aguilar, EPA RE: Closeout Report for IHSS Group 900-11, IHSS 155, 903 Lip Area and IHSS 900-140, January 13.

RMRS, 1997, Sampling and Analysis Plan for the Implementation of the IHSS 119.1 Source Removal Project, Rocky Flats Environmental Technology Site, Golden Colorado, April.

PAC REFERENCE NUMBER: 900-119.2

IHSS Number: 119.2

Current Operable Unit: 1

Former Operable Unit: 1

IHSS Group: Not Applicable

Unit Name: East Scrap Metal Storage and Solvent Spill Area

This Final Update to the HRR for PAC 900-119.2 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 119.2 is summarized in this update. The following HRR volumes contain IHSS 119.2 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

September 1968 to November 1971

Historical Summary

The location of IHSS 119.2 is shown on Figure 23. This area was one of two sites used for scrap metal storage. IHSS 119.2 was the eastern site located on a flat area just north of the Southeast Perimeter Road. In September 1968, arrangements were made to move the scrap metal pile (IHSS 119.2) from its location near the lithium disposal pit (PAC 900-140) to a new area 200 yards to the west in an attempt to limit traffic through the area. The area was located 60 ft north and 50 ft west of the fence marking the Hazardous Disposal Area. Aerial photographs reveal the storage of material in piles in both 1969 and 1970 (DOE 1992).

Residual oils and/or hydraulic coolants on pieces of scrap metal that came from various buildings on Site, may have dripped off into the soil. Higher than normal air samples in November 1971, were attributed to the bulldozing of the area during clean-up activities to disposition the scrap metal (DOE 1992).

IHSS Investigations

IHSS 119.2 was studied as part of OU 1 and the Final Phase III RFI/RI Report for OU 1 was issued in 1994 (DOE 1994a). In 1994, an ARA (DOE 1994b) consisting of the removal of radionuclide contaminated soils at five specific locations within IHSS 119.1 and one location within IHSS 119.2 was conducted. The areas were localized shallow contaminated soil that contained substantial activities of plutonium-239/240, americium-241, or uranium, as well as traces of several organic compounds. The hot spot dimensions were determined to be approximately 10 inches in diameter and 12 inches deep, with activities ranging from 10 nCi/g (surface) to 50 pCi/g (at 1 ft) (DOE 1994b). The ARA included excavation, containerization, storage, and disposal of twenty-one 55 gallon drums of radionuclide contaminated soil. The

drums were disposed of as LLM waste. The source removal of contaminants from these hot spot areas reduced potential risks by several orders of magnitude (DOE 1995).

In accordance with the IM/IRA for IHSS Group 900-11 (903 Lip Area) (DOE 2004), radionuclide hot spots with radionuclide SORs greater than 1 were excavated. Soil was removed in a 10-meter-diameter circle centered on the location of the original sampling point. Excavations continued until confirmation sampling results at the center of the circle were less than RFCA WRW soil ALs (DOE et al. 2003). Confirmation sampling results indicated residual plutonium-239/240 activities were 3.84 pCi/g (DOE 2005).

No Further Action Recommendation

No further action was justified for IHSS 119.2, because radionuclide hot spots were removed as part of the ARA and again as part of the IM/IRA for the 903 Lip Area. NFA for IHSS 119.2 was approved by the Agencies and is documented in the CAD/ROD for OU 1, 881 Hillside Area (DOE 1997b). The removal of hot spots, was completed as part of the 903 Lip Area remediation and was approved by EPA (the LRA) on January 13, 2005 (EPA 2005)

Comments

CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to ensure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994a, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994b, Proposed Action Memorandum, Hot Spot Removal, Operable Unit No. 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1995, Accelerated Response Action Completion Report, Hot Spot Removal, Rocky Flats Environmental Technology Site (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, April.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision Declaration, Operable Unit 1: 881 Hillside Area, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Interim Measure/Interim Remedial Action (IM/IRA) for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in Operable Unit 1 [881 Hillside]), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS Group 900-11, IHSS 900-155, 903 Lip Area, IHSS 900-140, Hazardous Disposal Area, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE, from M. Aguilar, EPA RE: Closeout Report for IHSS Group 900-11, IHSS 155, 903 Lip Area and IHSS 900-140, January 13.

PAC REFERENCE NUMBER: 900-130

IHSS Number:	130
Current Operable Unit:	1
Former Operable Unit:	1
IHSS Group:	Not Applicable
Unit Name:	Contaminated Soil Disposal Area East of Building 881 (IAG Name: Radioactive Site - 800 Area Site No. 1)

This Final Update to the HRR for PAC 900-130 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 130 is summarized in this update. The following HRR volumes contain IHSS 130 information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Dates(s) of Operation or Occurrence

1969 to 1972

Historical Summary

The location of IHSS 130 is shown on Figure 23. An area east of Building 881 was used between 1969 and 1972 to dispose of soil and asphalt contaminated with plutonium and uranium. IHSS 130 contained approximately 320 tons (250 cy) of material that came from three sources: 1) plutonium-contaminated soil and asphalt from the May 1969 fire in Building 776, placed in September 1969, and buried under 1 to 2 ft of fill; 2) road asphalt and soil contaminated with radionuclides from a leaking drum in transit along Central Avenue between Eighth Street and Tenth Street; and 3) 60 cy of plutonium-contaminated soil removed from around the Building 774 (PACs 700-146.1-146.6) process waste tanks in 1972 and covered with 3 ft of soil (DOE 1992, 1997b).

The plutonium-239/240 activity in the 1969 fire debris was estimated at 7.4 dpm/g. The total long-lived alpha activity was estimated at less than 250 dpm/g. The 60 cy buried in 1972 were contaminated with 250 cpm plutonium (DOE 1992).

IHSS Investigations

IHSS 130 was studied as part of OU 1 and the Final Phase III RFI/RI Report for OU 1 was issued in 1994 (DOE 1994). As summarized in the Final Phase III RFI/RI Report, a total of nine boreholes were drilled and sampled within the boundary of IHSS 130 and one borehole was located downgradient. Results indicated americium-241, plutonium-239/240, and the uranium isotopes were detected but at activities at or near background. Toluene was also detected at very low concentrations (DOE 1994).

No Further Action Recommendation

IHSS 130 was recommended for NFA, because the concentration of contaminants at the IHSS was very low. NFA for IHSS 130 was approved by EPA (the LRA) and CDPHE and is documented in the CAD/ROD for OU 1, 881 Hillside Area (DOE 1997b).

Comments

The RCRA 3004(u) report (DOE 1987) mentions without detail that unknown quantities of scrap metal were buried in this area as well. Documentation exists from the same time period indicating an old scrap metal storage area was being cleared of debris. The location was given as south of 903 Pad and east of Building 881. Aerial photographs reflect what may be these areas in the location of PACs 900-119.1 and 900-119.2. These areas were cleared of debris and the debris may have been disposed of in this contaminated asphalt area, but no documentation was found that substantiates this (DOE 1992).

CERCLA Five-Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to ensure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The March 1997 CAD/ROD for OU 1 (DOE 1997b), although a no action decision, stipulated that a Section 121(c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was taken as the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. It was concluded that final remedy for OU1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended.

In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

References

DOE, 1987, Appendix 1, Resource Conservation and Recovery Act 3004 (u) Waste Management Units, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Final Phase III RFI/RI Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1), Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Rocky Flats Environmental Technology Site, Golden Colorado, February, 1997.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-140

IHSS Number:	140
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	900-11
Unit Name:	Hazardous Disposal Area

This Final Update to the HRR for PAC 900-140 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 140 is summarized in this update. The following HRR volumes contain IHSS 140 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998);
Update Report – 2000 Annual (DOE 2000); and
Update Report – 2003 Annual (DOE 2003).

Date(s) of Operation or Occurrence

1956 to 1970

Historical Summary

The Hazardous Disposal Area (IHSS 140), shown on Figure 23, was used for the destruction of reactive metals and other chemicals. IHSS 140 is within the 903 Lip Area (PAC 900-155). Destruction of metallic lithium occurred in the 1950s and 1960s. The destructive reaction process included the disposition of metallic lithium in a trench and subsequent moistening with water to initiate the reaction. After the reaction, the residue (nontoxic lithium carbonate) was covered with fill and buried at the southeastern corner of the site. It is estimated that approximately 400 to 500 lbs of lithium were destroyed at the site. Unknown quantities of other reactive metals (sodium, calcium, and magnesium) and some solvents were also destroyed at this location. In addition, it was thought that nine bottles of nickel carbonyl and one can of iron carbonyl were disposed of in this area (DOE 1992). However, Report No. 317-72-174 Nickel Carbonyl Disposal (DOE 1992) states that "approximately 185 pounds of nickel carbonyl contained in seven 25-pound, two 5-pound cylinders, and one lecture bottle…" were safely emptied and disposed elsewhere on Site.

Previous analytical data (DOE 1995) collected at IHSS 140 indicated several metal concentrations greater than background means plus two standard deviations, but none greater than RFCA WRW soil ALs (DOE et al. 2003).

IHSS Investigations

IHSS 140 RFCA (DOE et al. 1996) accelerated action activities were planned and executed in accordance with the IM/IRA for IHSS Group 900-11 (DOE 2004). Accelerated action activities consisted of determining whether lithium contamination was present in the soil.

Because IHSS 140 was reported to contain a trench or several trenches, a magnetometer study was conducted to determine whether trenches could be detected in the subsurface. Based on the magnetometer study, the study locations were excavated to an approximate 3-ft radius around each location. Soil was removed in 1-ft lifts to an approximate depth of 4 ft bgs. Visible excavated debris was segregated from the excavated soil. Debris consisted of wood, utility poles, fence posts, rebar, and miscellaneous debris. Confirmation samples were collected.

After review of existing data, Nuclear Safety and Industrial Health and Safety Staff approved the excavations to verify the existence of nickel carbonyl. Excavations were controlled through an exclusion zone and all work was conducted using supplied air. Soil was excavated to a depth of 4 ft and nickel carbonyl canisters were not found during excavation (DOE 2005).

Characterization and confirmation sampling was conducted at IHSS 140 in accordance with the IM/IRA for IHSS Group 900-11 (DOE 2004) and through the consultative process (RCR dated October 18, 2004). Ten characterization samples were collected from the surface and the first subsurface soil interval at locations outside the excavated areas and a confirmation sample was collected from the bottom of each excavated area. A total of 22 locations were sampled. All soil samples were analyzed for metals. The highest remaining lithium concentration in surface soil is 33 mg/kg. The RFCA WRW soil AL for lithium is 20,400 mg/kg. Subsurface soil metal concentrations were less than background means plus two standard deviations. Radionuclide confirmation sampling results for IHSS 140 are reported as part of IHSS 155 (DOE 2005).

No Further Action Recommendation

Results of the accelerated action justify NFAA for IHSS 140 based on:

- Characterization and confirmation sampling results were less than RFCA WRW soil ALs;
- Results of the SSRS; and
- Results of the stewardship evaluation.

After review of the Closeout Report for IHSS Group 900-11, IHSS 155 903 Lip Area and IHSS 140 Hazardous Disposal Area (DOE 2005) by regulatory agencies, DOE received approval from EPA (the LRA) of NFAA status for IHSS 140 on January 13, 2005 (EPA 2005).

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Interim Measure/Interim Remedial Action (IM/IRA) for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in Operable Unit (OU) 1 [881 Hillside]), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Closeout Report for IHSS Group 900-11, IHSS 900-155, 903 Lip Area, IHSS 900-140, Hazardous Disposal Area Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Legare, DOE, from M. Aguilar, EPA RE: Closeout Report for IHSS Group 900-11, IHSS 155, 903 Lip Area and IHSS 900-140, January 13.

PAC REFERENCE NUMBER: 900-141

IHSS Number: 141

Current Operable Unit: 6

Former Operable Unit: 6

IHSS Group: Not Applicable

Unit Name: Sludge Dispersal

This Final Update to the HRR for PAC 900-141 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 141 is summarized in this update. The following HRR volumes contain IHSS 141 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997); and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

1952 to 1991

Historical Summary

The location of IHSS 141 is shown on Figure 23. Sanitary sewer sludge produced in the wastewater treatment plant (Building 995) was placed in a series of gravel- and sand-lined drying beds until the solid to liquid ratio was greater than 43 percent by weight and was considered suitable for packaging and shipment offsite for disposal. The configuration of the beds changed several times since 1952 but they were in regular operation. There were many incidents of the sludge in the beds overflowing toward the East Perimeter Road. Because the beds were open to the atmosphere, sludge was noted to have become airborne and dispersed. The predominant direction of airborne sludge dispersal was to the east.

The chemical characteristics of the sludge were reflective of the chemistry of the waste in the sanitary sewer system. At times, radioactively contaminated wastewater was known or suspected to have entered the sanitary sewer system in production and support buildings. The PAC 000-500 description details routine and nonroutine releases to the sanitary sewer system (DOE 1992). Sludge with small amounts of radionuclides in the drying beds came in contact with underlying soil that was predominantly fill material overlying claystone (DOE 1992).

Several specific incidents occurred when sludge overflowed from the drying beds or was dispersed by wind. A spill occurred on February 4, 1955, that extended to East Perimeter Road. The event occurred while sludge was being pumped from the digester to a drying bed. Analysis of the sludge from this overflow reported a radioactivity level of approximately 1.1×10^6 dpm/kg. Soil samples collected in the area impacted by the overflow had an average radioactivity level of 3.1×10^5 dpm/kg. Soil sampling of the area impacted by the February 1955 overflow was performed by collecting clay and gravel from the area. The sludge which had spilled out of the beds was “largely” recovered. An extensive surface soil sampling program was conducted in

the sludge drying bed area in June 1955. The response to each documented overflow release has been to collect and dispose of the sludge (DOE 1992).

On December 15, 1972, a plutonium-contaminated sludge spill occurred affecting the area from the sludge drying beds to the East Perimeter Road (DOE 1992). The sludge from the December 1972 overflow was controlled with fill material, which was drummed and shipped for off-site disposal. Airborne activity in subsequent months was monitored. In June 1973, air samples collected on East Perimeter Road were unusually high after the area had been disturbed by construction equipment preparing the road for re-asphalting. A report of the incident recommended that care should be exercised relating to dust-producing construction activities in the area (DOE 1992).

In July 1978, ambient air data indicated the sludge drying beds were contributing a higher than normal concentration of plutonium to the air (DOE 1992). In July 1978, windblown sludge was identified as a long-standing problem and an investigation of using mesh cover for the beds followed. In 1985, metal buildings were constructed around the beds to reduce windblown dispersal (DOE 1992).

In January 1982, sludge from three of the drying beds was blown out and dispersed during a windstorm. Measured radioactivity levels of the sludge varied from near background to approximately 1.2×10^6 dpm/kg (DOE 1992).

On February 1, 1991, one of the sludge drying beds overflowed and sludge spilled down the hillside south of the drying beds to South Walnut Creek (DOE 1992).

IHSS Investigations

IHSS 141 was studied as part of OU 6, Walnut Creek Priority Drainage (DOE 1996). Forty surface soil samples were collected and analyzed in IHSS 141. Results indicated chromium, cobalt, copper, iron, lead, mercury, nickel, silver, strontium, vanadium, and zinc were detected at concentrations greater than background values. Chromium was detected once at a concentration of 20.6 mg/kg. Copper was the most frequently detected metal (42%) with a mean concentration of 31.6 mg/kg. All detected metal concentrations were within the same order of magnitude as the background value except for zinc. The maximum americium-241 activity was 1.84 pCi/g and the maximum plutonium-239/240 activity was 10.4 pCi/g. Neither PCBs nor pesticides were detected. Subsurface soil samples were collected at one monitoring well location. Results indicated 2-butanone (maximum concentration 7.5 μg/kg) and toluene (maximum concentration 1.8 μg/kg) were detected. Radionuclides and metals were not analyzed. As documented in the OU 6 RFI/RI Report, IHSS 141 was grouped with IHSSs 165 and 152.6 as an AOC based on the results of the CDPHE conservative screen of the HHRA. The results of the HHRA for the AOC showed that for all current and future onsite receptors, the cumulative HIs for noncarcinogenic health effects are 0.01 or less. Therefore, no adverse noncancer health effects are expected under the exposure conditions evaluated. For all current and future onsite receptors, the excess lifetime cancer risk was estimated at 4×10^{-7} indicating negligible risk. Additionally, results of the ERA for the Walnut Creek Watershed did not indicate IHSS 141 was a source area (DOE 1996). The sludge drying beds were removed as part of the STP dismantlement in 2004.

No Further Action Recommendation

IHSS 141 was proposed for No Further Action in the 1997 Annual Update to the HRR (DOE 1997). The NFA recommendation is consistent with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996).

DOE received approval from CDPHE and EPA of the NFA status for IHSS 141 on July 9, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Final Phase I RFI/RI Report, Walnut Creek Priority Drainage, Operable Unit 6, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-153

IHSS Number:	153
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	900-2
Unit Name:	Oil Burn Pit No. 2

This Final Update to the HRR for PAC 900-153 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 153 is summarized in this update. The following HRR volumes contain IHSS 153 information:

Original Report – 1992 (DOE 1992);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

March 1957 to May 1965

Historical Summary

The location of IHSS 153 is shown on Figure 23. Historical information indicated uranium-contaminated coolant and waste oils from Building 444 and Building 881 were burned in two open pits, designated as IHSS 153 – Oil Burn Pit No. 2. Records indicate the pits were actually two parallel trenches. An estimated 1,354 drums were emptied into the pits and burned between March 1957 and May 1965 (DOE 1992). Unknown organic liquids were also stored at the site. Uranium activity in liquid residues in IHSS 153 was reported as up to 12,000 dpm/L. Approximately 370 cy of depleted uranium residue were estimated to be present in the area prior to removal activities (DOE 1992). Activities at this site likely contributed to groundwater contamination.

During 1978, soil was excavated to a depth of approximately 5 ft in this area. Approximately 500 cy of contaminated soil are reported removed and disposed of at an off-site facility. The cleanup criteria were based on radioactivity measurements and not VOC concentrations.

IHSS Investigations

RFCA (DOE et al. 1996) accelerated action activities were planned for IHSS Group 900-2 (which includes IHSS 153) and executed in accordance with the BZSAP Addendum #BZ-02-01 (DOE 2002), IABZSAP (DOE 2004), ER RSOP (DOE 2003b), and ER RSOP Notification #05-03 (DOE 2005a).

IHSS 153 was initially characterized in accordance with BZSAP Addendum #02-01 (DOE 2002). Eight surface and subsurface soil characterization locations were sampled in April 2002. Results indicated Aroclors-1254 and -1260, tetrachloroethane , and trichloroethene, exceeded RFCA WRW soil ALs (DOE et al. 2003). In January 2004 additional samples were collected to determine the extent of soil removal required.

An accelerated action was conducted in accordance with ER RSOP 05-03 (DOE 2005a). Approximately 1,370 cy of contaminated soil were excavated at IHSS 153. HRC® was added to the excavation area and clean backfill soil at IHSS 153 to enhance degradation of residual VOCs in the subsurface. A gravel drain was installed downgradient of IHSS Group 900-2 to ensure that water through this area is captured and directed to the Mound Site Plume Collection and Treatment System.

During soil removal activities, conducted at IHSS 153 from January through March 2005, 66 characterization, in-process, and confirmation samples were collected. Of the 66 locations sampled, 55 locations, classified as in-process and confirmation locations, were collected within the IHSS 153 remediation area. Nine of the remaining 11 locations, classified as characterization locations, were sampled northwest of the remediation area to determine soil conditions in the vicinity of Functional Channel 5. Analyses included dioxin/furans, PCBs, radionuclides, and VOCs. Following excavation of contaminated soil, confirmation sampling indicated all remaining contaminant concentrations were less than RFCA WRW soil ALs. Confirmation sampling indicated that Aroclor-1254 ranged from 20 to 11,000 μg/kg, Aroclor-1260 ranged from 16 to 12,000 μg/kg, tetrachloroethane ranged from 5.5 to 332,000 μg/kg, and trichloroethene ranged from 0.34 to 11,600 μg/kg. Excavated soil was disposed of based on analytical results as either hazardous, mixed, or TSCA waste (DOE 2005b).

No Further Action Recommendation

NFAA justification for IHSS 153 is presented in the Closeout Report for IHSS Group 900-2 (DOE 2005b). Justification is based on the following:

- The potential sources of contamination (PCBs and VOCs) existing in soil at concentrations greater than RFCA WRW soil ALs in IHSS 153 were removed.
- The excavation area and clean backfill soil at IHSS 153 were treated with HRC®; therefore, residual VOC contamination in the soil and groundwater is expected to exhibit continued degradation in this area.
- A gravel drain was installed downgradient of IHSS Group 900-2 to ensure that water through this area is captured and directed to the Mound Site Plume Collection and Treatment System.
- Residual contaminant concentrations are below RFCA WRW soil ALs in IHSS 153.
- In accordance with the SSRS, subsurface soil in the area is not subject to significant erosion.

DOE received approval from EPA (the LRA) of the NFAA status for IHSS Group 900-2 on June 13, 2005 (EPA 2005b).

Comments

IHSS 153 includes PIC 16.

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan, Addendum #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004, Industrial Area and Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2005a, Environmental Restoration RFCA Standard Operating Protocol Notification #05-03, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005b, Closeout Report for IHSS Group 900-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005b, Correspondence to J. Rampe, DOE Director, Project Management Division, from C. M. Aguilar, EPA, RE: Closeout Report for IHSS Group 900-2 (IHSS 900-153, Oil Burn Pit No. 2 and IHSS 900-154, Pallet Burn Site), June 13.

PAC REFERENCE NUMBER: 900-154

IHSS Number:	154
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	900-2
Unit Name:	Pallet Burn Site

This Final Update to the HRR for PAC 900-154 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 154 is summarized in this update. The following HRR volumes contain IHSS 154 information:

Original Report – 1992 (DOE 1992);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2003 Annual (DOE 2003).

Dates(s) of Operation or Occurrence

1965

Historical Summary

The location of IHSS 154 is shown on Figure 23. IHSS 154 – Pallet Burn Site is located west of PAC 900-153. Oil-contaminated pallets and other wood debris were burned in this area. Burning activities were conducted during 1965 and the site was removed at an unspecified date in the 1970s. IHSS 154 was identified as being located in the area formerly occupied by the PA security fencing (DOE 1992).

IHSS Investigations

Accelerated action activities were planned and executed in accordance with the BZSAP Addendum #02-01 (DOE 2002). Accelerated action surface and subsurface soil characterization samples were collected at six locations in IHSS 154. Analyses included metals, PCBs, pesticides, radionuclides, SVOCs, and VOCs. Of the six characterization locations sampled in IHSS 154, two exceeded RFCA WRW soil ALs (DOE et al. 2003) for arsenic in subsurface soil. Arsenic concentrations ranged from 15.3 to 55.1 mg/kg and Aroclor-1260 ranged from 9.0 to 63 µg/kg. Additionally, most VOCs were not detected, but tetrachloroethane ranged from nondetected to 1.5 µg/kg. Soil removal was not required because the arsenic exceedances were located in subsurface soil at a depth of 4.5 ft or greater.

No Further Action Recommendation

NFAA justification for IHSS 154 is presented in the Closeout Report for IHSS Group 900-2 (DOE 2005). Justification is based on the following:

- Arsenic is present at concentrations greater than the RFCA WRW soil AL in IHSS 154; however, because the exceedances are located in subsurface soil at a depth of 4.5 ft or greater, the site did not require remediation based on RFCA.

- In accordance with the SSRS, subsurface soil in the area is not subject to significant erosion.

DOE received concurrence from EPA (the LRA) of the NFAA status for IHSS Group 900-2 on June 13, 2005 (EPA 2005).

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan Addendum #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, March

DOE, 2003, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Closeout Report for IHSS Group 900-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, Correspondence to J. Rampe, DOE Director, Project Management Division, from C. M. Aguilar, EPA, RE: Closeout Report for IHSS Group 900-2 (IHSS 900-153, Oil Burn Pit No. 2 and IHSS 900-154, Pallet Burn Site), June 13.

PAC REFERENCE NUMBER: 900-155

IHSS Number: 155

Current Operable Unit: BZ

Former Operable Unit: 2

IHSS Group: 900-11

Unit Name: 903 Lip Area

This Final Update to the HRR for PAC 900-155 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 155 is summarized in this update. The following HRR volumes contain IHSS 155 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000).

Date(s) of Operation or Occurrence

Approximately 1964 to 1973

Historical Summary

The location of the 903 Lip Area is shown on Figure 23. Waste releases at the 903 Pad (PAC 900-112) are considered the primary source of radiological contamination in surface soil in this part of RFETS. Drums that contained hydraulic fluids and lathe coolant contaminated with plutonium-239/240 and uranium were stored on the Pad. When cleanup operations began in 1967, a total of 5,237 drums were at the 903 Pad. From 1968 through 1970, radiologically contaminated material was removed from the 903 Pad and Lip Area. However, during drum removal and cleanup activities, wind and rain (stormwater erosion) spread plutonium-contaminated soil east and southeast from the 903 Pad area resulting in contamination of the 903 Lip Area. Several limited excavations removed some of the plutonium-contaminated soil from the 903 Lip Area (DOE 1999b, Figure 1-4). However, results from the OU 2 Phase II RFI/RI (DOE 1995) and the Site Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and the Americium Zone (DOE 1999b) confirmed that radionuclide-contaminated soil remained.

IHSS Investigations

Surface and subsurface soil samples from 37 locations were collected around the 903 Pad in the inner lip area in 1998 and analyzed for radionuclides. In the 0.0 to 0.5 ft soil horizon, results at six locations were greater than RFCA Tier I soil ALs (DOE et al.1996), and results at nine locations were greater than RFCA Tier II soil ALs. In the second soil interval, 0.5 to 1.0 ft, results from four sampling locations were greater than RFCA Tier I soil ALs, and results from three sampling locations were greater than RFCA Tier II soil ALs. In the third soil interval (1.0 to 1.5 ft) results from three sampling locations were greater than RFCA Tier II soil ALs.

There were no RFCA Tier I soil AL exceedances in samples collected in the third interval (DOE 1999b).

Eleven hundred and 10 locations were also surveyed in 1998 using HPGe with a 10-meter field-of-view in the inner and outer lip areas. Results from the HPGe measurements indicated one location exceeded RFCA Tier I radionuclide soil ALs and more than 200 locations exceeded the RFCA Tier II soil ALs, mostly in the western portions of the lip area (DOE 1999a).

Based on these data, a RFCA (DOE et al. 1996) accelerated action characterization and soil removal was planned and executed in accordance with the following documents:

- ER RSOP Notification #03-07 (DOE 2003), which addressed accelerated actions in the Inner Lip Area and part of the Outer Lip Area; and
- The IM/IRA for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in OU 1 [881 Hillside]) (DOE 2004), which addressed accelerated actions in the 903 Outer Lip Area.

Removal activities at the Inner Lip and Outer Lip Areas are briefly described in the following sections.

Inner Lip Area

Removal activities for the Inner Lip Area included the following:

1. The area surrounding the 903 Pad and extending east to the former IHSS 155 inner perimeter fence road was divided into 42-ft grid cells and were given alphanumeric designations. The total number of cells or partial cells identified was 226.
2. Approximately 1 ft of fill was present east of the 903 Pad. This fill was removed before characterization or remediation started.
3. If characterization data were available in a grid cell indicating plutonium-239/240 activity in soil was greater than the RFCA WRW soil AL (DOE et al. 2003), 6 inches of soil was excavated over the entire grid cell, and a confirmation sample was collected.
4. If characterization data were available in a grid cell indicating plutonium-239/240 activity in soil was less than the RFCA WRW soil AL, a confirmation sample was collected.
5. If characterization data were not available in a grid cell, a prescreen sample was collected. If prescreen sample analysis indicated plutonium-239/240 activity in soil was greater than the RFCA WRW soil AL, 6 inches of soil was excavated over the entire grid cell.
6. If characterization data were not available in a grid cell, a prescreen sample was collected. If prescreen sample analysis indicated plutonium-239/240 activity in soil was less than the RFCA WRW soil AL, a confirmation sample was collected.
7. If a confirmation sample indicated plutonium-239/240 activity greater than the RFCA WRW soil AL, additional soil from the entire grid cell was excavated until confirmation samples indicated plutonium-239/240 activity in soil was less than the RFCA WRW soil AL or until 3 ft of native soil was removed and a confirmation sample was collected. Soil with plutonium-239/240 activities greater than 1 nCi/g at depths greater than 3 ft bgs was excavated.

8. Excavated areas were contoured to minimize low areas and for stormwater management. Erosion controls were established, including regrading and the placement of erosion mat, straw bales, and straw wattles, as necessary, in the excavation areas.
9. Small structures, concrete pads, power poles, trees, wells, and other debris were removed and disposed.
10. Monitoring wells designated to remain after completion of the removal action were protected.

Outer Lip Area

Removal activities for the Outer Lip Area included the following:

1. An average of 6 inches of soil was removed from the kriged area (Figure 4 [DOE 2005a]), starting in the western part of the Outer Lip Area and moving east and south. Existing characterization data were used to geostatistically determine the area with a 90 percent probability of having plutonium-239/240 activity greater than 50. The extent of the 903 Lip Area remediation was based on this analysis.
2. Individual confirmation grab samples were collected at 50-ft intervals across the kriged area from the upper 3 inches of remaining soil after excavation.
3. If a confirmation sample indicated plutonium-239/240 activity in soil was greater than the WRW soil AL, additional soil was removed until confirmation samples indicated plutonium-239/240 activity in soil was less than the RFCA WRW soil AL. Soil with plutonium-239/240 activities greater than 1 nCi/g at depths greater than 3 ft bgs would be excavated. There were no locations in the Outer Lip Area where plutionum-239/240 activities were greater than 1 nCi/g.
4. The kriging process indicated some probability of contamination at isolated areas outside the main kriged area, even though there were no data points in these areas. Therefore, approximately 3 inches of soil was removed from these areas and the remaining soil was evaluated with field instruments.
5. Small structures, concrete pads, power poles, trees, wells, and other debris were removed and packaged for disposal.
6. Excavated areas were recontoured to minimize low areas and for stormwater management. Erosion controls were established, including regrading and the placement of erosion mat, straw bales, and straw wattles.
7. Monitoring wells designated to remain were protected.

The accelerated action for IHSS 155, the 903 Lip Area, included excavation and off-site disposal of wind-blown contaminated soil. The following tasks were completed:

- Excavated 36.5 acres in the 903 Lip Area;
- Removed 49,800 cy (65,800 tons) of soil for disposal;
- Filled 3,452 intermodals with soil and shipped offsite for disposal;
- Filled 588 dirt, rubble, and trash (DRT) bags with soil and shipped offsite for disposal; and

- Collected confirmation samples in accordance with the BZSAP (DOE 2002a), ER RSOP Notification #03-07 (DOE 2003), and IM/IRA for IHSS Group 900-11 (DOE 2004).

Accelerated actions at IHSS 155 resulted in the removal of plutonium-contaminated soil with activities greater than 50 pCi/g in the Inner and Outer Lip Areas. Soil with plutonium-239/240 activities greater than the RFCA WRW soil AL (50 pCi/g) were excavated until a confirmation sample returned a result less than 50 pCi/g of plutonium-239/240 or at least 3 ft of material (from the surface) was removed. The highest remaining activity between 0 and 3 ft is 49.881 pCi/g and the lowest activity between 0 and 3 ft is 0.199 pCi/g in the Inner and Outer Lip Areas. The average residual plutonium-239/240 activity is 13.04 pCi/g, and the average excavation depth was 0.9 ft. The average excavation depth in the Inner Lip Area was 1.1 ft, and in the Outer Lip Area it was 0.9 ft. The extent of soil removal is shown on Figure 8 of the Closeout Report for IHSS Group 900-11 (DOE 2005a). At isolated kriged areas outside the main kriged area, approximately 3 inches of soil was removed and the remaining soil was evaluated with field instruments. All surface soil (0 to 3 ft) SORs were less than 1. The highest plutonium-239/240 activity between 3 and 6 ft remaining at IHSS 155 is 12.40 pCi/g of plutonium-239/240 at a depth of 3.3 to 3.5 ft bgs (DOE 2005a).

Additional accelerated action analytical data for the 903 Pad and Lip Area were collected during 2005 in accordance with IABZSAP Addendum #IABZ-05-02 (DOE 2005b) to evaluate VOCs in the subsurface. Soil samples were collected from the shallow subsurface (3 to 6 ft) and near the bedrock interface (approximately 15 to 25 ft depending on location). All samples were analyzed for VOCs. All results were less than WRW soil ALs.

Two locations, adjacent to the southern side of Trench T-12 (PAC NE-1412) with measured plutonium-239/240 activities of 133 pCi/g and 88 pCi/g in surface soil were attributed to the 903 Pad Lip Area (IHSS-155) and remediated as part of the 903 Lip Area IHSS 155 project.

No Further Action Recommendation

This accelerated action resulted in the removal of radioactively contaminated soil from IHSS 155 in IHSS Group 900-11. No soil exceeding the plutonium-239/240 RFCA WRW soil AL remains within 3 ft of the surface.

Results of the accelerated action justify NFAA for IHSS 155 based on:

- Removal of soil with plutonium-239/240 activities greater than the RFCA WRW soil AL to a depth of 3 ft at IHSS 155;
- Confirmation sampling results were less than WRW ALs;
- Results of the SSRS; and
- Results of the stewardship evaluation.

After review of the Closeout Report for IHSS Group 900-11, IHSS 155, 903 Lip Area and IHSS 140, Hazardous Disposal Area (DOE 2005a) by regulatory agencies, DOE received approval from EPA (the LRA) of NFAA status for IHSS 155, on January 13, 2005 (EPA 2005).

Verification sampling in the 903 Lip Area indicated five locations with plutonium-234/240 activities ranging from 52.8 pCi/g to 90.6 pCi/g. Six inches of soil was removed from each location and confirmation samples were collected. Results of the confirmation sampling indicated that residual activities ranged from 0.239 to 0.801 pCi/g.

Verification sampling conducted by DOE indicated that plutonium-239/240 activities were greater than 50 pCi/g in surface soil at 18 locations. Six inches of soil was removed from each location and confirmation samples were collected. Results of the confirmation sampling indicated that residual plutonium-239/240 activities ranged from 0.129 to 35.5 pCi/g.

Comments

None

References

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-07, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2004, Interim Measure/Interim Remedial Action (IM/IRA) for IHSS Group 900-11 (903 Lip Area and Vicinity, the Windblown Area, and Surface Soil in Operable Unit 1 [881 Hillside]), Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Closeout Report for IHSS Group 900-11, IHSS 900-155, 903 Lip Area, IHSS 900-140, Hazardous Disposal Area Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005b Industrial Area and Buffer Zone Sampling and Analysis Plan Addendum #BZ-05-02, 903 Pad Volatile Organic Compounds Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2005, C. Mark Aguilar letter to J. Legare, RE: Closeout Report for IHSS Group 900-11, IHSS 155, 903 Lip Area and IHSS 900-140, January 13.

PAC REFERENCE NUMBER: 900-165

IHSS Number: 165

Current Operable Unit: IA

Former Operable Unit: 6

IHSS Group: 000-1

Unit Name: Triangle Area

This Final Update to the HRR for PAC 900-165 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 165 is summarized in this update. The following HRR volumes contain IHSS 165 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1966 to 1975

Historical Summary

The location of IHSS 165 is shown on Figure 23. The Triangle Area, IHSS 165 is located east of and partially overlaps the contractor's storage yard (PAC 900-176). Both IHSSs are located east of the SEP (PAC 000-101) and are bounded by Spruce Avenue and the Northeast Perimeter Road. The area is referred to by many different names including Solar Pond Storage Yard, PU&D Pond Storage Yard, and 779 Storage Yard. Several incidents of leaking storage drums were noted and are described below (DOE 1992).

Drums were first moved into the Triangle Area during the construction of a drum storage area north of Building 883. The contents of the drums stored in the area were recoverable plutonium-bearing wastes and residues. Scrap material awaiting plutonium recovery was also stored in the Triangle Area. Examples of the types of scrap stored are graphite molds, crucibles, combustible wastes awaiting incineration, incinerator ash heels, crucible heels, and Raschig rings. No sludges or oils were stored in the Triangle Area. Some drums contained dilute nitric acid (HNO3), which contributed to the corrosion of the drums (DOE 1992).

Drums with dilute HNO_3 were double-lined with polyethylene bags and stored directly on the ground for the winter of 1966/1967. The following spring, the drums were placed on wooden pallets until 1971 when they were stored in cargo containers. Rigid poly drum liners were used after 1970. In 1973, all plutonium scrap was transferred to indoor storage (DOE 1992).

In 1968, more than 6,000 drums, containing fire waste from the May 1969 fire, were stored in the open field. High winds in the unprotected area blew over as many as 150 drums at a time. Radioactively contaminated salts from the SEP were often blown across the Contractor Storage Yard and Triangle Area and onto the drums. Drum integrity was damaged by collected condensation and drums being blown over. In 1969, approximately 292 leaking drums were discovered.

They were monitored and decontaminated according to the criteria used for spills in indoor processing areas. The leaking drums prompted containment of the drums in cargo containers in 1973. In 1973, some of the cargo containers were noted to be leaking drum contents. About 200 ft^2 of soil received high-level contamination and was shipped off-site (DOE 1992).

In the summer of 1973, two drums containing incinerator ash heels leaked through the floor of the cargo container in which they were stored. In June 1973, 200 yds of plutonium-contaminated soil were temporarily stored on the eastern side of the Triangle Area. The soil came from the excavation of waste storage tanks near Building 774 (PAC 700-146.1 – 146.6) (DOE 1992).

Subsequent to the 1973 drum leaks, the inside floors of the cargo containers were coated with fiberglass for added containment. Alpha surveys were conducted on soil when drums or cargo boxes were moved out of the area. Alpha and gamma surveys of the entire area took place in August 1974. The first FIDLER survey is thought to have taken place in September 1974, with surveys ending in mid-1975. A survey performed in April 1975 indicated no new hot spots and no contaminated soil was removed during that time. Surveys were performed periodically after 1975 and areas of soil were removed as appropriate (DOE 1992).

IHSS Investigations

Based on historical information regarding the drum storage and associated soil staining, soil samples were collected and analyzed for radionuclides, metals, SVOCs, and PCBs in November 2002, in accordance with IASAP Addendum #IA-03-02 (DOE 2002). Surface soil samples were collected from 16 locations within IHSS 165. Results indicated all contaminant concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003). Americium-241 activity at IHSS 165 ranged from nondetected to 0.53 pCi/g, uranium-235 ranged from nondetected to 0.23 pCi/g, and arsenic concentrations ranged from nondetected to 13.9 mg/kg. PCBs were not detected at IHSS 165. These locations and associated analytical data are summarized in the IHSS Group 000-1 Data Summary Report (DOE 2003b).

No Further Action Recommendation

No further action was proposed for IHSS 165 in the IHSS Group 000-1 Data Summary Report (DOE 2003b). Based on the analytical results from the soil samples, no current or potential contaminant source was identified for IHSS 165. COCs for this site were not detected above the RFCA soil ALs (DOE et al. 2003).

DOE received approval from CDPHE (the LRA) of NFAA status for IHSS Group 000-1 on July 29, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval of Data Summary Report, IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, July 29.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002, Addendum #IA-03-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-173

IHSS Number:	173
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	900-1
Unit Name:	South Dock Building 991 (IAG Name: Radioactive Site Building 991)

This Final Update to the HRR for PAC 900-173 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 173 is summarized in this update. The following HRR volumes contain IHSS 173 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1952 to 2003

Historical Summary

The location of IHSS 173 is shown on Figure 23. IHSS 173 originally encompassed Building 991 and associated underground storage vaults/tunnels 996, 997, 998, and 999. The IHSS was later revised to include only the southern dock area of Building 991. The "south dock" of Building 991 is located on the western side of the building and was a loading facility for the vaults/tunnels. The area received moderate to heavy traffic and had been paved for more than 20 years (DOE 2004b).

Products containing plutonium, uranium, and beryllium were received and shipped from the dock. Cleaning solvents were received at the dock, and spent solvents (stored in drums) were shipped from the dock. Reportedly, small parts and equipment were cleaned in the dock area along the northern wall of the asphalt-covered courtyard. In the late 1950s and early 1960s, cleaning of depleted uranium parts was conducted in the courtyard of Building 991, which is located on the western side of the building near the dock. According to Plant records, the dock and courtyard were often washed down with water that could have seeped into cracks and the edge of the asphalt. Spills and water could also have drained into the storm drains (DOE 2004b).

IHSS Investigations

Characterization of IHSS Group 900-1, which includes IHSS 173, was conducted in accordance with IASAP Addendum #IA-03-03 (DOE 2003). Two surface and subsurface soil locations were sampled in IHSS 173 that were analyzed for radionuclides, metals, and VOCs. Results indicated all contaminant concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). Analytical results from the characterization sampling are presented in the Closeout Report for IHSS Group 900-1 (DOE 2004b). A number of metals were detected in surface soil at concentrations greater than background means plus two standard deviations. All concentrations

were several orders of magnitude less than WRW soil ALs except arsenic which was present at a maximum concentration of 13.2 mg/kg. Uranium-234 and uranium-238 were detected at maximum activities of 3.25 pCi/g and uranium-235 was detected at maximum activities of 0.186 pCi/g. In subsurface soil, maximum concentrations for detected metals were: barium at 358 mg/kg, copper at 88 mg/kg, vanadium at 188 mg/kg, and zinc at 194 mg/kg. Uranium-234 and uranium-238 were detected at a maximum activity of 4.074 pCi/g, and uranium-235 was detected once at an activity of 0.241 pCi/g. tetrachloroethane and trichloroethene were detected at one location at concentrations very close to the RL.

No Further Action Recommendation

Based on analytical results and the SSRS, further action is not required and an NFAA determination was justified for IHSS 173 in the Closeout Report for IHSS Group 900-1 (DOE 2004b), because surface and subsurface contaminant concentrations in soil were less than RFCA WRW soil ALs.

After review of the Closeout Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 173 on March 31, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) – Approval, March 31.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-175

IHSS Number:	175
Current Operable Unit:	IA
Former Operable Unit:	10
IHSS Group:	900-4&5
Unit Name:	S&W Building 980 Contractor Storage Facility

This Final Update to the HRR for PAC 900-175 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 175 is summarized in this update. The following HRR volumes contain IHSS 175 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1980 to 2002

Historical Summary

The location of IHSS 175 is shown on Figure 23. The S&W contractor storage facility is a 25-ft by 25-ft area south of Building 980 that was used for storage of 55-gallon drums. The area was bordered by a 1 to 1 1/2 ft berm on the western, southern, and eastern sides. The drums were placed directly on the ground. No documentation was found identifying leaks or spills, although soil staining was noted in a March 1988 visual inspection.

The wastes stored in the drums were generated in the on-site contractors' maintenance and fabrication shops and typically came from vehicle maintenance and miscellaneous painting activities. Generally, the drums contained waste oils and thinners. Sometime after the March 1988 inspection, the 55-gallon drums were removed and the area was regraded and covered with clean gravel.

IHSS Investigations

Based on historical information regarding the drum storage and associated soil staining, soil was sampled at six surface locations within IHSS 175 in April 2002. Analyses were conducted for metals, inorganics, SVOCs, and radionuclides in accordance with IASAP Addendum #IA-02-02 (DOE 2002). Results indicate that americium-241 was detected a maximum activity of 1.23 pCi/g, plutonium-239/240 was detected at a maximum activity of 13.18 pCi/g, and uranium-238 at 2.9 pCi/g. Copper, chromium, nickel, and tin were detected at all locations and had maximum concentrations of 74.4, 114, and 69.7 mg/kg, respectively. All contaminant concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

IHSS 175 was recommended for NFAA in the Data Summary Report for IHSS Group 900-4&5 (DOE 2003b) for the following reasons:

- All contaminant concentrations were less than WRW ALs.
- Based on the analytical results and the distance to the nearest surface water body, IHSS Group 900-4&5 did not appear to have adversely impacted surface water.

After review of the Data Summary Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 175 on July 23, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval, Data Summary Report, IHSS Group 900-4&5 (PAC 900-175, S&W B980 Contractor Storage Facility), July 23.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-02, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 900-4&5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-176

IHSS Number:	176
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-1
Unit Name:	S&W Contractor Storage Yard

This Final Update to the HRR for PAC 900-176 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 176 is summarized in this update. The following HRR volumes contain IHSS 176 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

1960 to 2002

Historical Summary

The location of IHSS 176 is shown on Figure 23. The S&W contractor storage yard was located east of SEP Ponds 207B-Center and 207B-South (PAC 000-101) and partially overlapped the Triangle Area (PAC 900-165). The Contractor Storage Yard was considered a potential AOC because of wind-blown radioactive nitrate spray from the adjacent SEP and the hazardous nature of some of the contractor material stored in the yard (DOE 1992).

Construction of the 207B series of SEP was completed in June 1960. The adjacent area east of these ponds became a contractor storage yard sometime after 1966 but before 1969. Most of the structures and equipment stored in the yard were affected by spray from the ponds. High winds blew low-level (102 dpm/100 cm^2) contamination and salts out of the SEP onto equipment that was stored in the S&W area. The water in SEP historically contained elevated concentrations of nitrate and low-level concentrations of radioactivity, as well as VOCs and inorganic components (DOE 1992). Alpha surveys were performed periodically to evaluate conditions surrounding the SEP. No significant alpha contamination was found (DOE 1992).

The primary use of the yard was the storage of surplus or raw materials. Drums containing construction material, which qualified as hazardous waste, were stored in the area until 1985. Drums were placed directly on the ground or on wooden pallets. In general, the drums stored in the storage yard contained waste oils with some VOCs and metals. Building 964 was located in the area until late 2002 and was used for the storage of hazardous waste. There are no documented releases to the environment from waste storage practices from Building 964 (DOE 1992).

In August 1988, a fuel oil spill of unknown quantity occurred in the yard as a result of a leaking portable heating unit. The quantity of fuel oil spilled was not reportable (DOE 1992). The oil-soaked soil was excavated and transported to the Present Landfill (PAC NW-114). All drums

containing hazardous waste or constituents were removed by March 1988. After 1988, the area was primarily used to store equipment.

IHSS Investigations

Because of this area's history and proximity to other IHSSs, seven surface soil samples were collected in the IHSS 176 area in November 2002, and analyzed for radionuclides, metals, SVOCs, and PCBs in accordance with the IASAP Addendum #IA-03-02 (DOE 2002). Results indicated all contaminant concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003). Americium-241 activity at IHSS 176 ranged from nondetected to 2.0 pCi/g, uranium-235 ranged from nondetected to 0.25 pCi/g, and arsenic concentrations ranged from nondetected to 18.9 mg/kg. Aroclor-1254 was detected at maximum concentration of 66 µg/kg. Sampling locations and analytical data are presented in the Group 000-1 Data Summary Report (DOE 2003b).

No Further Action Recommendation

IHSS 176 was recommended for NFAA based on the results of the soil samples collected. There were no COCs at IHSS 176 detected at concentrations greater than the RFCA WRW soil ALs (DOE et al. 2003).

DOE received approval from CDPHE (the LRA) of NFAA status for IHSS Group 000-1 on July 29, 2003 (CDPHE 2003).

Comments

IHSS 176 partially overlaps IHSS 165. IHSS 176 includes PIC 47 and may be the location of PIC 51.

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Approval of Data Summary Report, IHSS Group 000-1, July 29.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002, Addendum #IA-03-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, CDPHE, and EPA, 2003, Modifications, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-183

IHSS Number:	183
Current Operable Unit:	BZ
Former Operable Unit:	2
IHSS Group:	Not Applicable
Unit Name:	Gas Detoxification Area

This Final Update to the HRR for PAC 900-183 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 183 is summarized in this update. The following HRR volumes contain IHSS 183 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

Approximately 1963 to Approximately 1983

Historical Summary

The location of IHSS 183 is shown on Figure 23. Building 952 was constructed in 1963 as a toxic gas storage building. Beginning in approximately January 1967, bottles containing hazardous gases were transported from various buildings to Building 952 for storage. Typically, shipments consisted of one or two lecture-size gas bottles. Gases were stored up to 5 years prior to disposal; however, select gases were detoxified at the site. Other gases were packed and shipped to off-site vendors for disposal (DOE 1992).

Select gases were detoxified using various commercial neutralization processes available at the time. Neutralization processes included reaction with water, acid, caustic, carbon, or air. Byproducts were disposed of as process wastes. Upon completion of the neutralization process for each type of gas, the glassware used in the process was triple-rinsed, crushed, and deposited in the Present Landfill (PAC NW-114) (DOE 1992).

IHSS Investigations

IHSS 183 was studied as part of the OU 2 RFI/RI and, for investigative purposes, was grouped with PAC 900-140 because of the close proximity of these two IHSSs. Of the nine boreholes located within IHSS 140, one borehole was located near IHSS 183. Surface and subsurface soil samples were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, metals, and radionuclides. Only methylene chloride (2 ppb) and acetone (15 ppb) were detected in the borehole. These chemicals were not retained in the OU 2 RFI/RI or the associated human health risk assessment as chemicals of concern (DOE 1995). With respect to ecological receptors,

IHSS 183 was not identified as a source area in the ERA for the Woman Creek Watershed (DOE 1996).

No Further Action Recommendation

Based on the lack of any evidence for, or documentation of, past releases from this IHSS, and the sampling results from the OU 2 RFI/RI (DOE 1995a), IHSS 183 was proposed for NFA status in the 1997 and 2000 Annual Updates to the HRR (DOE 1997, 2000).

IHSS 183 was discussed at the consultative process in NFA Working Group meetings on October 24, 2001 and November 14, 2001. The NFA was verbally agreed to in the November 14, 2001 meeting, provided that the closure plan correspondence from DOE RFFO to CDPHE dated November 9, 1995 (DOE 2002), be submitted in the 2000 Annual Update to the HRR (DOE 2000). This letter was provided as an attachment in Appendix 2 of the 2000 Annual Update to the HRR. The NFA for IHSS 183 was formally approved by CDPHE and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

IHSS 183 overlaps with IHSS 155 (PAC 900-155), which was addressed as a separate action.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Final Phase I RFI/RI Report 903 Pad, Mound, and East Trenches Area, Operable Unit 2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1996, Final Phase I RFI/RI Report Woman Creek Priority Drainage, Operable Unit 5, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-184

IHSS Number:	184
Current Operable Unit:	IA
Former Operable Unit:	8
IHSS Group:	900-1
Unit Name:	Radioactive Site Building 991 Steam Cleaning Area

This Final Update to the HRR for PAC 900-184 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 184 is summarized in this update. The following HRR volumes contain IHSS 184 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1952 to 1978

Historical Summary

The location of IHSS 184 is shown on Figure 23. Radioactively contaminated equipment and drums may have been steam cleaned at a location near Building 992 southwest of Building 991. The effluent from the steam-cleaning process was collected in a sump and entered the OPWL system. The steam cleaning may have occurred between 1953 and 1978. IHSS 184 was originally defined as a 50-ft by 50-ft area near Building 992, southwest of Building 991 (DOE 1994). An EPA aerial photograph from August 6, 1971, indicates a darkened area along the dirt road from Building 992. The connection between the darkened area in the photograph and this potential release is not known (DOE 1992). A sitewide radiological survey conducted from 1977 through 1984 did not detect any radioactive hot spots.

IHSS Investigations

Characterization of IHSS 184 was conducted in accordance with IASAP Addendum #IA-03-03 (DOE 2003). Radionuclides, metals, and VOCs were considered COCs for IHSS 184. Analytical results from the characterization sampling of surface and subsurface soil are presented in the Closeout Report for IHSS Group 900-1 (DOE 2004b). Five surface and subsurface soil samples were collected in IHSS 184. Surface soil results indicated uranium-234 and uranium-238 were detected at a maximum activity of 5.218 pCi/g and uranium-235 was detected at a maximum activity of 0.186 pCi/g. A number of metals were detected but all very close to background means plus two standard deviations, except for arsenic which ranged from 12.9 to 14.0 mg/kg. In subsurface soil maximum detections include: uranium-234 at 4.310 pCi/g, uranium-235 at 0.228 pCi/g, uranium-238 at 4.310 pCi/g, arsenic at 13.4 mg/kg, barium at 749 mg/kg, copper at 19.0 mg/kg, strontium at 265.0 mg/kg and vanadium at 221 mg/kg. Ethylbenzene, methylene chloride, and xylene were also detected but at concentrations very close to the RL.
Results indicate all contaminant concentrations and activities were less than RFCA WRW soil ALs (DOE et al. 2003).

No Further Action Recommendation

A recommendation of NFAA is provided in the Closeout Report for IHSS Group 900-1 (DOE 2004b). Based on analytical results and the SSRS, further action was not required and an NFAA determination was justified for IHSS 184, because surface and subsurface contaminant concentrations in soil were less than RFCA WRW ALs.

After review of the Closeout Report by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 184 on March 31, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) - Approval, March 31.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1994, Operable Unit 8 Phase I RCRA Facility Investigation/Remedial Investigation Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-210

IHSS Number:	210
Current Operable Unit:	IA
Former Operable Unit:	10
IHSS Group:	Not Applicable
Unit Name:	Building 980 Cargo Container, Unit 16

This Final Update to the HRR for PAC 900-210 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 210 is summarized in this update. The following HRR volumes contain IHSS 210 information:

Original Report – 1992 (DOE 1992);
Update Report – 1997 Annual (DOE 1997) ; and
Update Report – 1999 Annual (DOE 1999).

Dates(s) of Operation or Occurrence

1986 to May 1988

Historical Summary

The location of IHSS 210 is shown on Figure 23. IHSS 210, Unit 16 was located southeast of Building 980 and was used for solid and liquid waste drum storage of oil, solvents, and paint waste. The steel cargo container met the requirements of 6 CCR 264.17 for hazardous waste storage (DOE 1992) and was used as a RCRA 90-day accumulation area. The cargo container had an inner catch basin. Steel drums were stored on roller-pallets and had 3-ft aisle spacing. Periodic container inspection was performed. A small area beside the cargo container was enclosed by rope and used for additional storage. Stored material included nonradioactive containerized hazardous waste including automotive oils, solvents, paints, paint thinner, grease, gasoline, diesel fuel, and paper and rags contaminated with oils. These wastes were generated in the Building 980 construction contractor work area (DOE 1992). All hazardous waste was removed from the unit by May 31, 1988 (DOE 1992).

IHSS Investigations

IHSS 210 was studied as part of the OU 10 RFI/RI. As documented in the OU 10 RFI/RI Report (DOE 1995), IHSS 210 was field-screened for radionuclides and VOCs. Nine surface soil locations were sampled and analyzed for SVOCs and metals. Maximum concentrations of detected metals included copper at 76.3 mg/kg and zinc at 311 mg/kg. PAHs were detected at two locations at concentrations equal to or only slightly greater the MDLs.

No Further Action Recommendation

In accordance with the criteria for recommending NFA decisions presented in RFCA (DOE et al. 1996), IHSS 210 was proposed for NFA in the 1997 Annual Update to the HRR (DOE 1997).

DOE received approval from CDPHE (the LRA) and EPA of NFA status for IHSS 210 on July 29, 1999 (CDPHE and EPA 1999).

Comments

None

References

CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual Update for the Historical Release Report (September, 1997) July 9.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1995, Technical Memorandum 1, Operable Unit 10, Other Outside Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-213

IHSS Number: 213

Current Operable Unit: IA

Former Operable Unit: 10

IHSS Group: 900-3

Unit Name: 904 Pad

This Final Update to the HRR for PAC 900-213 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this IHSS in accordance with the RFCA accelerated action process. The disposition of IHSS 213 is summarized in this update. The following HRR volumes contain IHSS 213 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Dates(s) of Operation or Occurrence

August 1987 to 2003

Historical Summary

The location of IHSS 213 is shown on Figure 23. The 904 Pad was located west of the 903 Pad and south of Central Avenue. It was created in 1987 for the outdoor storage of various waste materials including pondcrete (precipitate from the SEP process treated with cement for stabilization), saltcrete (precipitate from the Building 374 evaporation process treated with cement for stabilization), sewage sludge, and miscellaneous materials in cargo containers. Pondcrete is characterized by high nitrate, and low-level radiation, with traces of VOCs. Saltcrete is made from salts resulting from the Building 374 evaporator and contains a variety of materials (DOE 1992).

The asphalt pad occupied a 129,505-ft^2 rectangular area and was sloped approximately 0.7 percent to the northeast. Improvements to the original design included a 6-inch asphalt berm and tent enclosures. The sludge-like consistency of the pondcrete that resulted in spills prompted the construction of the 6-inch berm to contain runoff, not as a spill containment structure. Because of the berm's inability to handle a 25-year, 24-hour storm, a mobile fuel tanker equipped with pumps was moved to the pad to collect water and transport it to Building 371 for treatment. Water overflow from the pad entered the B-Series Ponds in the South Walnut Creek drainage. Tents were constructed over the entire pad in 1990 (DOE 1992).

Boxes of pondcrete were stacked three high and arranged in groups of 72. Each group was covered with a plastic-lined canvas tarpaulin for weather protection (not completely weatherproof). A passageway was left between stacks for emergency access, inspection, and operations. The tri-walled boxes were designed for transportation rather than long-term storage (DOE 1992).

Several incidents occurred on the pad; however, releases were below reportable quantities. In May, July, and September 1988, a small amount of softened pondcrete spilled from tri-wall boxes. The May 1988 incident involved a spill of approximately 0.25 ft^3 of pondcrete, affecting

an area of 12 ft^2. Saltcrete spilled during two events in June and July 1989 and July and August 1989 (DOE 1992). In response, radiation surveys were performed to determine the level of contamination. Air monitoring indicated plutonium was present at a maximum concentration of 2.5×10^{-4} pCi/m^3 of air for a period in May 1988. Two RCRA Implementation Plans were implemented in response to potential releases to the environment occurring at the 904 Pad. CPIR 88-001 was in response to the May 23, 1988 incident of deformed boxes of pondcrete. CPIR 88-002 was in response to the July 22, 1988 incident of a deformed box (DOE 1992).

In September 1990, a waste box stored on a pallet, located along the western wall of Tent 10, was identified as being radioactively contaminated. The affected box and pallet were bagged and placed in a permacon storage area. Additional smear samples were collected that revealed approximately 15 pallets with high activity levels which were bagged and placed in storage. Contaminated spots on the floor were decontaminated to less than 20 dpm. Procedures were developed to prevent future incidents and identify appropriate action in response to an event (DOE 1992).

Prior to the construction of the tent enclosures, small amounts of leakage under the berm were routinely observed due to inadequate sealing of the berm to the existing asphalt pad. Additionally, the asphalt berms overflowed with runoff during periods of heavy rainfall. Elevated levels of gross alpha activity, gross beta activity, and nitrate were identified in the runoff (DOE 1992).

Soil, water, and air were sampled regularly since the beginning of pad operations. It was determined from the sampling that fill material used to construct the facility was placed over native soil contaminated with radionuclides. The source of the radioactivity was attributed to the adjacent 903 Pad. “Background” soil samples were collected to evaluate nitrate concentrations that were not characteristic of the 903 Pad area.

IHSS 213 was also a RCRA Unit 15. The waste, tents, and pad were removed in 2003 and the RCRA Unit closed (DOE 2003a).

IHSS Investigations

In accordance with IASAP Addendum #IA-03-01 (DOE 2002), 43 surface soil characterization samples were collected and analyzed for radionuclides, metals, VOCs, cyanide, and nitrate. An additional 11 locations were sampled for radionuclides during the accelerated action through the consultative process to specifically investigate fill material under the Pad. Results indicated all COC concentrations were less than RFCA WRW soil ALs (DOE et al. 2003) except for one arsenic value (23.7 mg/kg) in surface soil that slightly exceeded the corresponding WRW soil AL (22.2 mg/kg). Americium-241 was detected 11 percent of the time and when detected ranged from 0.39 to 1.47 pCi/g. Plutonium-239/240, when detected ranged from 2.23 to 8.36 pCi/g. Uranium-235 ranged from nondetect to 0.39 pCi/g and uranium-238 ranged from nondetect to 6.5 pCi/g. Analytical results from the characterization are presented in the Data Summary Report for IHSS Group 900-3 (DOE 2003b).

Based on the analytical results presented in the Data Summary Report, IHSS 213 was proposed for NFAA. All but one of the COC concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). The exception was a single arsenic value (23.7 mg/kg) in surface soil that slightly exceeded the corresponding WRW soil AL (22.2 mg/kg). In addition, there is no identified potential to exceed surface water standards at a POC from this IHSS Group.

No Further Action Recommendation

After review of the Data Summary Report for IHSS Group 900-3 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for IHSS 213 on December 17, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Final Approval, Data Summary Report, IHSS Group 900-3 (904 Pad), December 17.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Closure Summary Report for RCRA Units 15 and 35 Closed in Accordance With RCRA Under the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2003b, Data Summary Report IHSS Group 900-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: 900-1300

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Reverse Osmosis (RO) Plant Sludge Drying Beds

This Final Update to the HRR for PAC 900-1300 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC-900-1300 is summarized in this update. The following HRR volumes contain PAC 900-1300 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002a).

Dates(s) of Operation or Occurrence

1984 to 1991

Historical Summary

The location of PAC 900-1300 is shown on Figure 23. Two open sludge drying beds (Building 228A and Building 228B) were adjacent to Building 910 and were originally used to store and dry brine from the RO process. After the RO process was discontinued, the beds were used to dry sludge from the STP, Building 995. The sludge was trucked from Building 995 to the Building 910 drying beds. The drying beds were underlain by a sand and gravel filter on native soil. The use of these beds for storing and drying sanitary sewage sludge continued until 1991. Sludge from the sanitary treatment plant was treated as a low-level radioactive waste. Chemical composition of the sludge was monitored regularly (DOE 1992).

PAC Investigations

As part of the PDSR, the drying beds were evaluated and it was determined that contaminant concentrations in the soil inside and outside the drying beds were less than RFCA Tier II soil ALs (DOE 2002b, DOE et al. 1996). Building 910 and associated structures were demolished in 2002.

No Further Action Recommendation

PAC 900-1300 was initially addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. There were very low concentrations of contaminants in the drying beds. Relevant groundwater monitoring information was provided to CDPHE at the December 19, 2001 meeting. After review of the groundwater monitoring information and subsequent discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the April 3, 2002 meeting and was formally approved by CDPHE and EPA in a letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Pre-Demolition Survey Report (PDSR), Building 910 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1301

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	900-1
Unit Name:	Building 991 Enclosed Area

This Final Update to the HRR for PAC 900-1301 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1301 is summarized in this update. The following HRR volumes contain PAC 900-1301 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

November 6, 1953 to approximately 1968

Historical Summary

The location of PAC 900-1301 is shown on Figure 23. An enclosed area approximately 50 ft wide along the southern side of Building 991 was used for storage of various radioactively contaminated waste and materials. The earliest document found regarding this area indicated that in November 1953, 79 drums of concreted waste from Building 991 were stored at this PAC. Monthly reports documented no drums were added or removed until January 1961, when the drums were moved to the Mound Area (PAC 900-113) (DOE 1992). These wastes were contaminated with enriched and depleted uranium. No documentation was found that details a release to the environment from these items (DOE 1992).

Other materials were stored in the same general area including shipping crates and carrying cases for assembled weapon components that may have been contaminated (DOE 1992).

PAC Investigations

PAC 900-1301 was characterized in accordance with IASAP Addendum #IA-03-03 (DOE 2003). Surface and subsurface soil samples were collected at three locations in PAC 900-1301 and analyzed for metals and radionuclides. Metals and the uranium isotopes were detected at concentrations or activities greater than background, but less than RFCA WRW soil ALs. In surface soil, uranium-234 was detected a maximum activity of 4.065 pCi/g, uranium-235 was detected at a maximum activity of 0.22 pCi/g, and uranium-238 was detected at a maximum activity of 4.065 pCi/g. Various metals were detected at concentrations close to background means plus two standard deviations. However, strontium was the most abundant metal found in surface soil and ranged from 70 to 293 mg/kg. Maximum activities in subsurface soil include uranium-234 at 3.190 pCi/g, uranium-235 at 0.171 pCi/g, and uranium-238 at 3.19 pCi/g. Again, strontium concentrations were the highest of the detected metals with a maximum value

of 263.0 mg/kg. Analytical results from the characterization sampling are presented in the Closeout Report for IHSS Group 900-1 (DOE 2004b).

No Further Action Recommendation

Based on analytical results and the SSRS, justification for an NFAA status for PAC 900-1301 was provided in the Closeout Report for IHSS Group 900-1 (DOE 2004b).

After review of the Closeout Report by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for PAC 900-1301 on March 31, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) - Approval, March 31.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

PAC REFERENCE NUMBER: 900-1302

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Gasoline Spill

This Final Update to the HRR for PAC 900-1302 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1302 is summarized in this update. The following HRR volumes contain PAC 900-1302 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

October 5, 1989

Historical Summary

The location of PAC 900-1302 is shown on Figure 23. A 55-gallon drum containing gasoline was discovered leaking in the contractor staging yard south of the 904 Pad. An estimated 2 gallons of gasoline sprayed into the air or leaked onto the ground. HAZMAT responded and sealed the leak. A concrete containment berm was to be installed around the contractor's fuel storage facility as a result of this incident (DOE 1992).

PAC Investigations

No additional investigation was required because the spill was small.

No Further Action Recommendation

PAC 900-1302 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001 meeting, and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1303

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Natural Gas Leak

This Final Update to the HRR for PAC 900-1303 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1303 is summarized in this update. The following HRR volumes contain PAC 900-1303 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

July 1961 to April 1971

Historical Summary

The location of PAC 900-1303 is shown on Figure 23. A gas leak in the pipeline to Building 995 and Building 991 occurred in July 1961. The leak was apparently present for years and had permeated the ground under the pavement. In April 1971, a major problem with corrosion in the pipeline near Building 991 due to inadequate wrapping was discovered (DOE 1992). The pipe was repaired and 400 ft of gas line near Building 991 was replaced in 1971 (DOE 1992).

PAC Investigations

No additional investigation was required.

No Further Action Recommendation

PAC 900-1303 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001 meeting, and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1304

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Chromic Acid Spill – Building 991

This Final Update to the HRR for PAC 900-1304 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1304 is summarized in this update. The following HRR volumes contain PAC 900-1304 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

April 22, 1989

Historical Summary

The location of PAC 900-1304 is shown on Figure 23. A portable 500-gallon receiving vessel located outside Building 991, overflowed during a transfer. The portable containers were not equipped with site gages or visible level indicators. The container was being used to transfer liquids generated in the building. Several gallons of chromic acid laboratory waste were spilled into a cement pit. No chemical waste was released because the cement berm functioned as designed. The event occurred on a Saturday and was reported the following Monday. Procedures were reviewed as a result of this incident and steps were taken to prevent its recurrence (DOE 1992).

PAC Investigations

No additional investigation was required because the spill was to a cement berm.

No Further Action Recommendation

PAC 900-1304 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. No waste was released to the environment. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001 meeting, and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1305

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Building 991 Roof

This Final Update to the HRR for PAC 900-1305 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1305 is summarized in this update. The following HRR volumes contain PAC 900-1305 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

July 1982

Historical Summary

The location of PAC 900-1305 is shown on Figure 23. The roof of Building 991 received a primer coating in July 1982. Approximately 5 gallons of the primer Tremco Tremprime spilled in an area under the intake. The primer contained mineral spirits as a solvent. Fumes from the spill entered an air intake conduit on the roof and affected the climate inside the building. The primer was spread around and dried and the odor diminished (DOE 1992).

PAC Investigations

No additional investigation was required because the spill was to the roof.

No Further Action Recommendation

PAC 900-1305 was addressed through the consultative process in an NFA Working Group meeting on November 14, 2001. The spill was not released to the environment. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the November 14, 2001 meeting, and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1306

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Transformers 991-1 and 991-2

This Final Update to the HRR for PAC 900-1306 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1306 is summarized in this update. The following HRR volumes contain PAC 900-1306 information:

Original Report – 1992 (DOE 1992);
Update Report – 1996 Annual (DOE 1996); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

Prior to February 1986

Historical Summary

The location of PAC 900-1306 is shown on Figure 23. In February 1986, several leaks were observed on pipe flanges, valves, gages, and bushing compartments of Transformers 991-1 and 991-2. Large amounts of oil were noted on the ground under the two transformers. The oil in Transformers 991-1 and 991-2 contained PCBs at concentrations of 114 and 60 ppm, respectively. The PCBs were cleaned up and the transformers were repaired in February 1986. It is not clear whether the cleanup involved soil (DOE 1992). These transformers were removed in 2004 when Building 991 was demolished.

PAC Investigations

As part of the Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs conducted in July 1991 (DOE 1991), soil samples were collected in accordance with approved EPA sampling protocols and analyzed for PCBs using EPA Method 8080. The highest PCB detection in soil samples collected adjacent to the concrete transformer pads was 0.510 ppm.

No Further Action Recommendation

Recently, there has been much toxicological research pertaining to dioxins and other compounds with dioxin-like properties. Although Aroclors (a mixture of PCB congeners) do not contain dioxins, they do contain a few PCB congeners with dioxin-like properties. A White Paper (DOE 2004b) was prepared and submitted to CDPHE that evaluates whether cleanup of PCB-contaminated soil at a transformer site to less than 10 ppm Aroclor is sufficiently protective to render PCB sites NFAA in light of recent studies showing that a few PCB congeners have dioxin-like properties. The evaluation presented in the paper demonstrates that the past cleanup

of the PCB sites at RFETS to achieve Aroclor levels less than 10 ppm, as well as the future cleanup of transformer sites to achieve the WRW AL of 12.4 ppm, adequately protects human health. Although dioxin-like compounds are present in the Aroclors released to soil, the White Paper demonstrates that:

- The health risk posed by the dioxin-like compounds is not a concern at these cleanup levels.
- Weathering of the Aroclors released to the soil is unlikely to significantly alter the congener distribution or the toxicity of the Aroclors.
- Congener-specific PCB analysis of soil samples, or analysis for dioxins and furans, is not required for characterizing transformer sites at RFETS.

Based on the site data and White Paper findings noted above, NFAA status was proposed for PAC 900-1306 in the No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (DOE 2004c).

After review of the White Paper by the regulatory agencies, DOE received approval from CDPHE (the LRA) on the NFAA status for PAC 900-1306 on May 6, 2004 (CDPHE 2004).

Comments

The boundaries of the original location of PAC 900-1306 were estimated. For the 2004 Annual Update to the HRR (DOE 2004a), the boundaries were revised based on sampling location surveys and field reconnaissance.

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.

DOE, 1991, Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs) Preliminary Assessment/Site Description, Rocky Flats Plant, Golden, Colorado, July.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Dioxin-Like Compounds in Transformer Oil: An Evaluation of their Potential Impact on Soil Cleanup Strategies at RFETS, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites (as proposed in 1996 HRR), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

PAC REFERENCE NUMBER: 900-1307

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	900-1
Unit Name:	Explosive Bonding Pit

This Final Update to the HRR for PAC 900-1307 consolidates the information in the initial 1992 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1307 is summarized in this update. The following HRR volumes contain PAC 900-1307 information:

Original Report – 1992 (DOE 1992);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2004 Annual (DOE 2004a).

Dates(s) of Operation or Occurrence

1965 to approximately 1968

Historical Summary

The location of PAC 900-1307 is shown on Figure 23. Explosive bonding experiments were conducted at the explosive forming area near Building 993. At least seven events took place within a few days in March 1968 in an experiment to explosively bond together flat plates of stainless steel and uranium alloy. The explosive consisted of 192 g of 40 percent dynamite. The energy released from the dynamite drove the stainless steel plate into the radioactive material to form a bonded laminate. An experiment conducted on March 6, 1968, caused a piece of aluminum used in the experiment to be thrown a distance of 525 ft (DOE 1992).

Other experiments of an unknown nature took place in this general location for at least 2½ years. Until March 1968, experiments took place inside buried, sand-filled, 55-gallon drums. The explosive events took place below grade. Air shocks from the explosions were objectionable to Building 991 occupants until a pit was dug into a hillside near Building 993 to house the apparatus and mitigate air shocks. The 10-ft by 19-ft pit was approximately 4 ft deep (DOE 1992).

Uranium alloy and stainless steel were the materials used in the experiments. No documentation was found that details the physical and chemical characteristics of the constituents that may have been released to the environment (DOE 1992).

PAC Investigations

PAC 900-1307 was characterized as part of IHSS Group 900-1 in accordance with IASAP Addendum #IA-03-03 (DOE 2003). Eleven surface soil samples and one subsurface soil sample beneath the explosive bonding pit were collected and analyzed for radionuclides, metals, and explosives. Metals and uranium isotopes were detected at concentrations or activities greater

than background, but less than RFCA WRW soil ALs (DOE 2004b). The maximum activities detected in surface soil include uranium-234 at 9.016 pCi/g, uranium-235 at 0.329, and uranium-238 at 9.016. Most metals were detected at least once in surface soil at concentrations close to background means plus two standard deviations. The exceptions were strontium detected at a maximum value of 296 mg/kg and copper at a maximum value of 178 mg/kg. In subsurface soil, uranium-234 and uranium-238 were detected at a maximum value of 3.954 pCi/g and uranium-235 was detected at a maximum value of 0.274 pCi/g. Maximum values for metals detected in subsurface soil include arsenic at 19.6 mg/kg, barium at 559 mg/kg, copper at 88.8 mg/kg, vanadium at 174 mg/kg, and zinc at 159 mg/kg. Analytical results from the characterization sampling are presented in the Closeout Report for IHSS Group 900-1 (DOE 2004b).

No Further Action Recommendation

Based on analytical results and the SSRS, justification for an NFAA status for PAC 900-1307 was provided in the Closeout Report for IHSS Group 900-1 (DOE 2004b).

After review of the Closeout Report by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for PAC 900-1307 on March 31, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) - Approval, March 31.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

PAC REFERENCE NUMBER: 900-1308

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Gasoline Spill Outside of Building 980

This Final Update to the HRR for PAC 900-1308 consolidates the information in the Sixth Quarterly HRR Update and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1308 is summarized in this update. The following HRR volumes contain PAC 900-1308 information:

Original Report – Sixth Quarterly (DOE 1994a);
Update Report – Eighth Quarterly (DOE 1994b);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

November 22, 1993

Historical Summary

The location of PAC 900-1308 is shown on Figure 23. At approximately 6:00 P.M. on November 22, 1993, a garage employee was refueling a security vehicle near the southeastern corner of Building 980 when a gasoline spill occurred. Approximately 0.7 gallon of gasoline were released to a truck bed and the underlying soil when a hose nozzle was inadvertently left on (DOE 1994a).

A spill response was conducted on the same day of the occurrence and all of the wetted soil was excavated and placed into a black and white drum. Documentation of the amount of material removed from the site was not identified.

The soil contents of the black and white drum were determined to be nonradioactive by on-site screening methods and were transported to the Plant garage (Building 331 [UBC 331]) for storage in a satellite collection area (DOE 1994a).

PAC Investigations

No investigation was required because the spill was very small and the soil was removed.

No Further Action Recommendation

Based upon review of the original PAC narrative, a walk-down of the area, the small amount of the spill, and documentation that the spill was physically remediated during spill cleanup, no current or potential contaminant source could be identified for this site (DOE 2001). Accordingly, PAC 900-1308 was proposed for NFA status consistent with RFCA criteria (DOE et al. 1996) in the 2001 Annual Update to the HRR (DOE 2001).

PAC 900-1308 was addressed through the consultative process in an NFA Working Group meeting on December 19, 2001. Based on these discussions, agreement was reached that an NFA was justified. An NFA was verbally agreed to in the December 19, 2001 meeting, and was formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1994a, Sixth Quarterly Update for Historical Release Report, October 1, 1993 to January 1, 1994, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1994b, Eighth Quarterly Update for Historical Release Report, April 1, 1994 to June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1309

IHSS Number:	Not Applicable
Current Operable Unit:	BZ
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	OU 2, Field Treatability Unit

This Final Update to the HRR for PAC 900-1309 consolidates the information in the Sixth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1309 is summarized in this update. The following HRR volumes contain PAC 900-1309 information:

Original Report – Sixth Quarterly (DOE 1994a);
Update Report – Seventh Quarterly (DOE 1994b);
Update Report – Eighth Quarterly (DOE 1994c);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000).

Dates(s) of Operation or Occurrence

December 4, 1993

Historical Summary

The location of PAC 900-1309 is shown on Figure 23. Approximately 10 gallons of potentially contaminated water from an influent pipe system leading from Walnut Creek to the OU 2 treatment system were released to the environment. The release was detected when a contractor responded to an alarm indicating the release had occurred. The contractor identified a slow leak coming from a connection in the secondary containment portion of the influent pipeline. The source of the leak was a hole in the primary pipeline that resulted from the separation of two pipes that make up the secondary pipeline. Thirty to 40 gallons of the water were contained by the secondary containment structure. The point of release was located under a road culvert immediately west of the OU 2 treatment system. The 10 gallon release estimate was based on visual observation of a wetted 2 ft by 3 ft soil area (DOE 1994a).

The released influent water was designated as an “F001” listed hazardous waste. The sources of the water being collected for treatment were SW59, SW61, and SW132, which contained mostly surface water runoff from the PA. This water was treated in a Chemical Precipitation/Microfiltration/Granular Activated Carbon system for removal of VOCs, soluble metals, and radioactive constituents before being returned to the creek. The influent water was sampled weekly and the detected contaminants included carbon tetrachloride, methylene chloride, trichloroethene, and tetrachloroethane. Additionally, chromium and 1,2-dichloroethene, chloroform, 1,1-dichloroethane, and 1,1-dichloroethene were detected in the influent water at low levels. Other contaminants that were tested for, but not detected, included acetone, vinyl chloride, barium, cadmium, lead, and mercury (DOE 1999a).

Upon discovery of the leak, the RCRA Contingency Plan was implemented as described in CPIR No. 93-010. The pumps were immediately shut down and the lines were visually inspected for the release. The line was repaired and returned to service on December 8, 1993. The released material was not directly recoverable because it had permeated into the soil.

PAC Investigations

Two risk assessments, an initial one on January 7, 1994, and a second one in March of 1994 using CDPHE methodology (CDPHE 1993), were conducted to evaluate the need for soil remediation. The risk assessments verified the immediate removal of the affected soil was not required, because the contaminant concentrations in the soil did not pose an unacceptable risk to human health and the environment. Risk assessment information is documented in the Sixth (DOE 1994a), Seventh (DOE 1994b), and Eighth (DOE 1994c) Quarterly Updates to the HRR.

Sampling to support characterization of PAC 900-1309 for designation as NFA was conducted in accordance with the SAP for Characterization of Potential No Further Action Sites (DOE 1999b). Surface and subsurface soil samples were collected at two locations within the spill area. Results are presented in Tables 3.16 and 3.17 of the 1999 Annual Update to the HRR (DOE 1999a). Trichlorofluoromethane was detected in one surface soil sample and the corresponding subsurface soil sample at low levels. It is suspected that the chemical is a laboratory-introduced contaminant and is not attributable to the release at PAC 900-1309. Trichlorofluoromethane was detected in other method blanks analyzed by the laboratory and is not a PCOC for the spilled influent (DOE 1999a).

No Further Action Recommendation

PAC 900-1309 was recommended for NFA in the 1999 Annual Update to the HRR based upon the following criteria:

- Trichlorofluoromethane was detected in one surface and corresponding subsurface sample at a concentration of 0.002 mg/kg.
- Although a RFCA AL for trichlorofluoromethane does not exist, the observed concentration is well below the EPA Region III residential RBC of 23,000 mg/kg (EPA 1999).
- Because EPA Region 3 RBCs are based on similar assumptions as RFCA ALs, a contaminant source was not identified for PAC 900-1309 in accordance with RFCA (DOE et al. 1996).

After review of the 1999 Annual Update to the HRR by the regulatory agencies, DOE received approval from CDPHE and EPA (the LRA) of the NFA status for PAC 900-1309 on June 23, 2000 (CDPHE and EPA 2000).

Comments

None

References

CDPHE, 2003, Interim Final Policy and Guidance on Risk Assessments for Corrective Action at RCRA Facilities, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: Annual Update for the Historical Release Report (September 1999), Colorado, June 23.

DOE, 1994a, Sixth Quarterly Update for Historical Release Report, October 1, 1993 to January 1, 1994, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1994b, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994c, Eighth Quarterly Update for Historical Release Report, April 1, 1994 to June 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Sampling and Analysis Plan for Characterization of Potential No Further Action Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

EPA, 1999, EPA Region III Risk-based Concentration Table, April.

PAC REFERENCE NUMBER: 900-1310

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	000-1
Unit Name:	ITS Water Spill (formerly 000-502)

This Final Update to the HRR for PAC 900-1310 consolidates the information in the Second Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1310 is summarized in this update. The following HRR volumes contain PAC 900-1310 information:

Original Report – Second Quarterly (DOE 1993a);
Update Report – Third Quarterly (DOE 1993b);
Update Report – Seventh Quarterly (DOE 1994);
Update Report – 2000 Annual (DOE 2000); and
Update Report – 2003 Annual (DOE 2003a).

Dates(s) of Operation or Occurrence

November 30, 1992

Historical Summary

The location of PAC 900-1310 is shown on Figure 23. A release of approximately 490 gallons of interceptor trench water was reported at 1:45 A.M. on November 30, 1992. CDH and EPA were notified that the RCRA Contingency Plan was implemented. Surface water runoff and potentially contaminated groundwater were collected in the SEP Interceptor Trench Pump House (ITPH) system prior to being pumped from a centralized sump into SEP Pond 207B North. The release originated from a separation of a pipe coupling in the 3-inch transfer line on the eastern slope of the SEP Pond 207B North berm and flowed onto the surrounding soil.

The 3 ft section of drain hose that was connected to the end of the inlet pipe to Pond 207B North had frozen during several days of subzero weather and caused back pressure in the pipe when the interceptor central sump began to pump water into the pond.

The interceptor trench water was managed as RCRA-regulated hazardous waste because the groundwater had the potential to contain RCRA-regulated hazardous constituents, and because of the possibility of releases from the SEP. Previous analytical testing indicated that listed hazardous waste constituents were detected in the interceptor trench water. The material in the SEP was characterized as RCRA-regulated waste with the following EPA waste codes: D006, F001, F002, F003, F005, F006, F007, and F009. A sample of the water was collected on November 30, 1992 and results indicated volatiles were comparable to previous analytical results for this waste stream. The pipe connection was repaired and the system was placed back into service. The released material was not directly recoverable because it had permeated into the soil. Because of the location of the release (upgradient of the ITPH system in an area previously

identified as possibly contaminated by past releases from the proximal SEP) no action was taken to immediately recover the material.

The ITS water collection and pumping ceased when the Solar Pond Plume groundwater barrier system was installed in 1999 (DOE 1999).

PAC Investigations

PAC 900-1310 was characterized as part of IHSS Group 000-1 in accordance with IASAP Addendum #IA-02-07 (DOE 2002). Characterization activities were executed between August 6, 2002 and November 20, 2002. Six surface soil samples were collected at PAC 900-1310. Samples were analyzed for radionuclides, metals, and nitrate. Arsenic was detected at concentrations greater than RFCA Tier II soil ALs (DOE et al. 1996) but less than background means plus two standard deviations. Arsenic was detected at concentrations ranging from 10 mg/kg to 17 mg/kg.

No Further Action Recommendation

Based on the characterization analytical results that indicated all analyte concentrations were less than RFCA Tier II soil ALs, with the exception of arsenic, which was less than background, and accelerated action activities, an NFAA was justified in the Closeout Report for IHSS Group 000-1 (DOE 2003b) for PAC 900-1310. CDPHE (the LRA) and EPA approved the NFAA designation on July 25, 2003 (CDPHE and EPA 2003).

Comments

This PAC was formerly identified as PAC 000-502 - Hillside Spill North of Solar Evaporation Pond 207B North in the Second Quarterly Update to the HRR (DOE 1993a). Based upon further investigation, this PAC was more accurately located within the 900 Area in the Seventh Quarterly Update to the HRR (DOE 1994) and was renamed ITS Water Spill

References

CDPHE and EPA, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, July 25.

DOE, 1993a, Second Quarterly Update for Historical Release Report, October 1, 1992 to January 1, 1993, Rocky Flats Plant, Golden, Colorado, January.

DOE, 1993b, Third Quarterly Update for Historical Release Report, January 1, 1993 to April 1, 1993, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1999, Final Solar Ponds Plume Decision Document, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-02-07, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1311

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Septic Tank East of Building 991

This Final Update to the HRR for PAC 900-1311 consolidates the information in the Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1311 is summarized in this update. The following HRR volumes contain PAC 900-1311 information:

Original Report – Seventh Quarterly (DOE 1994);
Update Report – 1999 Annual (DOE 1999a);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

1952

Historical Summary

The location of PAC 900-1311 is shown on Figure 23. A sewage-related structure existed east of Building 991 during 1952 (DOE 1994). This structure is referred to in several documents by a variety of names including “temporary sewage disposal bed,” “sewerage test area,” septic tank, and wooden septic tank (DOE 1994). The location of the septic tank has been variously described in the HRR, however, the current location is considered accurate (DOE 2000).

In 1952 a brownish, odorous liquid flowing from a roughly 4-inch diameter metal pipe into the wooden structure was reported during construction of the tank. The fluid was thought to have been sewage and was expected to have been contaminated with radionuclides (DOE 1994).

A wooden flume is believed to have transported the sewage effluent from the waste disposal plant's septic tank to a ditch that discharged to a pond east of Building 991 before uncontrolled release of the effluent to South Walnut Creek. Effluent was described as clear, white, and odorless. The ditch above the discharge was dry and the ditch below the discharge contained a considerable amount of green algae. No odor was noticed at the septic tank, discharge, or ditch (DOE 1994).

In September, 1952 the effluent from the Building 991 was sampled at two points: the flume coming out of the septic tank near Building 995 and the first pond just below the septic tank. Test results showed 11 ppm of dissolved oxygen. On September 25, 26, and 29, 1952, visual effluent samples taken from the septic tank were clear with no odor (DOE 1994).

No documentation was identified which noted the termination of usage or removal of the septic tank; however, the Building 995 activated sewage sludge treatment system may have replaced the use of this tank in 1953 (DOE 1994).

PAC Investigations

During preparation of the SAP for Characterization of Potential No Further Action Sites (DOE 1999b), it became apparent that the location of PAC 900-1311 as identified in the HRR Seventh Quarterly Update (DOE 1994) was not accurate. Based on the original PAC description and as described above, the flume was located across South Walnut Creek and upgradient by several hundred feet. This location was not consistent or logical with the original description. Based upon this finding, PAC 900-1311 was relocated to its probable location and documented in the 2000 Annual Update to the HRR (DOE 2000). Although the exact location could not be positively identified, the area chosen for sampling lies within a topographical low that should reflect any elevated concentrations of contaminants because surficial contamination would likely migrate through this low area before leaving through a culvert (DOE 1999b).

Sampling at PAC 900-1311 was conducted in accordance with the SAP for Characterization of Potential No Further Action Sites (DOE 1999b). Four surface soil samples were collected from a depth of zero to six inches and analyzed for SVOCs, pesticides/PCBs, metals, and isotopic radionuclides. Four shallow subsurface composite soil samples were also collected from a depth of 6 inches to a depth of 2 ft to evaluate the potential vertical distribution of these contaminants. Results of the analyses are summarized in Tables 2.7 and 2.8 of the 2000 Annual Update to the HRR, along with the appropriate RFCA ALs for soil. All of the analytical results are presented in the NFA Justification Document for incorporation into the HRR for PACs NW-1501, NE-1408, NE-1409, 900-1309, 900-1311, 900-1312, 900-1313 (DOE 1999a).

PCOCs identified at PAC 900-1311 were not detected at levels exceeding RFCA Tier I and Tier II soil ALs (DOE et al. 1996). For those PCOCs without a corresponding ALs, the EPA Region 3 RBC table was reviewed. Of those contaminants (carbazole, 2-methylnapthalene, and benzo(g,h,i)perylene), carbazole had a RBC of 290.0 mg/kg (DOE 1999a). The detected concentrations were less than the RBC. The laboratory results for four SVOCs, carbazole, 2-methylnapthalene, benzo(g,h,i)perylene, and phenanthrene, are qualified as estimated values, less than the detection limit.

No Further Action Recommendation

PAC 900-1311 was addressed through the consultative process in NFA Working Group meetings on October 14, 2001 and November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 900-1311, because investigations did not identify any evidence of a release associated with this PAC. An NFA was verbally agreed to in the November 14, 2001 meeting, and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1994, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Sampling and Analysis Plan for Characterization of Potential No Further Action Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1312

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: OU 2 Water Spill

This Final Update to the HRR for PAC 900-1312 consolidates the information in the Seventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1312 is summarized in this update. The following HRR volumes contain PAC 900-1312 information:

Original Report – Seventh Quarterly (DOE 1994a);
Update Report – 1999 Annual (DOE 1999); and
Update Report – 2000 Annual (DOE 2000).

Dates(s) of Operation or Occurrence

March 10, 1994

Historical Summary

The location of PAC 900-1312 is shown on Figure 23. As part of the OU 2 IM/IRA (DOE 1994b) activities at OU 2, surface water was collected at surface water stations SW59, SW61, and SW132, transferred through a pipeline, and treated at the OU 2 treatment facility (Building 891). As a result of separation in the primary and secondary piping associated with the transfer line, approximately 200 gallons of surface water potentially containing hazardous waste constituents were released to the environment. The pipeline was visually inspected eight hours prior to the discovery of the release. The leak was discovered when the influent flow totalizer meter showed a marked decrease in the amount of water entering the system and the operator proceeded to visually inspect the pipeline. The primary and secondary piping were found to be separated approximately 800 ft from the treatment unit, approximately 200 ft above the SW-61 collection point. The amount of liquid released to the soil was estimated to be 200 gallons based on a visual determination of the size of the wetted area. In addition, possibly up to 6,000 gallons may have been released from the primary piping, flowed through the secondary piping and returned to the SW-61 collection point. Approximately 97 percent of the water diverted to the treatment system was collected from SW61 (DOE 1994a).

None of the estimated 6,000 gallons which flowed back into the creek was recovered; however, the water returned to Walnut Creek was essentially indistinguishable from the periodic overflows of the water which exceed the 60 gpm treatment requirements of the OU 2 treatment unit (DOE 1994a).

The water that was released was collected from SW59, SW61, and SW132 (most of which is surface runoff from the PA). Analytical results from sampling events of the influent water from May 1993 and March 1994 are summarized in Table 3.22 of the 2000 Annual Update to the HRR

(DOE 2000). Based on these historical data, contaminants that have been detected include carbon tetrachloride, trichloroethene, and tetrachloroethane. Cis-1,2-dichloroethene, chloroform, 1,1-dichloroethene, and toluene have also been detected in the influent water but not at levels that constitute characteristic hazardous waste (DOE 1994a).

The operator immediately shut down the inlet pumps to the pipeline and the RCRA Contingency Plan was implemented. Samples were collected of the influent water and the soil in the area affected by the release. The pumps were de-energized after the leak was discovered and personnel immediately began repairs on the pipe. The system was back in normal operation within six hours of discovery of the leak (DOE 1994a).

PAC Investigations

The surface soil affected by the release was sampled on March 10, 1994, in two locations and analyzed for VOCs and radionuclides. The results for analytes detected above background are summarized in Table 3.23 of the 1999 Annual Update to the HRR (DOE 1999). Americium-241 was detected at activities ranging from 0.86 to 0.92 pCi/g and plutonium-239/240 was detected at activities ranging from 1.5 to 2.5 pCi/g. 2-Butone was detected at concentrations ranging from 4 to 5 μg/kg and tetrachloroethane was detected at concentrations ranging from 2 to 3.3 μg/kg. None of the listed analytes were detected above RFCA Tier II soil ALs (DOE et al. 1996).

Based on historical analyses of influent water and the previous risk calculations, a decision was made on March 10, 1994, to not immediately remove the soil impacted by the release. This decision was validated through risk calculations (CDPHE Methodology [CDPHE 1993]), which resulted in a cancer risk of 10^{-7} to 10^{-8} (DOE 1994a).

No Further Action Recommendation

Based on the results of the soil samples collected at the time of the incident, a contaminant source was not identified. Therefore, in accordance with RFCA (DOE et al. 1996), PAC 900-1312 was recommended for NFA in the 1999 Annual Update to the HRR (DOE 1999).

DOE received approval from CDPHE (the LRA) and EPA of NFA status for PAC 900-1312 on June 23, 2000 (CDPHE and EPA 2000).

Comments

None

References

CDPHE, 1993, Interim Final Policy and Guidance on Risk Assessments for Corrective Action at RCRA Facilities, November.

CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: Annual Update for the Historical Release Report (September 1999), Colorado, June 23.

DOE, 1994a, Seventh Quarterly Update for Historical Release Report, January 1, 1994 to March 31, 1994, Rocky Flats Plant, Golden, Colorado, April.

DOE, 1994b, OU 2 Subsurface IM/IRA Site No. 1, Soil Vapor Extraction Pilot Test Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1313

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Seep Area Near OU 2 Influent Piping

This Final Update to the HRR for PAC 900-1313 consolidates the information in the Ninth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1313 is summarized in this update. The following HRR volumes contain PAC 900-1313 information:

Original Report – Ninth Quarterly (DOE 1994);
Update Report – 1999 Annual (DOE 1999a); and
Update Report – 2000 Annual (DOE 2000).

Dates(s) of Operation or Occurrence

March 18, 1994

Historical Summary

The location of PAC 900-1313 is shown on Figure 23. At approximately 2:00 P.M. on March 18, 1994, 2 - 3 gallons of a glossy liquid substance were noticed collecting in a stagnant pool within the Walnut Creek bed approximately 10 ft downstream from the OU 2 water treatment facility. Samples were collected by both Plant and CDPHE personnel on March 18, 1994. Additional samples were collected by Plant personnel on March 24, April 7, and October 25, 1994. The stagnant appearance of the pool and the glossy sheen observed on the surface were determined to be from anaerobic degradation typical of stagnant pond environments; however, validated results from all but the October sampling event indicated elevated levels of vinyl chloride and other VOCs (see Table 3.24 in the 1999 Annual Update to the HRR [DOE 1999a]). Vinyl chloride is not a COC identified in the influent waters pumped to the OU 2 water treatment facility but may be a degradation product (DOE 1994).

PAC Investigations

Sampling to support characterization of IHSS 192 for possible designation as NFA was conducted in accordance with the SAP for Characterization of Potential No Further Action Sites (DOE 1999b). Two surface sediment and two subsurface sediment samples were collected at the location of the seep to verify the adequacy of the previous response action and to further characterize the potential for residual contaminants. The samples were analyzed for VOCs and radionuclides. Americium-241 was detected at activities ranging from 0.299 to 0.5 pCi/g, plutonium-239/240 was detected at activities ranging from 0.165 to 0.352 pCi/g, and uranium-235 was detected at activities ranging from 0.0247 to 0.107 pCi/g. Acetone was detected at concentrations ranging from nondetection to 69 μg/kg. All potential COCs were less than RFCA Tier I and Tier II soil ALs (DOE et al. 1996). Results of the analyses are summarized

in Tables 3.25 and 3.26 of the 1999 Annual Update to the HRR (DOE 1999a). All of the analytical results are presented in the NFA Justification Document for incorporation into the HRR for PACs NW-1501, NE-1408, NE-1409, 900-1309, 900-1311, 900-1312, and 900-1313 (DOE 1999a).

No Further Action Recommendation

Based on the results of the sediment samples collected, a contaminant source was not identified for IHSS 192. In accordance with RFCA (DOE et al. 1996), IHSS 192 was recommended for NFA in the 1999 Annual Update to the HRR (DOE 1999a).

DOE received approval from CDPHE (the LRA) and EPA of NFA status for IHSS 192 on June 23, 2000 (CDPHE and EPA 2000).

Comments

None

References

CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: Annual Update for the Historical Release Report (September 1999), Colorado, June 23.

DOE, 1994, Ninth Quarterly Update for Historical Release Report, July 1, 1994 to September 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1999a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999b, Sampling and Analysis Plan for Characterization of Potential No Further Action Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

PAC REFERENCE NUMBER: 900-1314

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Solar Evaporation Pond 297B Sludge Release

This Final Update to the HRR for PAC 900-1314 consolidates the information in the Ninth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1314 is summarized in this update. The following HRR volumes contain PAC 900-1314 information:

Original Report – Ninth Quarterly (DOE 1994); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

August 8, 1994

Historical Summary

The location of PAC 900-1314 is shown on Figure 23. During sludge vacuuming operations at SEP 207B South, approximately 1 quart of hazardous waste was released to the soil along the east berm of the pond. The release occurred when a damaged latching mechanism on the side door of the vacuum truck did not properly seal. Operations were immediately suspended, a catch pan was placed under the leaking door, and the collected liquid was vacuumed up and transferred to RCRA-permitted storage tanks. The affected soil was removed and placed into a 55-gallon drum to be managed as a RCRA-regulated hazardous waste.

The material released from the vacuum tanker was SEP water and sludge. EPA waste codes assigned to SEP sludge and water include: F001, F002, F003, F005, F006, F007, F009, and D006.

Samples of the remaining soil were collected to ensure that all contaminated soils were adequately cleaned up (DOE 1994). No documentation was found for the results of any analyses performed on the samples.

PAC Investigations

No investigation was required because the soil was removed.

No Further Action Recommendation

Based on the documented clean-up of the spill immediately after it occurred, PAC 900-1314 was recommended for NFA in the Ninth Quarterly Update to the HRR (DOE 1994).

PAC 900-1314 was addressed through the consultative process in NFA Working Group meetings. DOE received approval from CDPHE (the LRA) and EPA of NFA status for PAC 900-1314 on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1994, Ninth Quarterly Update for Historical Release Report, July 1, 1994 to September 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1315

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Tanker Truck Release on East Patrol Road, North of Spruce Ave.

This Final Update to the HRR for PAC 900-1315 consolidates the information in the Tenth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1315 is summarized in this update. The following HRR volumes contain PAC 900-1315 information:

Original Report – Tenth Quarterly (DOE 1995a);
Update Report – Eleventh Quarterly (DOE 1995b); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

December 13, 1994

Historical Summary

The location of PAC 900-1315 is shown on Figure 23. At approximately 11:40 A.M., December 13, 1994, during transport operations of SEP decant waste water, approximately 10 gallons of hazardous waste was released. A tanker truck was transporting the decant water from the 750 Storage Pad (PAC 700-214 [RCRA Unit 25]) where SEP sludges were separated through a settling process to Building 374 feed storage tanks (Tanks 231 A and B). The vent/blow-down valve was inadvertently left open during the filling process. It was estimated that approximately 10 gallons of hazardous waste was released to the asphalt and soil. The released liquid contacted two sections of asphalt road surface and one section of soil (approximately 1 ft by 100 ft). The release to asphalt was north of Spruce Avenue on the East Patrol Road. Soil was contaminated in an area just northeast of Building 964. Soil samples were collected from an area northeast of Building 964 on December 13, 1994.

Historical records document that the SEPs frequently received untreated process waste as well as treated process waste and contaminated scrap metals. EPA waste codes assigned to the sludge and decant water were determined from historical characterization records and included: F001, F002, F003, F005, F006, F007, F009, and F039.

PAC Investigations

Upon discovery of the release, surveys were conducted. The vent/blow-down valve was closed to prevent further release of the decant water and decontamination procedures began immediately to remediate the spilled liquid both on the tanker and asphalt surfaces. A triple rinse was performed on the asphalt surfaces using a detergent solution followed by Wet-Vac vacuum procedures. The decant liquid spilled on the soil was excavated to a depth of 2 inches (until no

evidence of wetted soil could be seen) and containerized in wooden crates. Approximately 4,560 lbs of soil were removed and managed as RCRA-regulated hazardous waste at RCRA Unit 25 (750 Pad [PAC 700-214]). Two surface soil samples were collected from the area on December 13, 1994. One composite soil sample was collected after the wetted soil was containerized to verify that adequate cleanup was performed and another was collected adjacent to the spill area to determine if any pre-existing contamination was present because of the close proximity of PAC 900-165. In addition, samples of decant water were collected from the tanker. Analytical results are presented in Tables 1 and 2 of the Eleventh Quarterly Update to the HRR (DOE 1995). Based on TCLP analysis, cadmium was detected in soil from 0.014 to 0.047 mg/kg and chromium was detected from 0.005 to 0.008 mg/kg. All VOCs concentrations were less than the detection limit.

No Further Action Recommendation

Because of the condition of the soil (that is, hard packed) and the prompt removal of liquid and wetted soil, hazards to human health or the environment were mitigated. The pH of the liquid released was 9.14. Based on the results of the samples collected of the soil remaining in the wetted area after the contaminated soil was removed, the concentrations of contaminants in the remaining soil were either below the analytical detection limits or equal to the concentrations in the adjacent soil; therefore, no further remedial actions were required.

Based upon cleanup documentation, validated analytical data, and radiological surveys of the area, PAC 900-1315 was recommended for NFA in the Eleventh Quarterly Update to the HRR (DOE 1995b).

DOE received approval from CDPHE (the LRA) and EPA of NFA status for PAC 900-1315 on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995a, Tenth Quarterly Update for Historical Release Report, September 30, 1994 to December 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 1995b, Eleventh Quarterly Update for Historical Release Report, January 1, 1995 to March 31, 1995, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1316

IHSS Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Elevated Chromium (total) Identified during Geotechnical Drilling

This Final Update to the HRR for PAC 900-1316 consolidates the information in the Tenth Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1316 is summarized in this update. The following HRR volumes contain PAC 900-1316 information:

Original Report – Tenth Quarterly (DOE 1995); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

August 24, 1994

Historical Summary

The location of PAC 900-1316 is shown on Figure 23. On August 24, 1994, while conducting geotechnical drilling prior to construction of a storage facility at the Field Operations Yard located south and west of the 904 Pad (PAC 900-213), chromium (total) was detected in the drummed cuttings at 106 mg/kg and 120 mg/kg, indicating the chromium concentrations may have been greater than the RCRA D007 characteristic hazardous waste value.

Historically, the Field Operations Yard (formerly called the contractor's yard) was used to store miscellaneous equipment, discard scrap metal, stockpile gravel for construction use, and deposit spoils from excavation projects.

PAC Investigations

Upon receipt of the data, further investigation was initiated to identify the potential source of the chromium anomaly. Additional sampling was conducted on September 28, 1994, from six study pits excavated to a depth of 6 ft along the eastern perimeter of the proposed building foundation. Analytical results indicated chromium levels below or at background. On October 19, 1994, one additional borehole was drilled approximately 18 ft northwest of the southwestern corner of the proposed building. Analytical results from this borehole detected chromium (total) at 138 ppm and 347 ppm from two depth-integrated composite sample intervals collected between 6 and 8 ft and 10½ and 14 ft, respectively. VOCs were not detected in any of the sampling events (DOE 1995).

A risk assessment screen (RAS) using all available data was completed on January 17, 1995. Analytical data are included in Tables 1, 2, and 3 of the RAS, which is provided as a supplementary attachment to the PAC 900-1316 write-up in the Tenth Quarterly Update to the HRR (DOE 1995).

TCLP analysis for metals collected from the area of the highest chromium concentration (347 ppm at 10½ - 14 ft) indicated that soil from the chromium anomaly did not readily leach and the anomaly did not pose an unreasonable risk to human health or the environment (DOE 1995).

No Further Action Recommendation

Based on calculated risk results from the RAS completed January 17, 1995, and TCLP analytical data indicating that the chromium did not readily leach, PAC 900-1316 was recommended for NFA in the Tenth Quarterly Update to the HRR (DOE 1995).

DOE received approval from CDPHE and EPA (the LRA) of NFA status for PAC 900-1316 on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995, Tenth Quarterly Update for Historical Release Report, September 30, 1994 to December 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1317

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Soil Release from Wooden Crate in 964 Laydown Yard

This Final Update to the HRR for PAC 900-1317 consolidates the information in the Eleventh Quarterly HRR Update and subsequent updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1317 is summarized in this update. The following HRR volumes contain PAC 900-1317 information:

Original Report – Eleventh Quarterly (DOE 1995); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

January 18, 1995

Historical Summary

The location of PAC 900-1317 is shown on Figure 23. At approximately 6:00 P.M. on January 18, 1995, carpenters were attempting to reattach a lid from a wooden half crate located south of Building 964 and within PAC 900-176. The lid was believed to have blown off the previous day during a period of high winds. While working on the crate, one of the structural sides fell apart, inadvertently exposing the plastic liner and releasing approximately 1 lb of coarse gravel and residual soil material to the ground. The only information available regarding the origin of the crate contents were the words “oil and soil” handwritten on the plastic liner. The half crate associated with this release and another half crate staged adjacent to it were apparently placed within a RCA because of the unknown nature of the contents as part of an accelerated cleanup project. There were no identifying markings on either crate except for the dates of manufacture of 1989 and 1990. Approximately 1 lb of coarse gravel (<1/2 inch diameter) and residual soil was released to the ground (DOE 1995).

At the time the release occurred, IHSS 176 (the 964 Laydown Yard) was being investigated as part of OU 10.

PAC Investigations

Once the release was identified, a tarp was placed over the open crate and weighed down with rocks until the spilled soil and gravel could be placed back into the crate. On January 19, 1995, the spilled material was cleaned up and samples were collected from the area of the release to complete a waste determination and provide cleanup verification. Additional collection of samples from the crate was required on January 24, 1995, because an insufficient amount of actual soil was collected in the first sampling event (the release was comprised of mostly gravel) (DOE 1995).

Analytical results for the soil and gravel in the area of the release indicated VOCs such as acetone and methyl ethyl ketone (MEK) were detected in the low ppb ranges for samples collected in the spill area but not detected in samples collected from within the crates. These organic compounds were detected well below the practical quantitation limits (PQLs) of the laboratory equipment and are commonly seen as laboratory contaminants. Radiological analyses indicated low-level radiological contamination (9.1 pCi/g plutonium-239/240) (DOE 1995).

A RCRA 90-day storage area was immediately established at the release site until a waste determination could be made. On March 1, 1995, a waste determination concluded that the released material was nonhazardous; however, because of low-level radiological contamination, the crates were scheduled to be re-packaged as nonhazardous LLW and transferred to Building 664 for storage (DOE 1995).

No Further Action Recommendation

Based on the small amount of material (1 lb or less) released to the environment, the immediate cleanup response, analytical data indicating the spilled material was nonhazardous, and that IHSS 176 was then under investigation for VOC, inorganic, and radiological contamination, PAC 900-1317 was recommended for NFA in the Eleventh Quarterly Update to the HRR (DOE 1995). DOE received approval from CDPHE (the LRA) and EPA of NFA status for PAC 900-1317 on September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1995, Eleventh Quarterly Update for Historical Release Report, January 1, 1995 to March 31, 1995, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PAC REFERENCE NUMBER: 900-1318

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	Not Applicable
Unit Name:	Release of F001 Listed Waste Water to Soil

This Final Update to the HRR for PAC 900-1318 consolidates the information in the 1997 HRR and subsequent HRR updates with information gained through the disposition of this PAC in accordance with the RFCA accelerated action process. The disposition of PAC 900-1318 is summarized in this update. The following HRR volumes contain PAC 900-1318 information:

Original Report – 1997 Annual (DOE 1997);
Update Report – 1998 Annual (DOE 1998);
Update Report – 2000 Annual (DOE 2000);
Update Report – 2001 Annual (DOE 2001); and
Update Report – 2002 Annual (DOE 2002).

Dates(s) of Operation or Occurrence

October 7, 1996

Historical Summary

The location of PAC 900-1318 is shown on Figure 23. On October 7, 1996, at approximately 10:00 A.M., workers discovered a small amount of waste water leaking from a level-indicating valve associated with the SW059 collection tank. The valve was positioned on the northern side of the tank and the estimated volume of water (which contained F001-listed RCRA constituents) reaching the soil was approximately 1 pint. The fitting was tightened immediately which stopped the leak and the area was monitored for VOCs during remediation of the soil (DOE 1996). Historical characterization of the SW059 seep water indicated elevated levels of the following VOCs: carbon tetrachloride, chloroform, tetrachloroethane, and trichloroethene (DOE 2000). SW059 no longer exists because of Functional Channel 4.

PAC Investigations

The spill area was contained after the area was monitored for VOCs. Approximately one 55-gallon drum of soil was removed and transported to a RCRA Hazardous Waste Management Unit (RCRA Unit No.18.03) after radiological screening was performed. A surface soil confirmation sample was collected to verify that the spill was cleaned up and a RCRA CPIR was filed (DOE 1996). Sample results confirmed that no current or potential source of contamination existed at the spill location. Results are tabulated in CPIR Report 1996-0011, which is provided as an attachment to the PAC 900-1318 narrative in the 2000 Annual Update to the HRR (DOE 2000). Results indicated that while acetone (5 μg/kg), 2-butanone (3 μg/kg) and tetrachloroethane (2 μg/kg) were detected, all were estimated and acetone and 2-butanone were also found in laboratory blanks.

No Further Action Recommendation

Based on the small amount of material released to the environment, the immediate remedial response, and the cleanup confirmation sample showing that the release was adequately cleaned up, PAC 900-1318 was proposed for NFA consistent with RFCA (DOE et al. 1996) in the 2000 Annual Update to the HRR (DOE 2000).

The PAC 900-1318 NFA was addressed through the consultative process in NFA Working Group meetings on October 14, 2001 and on November 14, 2001. Based on these discussions, agreement was reached that an NFA was justified for PAC 900-1318, because no current or potential source of contamination was associated with this PAC. An NFA was verbally agreed to in the November 14, 2001 meeting, and formally approved by CDPHE (the LRA) and EPA in a letter dated February 14, 2002 (CDPHE and EPA 2002).

Comments

This PAC was inadvertently numbered as 900-1307 in the 1997 Annual Update to the HRR (DOE 1997). The PAC reference number was corrected as PAC 900-1318 in the 1998 Annual Update to the HRR (DOE 1998).

The location where the spill occurred was physically removed during the installation of the Mound Plume Treatment System collection trench in 1997.

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.

DOE, 1996, Occurrence Report (RFO-KHLL-ENVOPS-1996-0011), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

UBCs

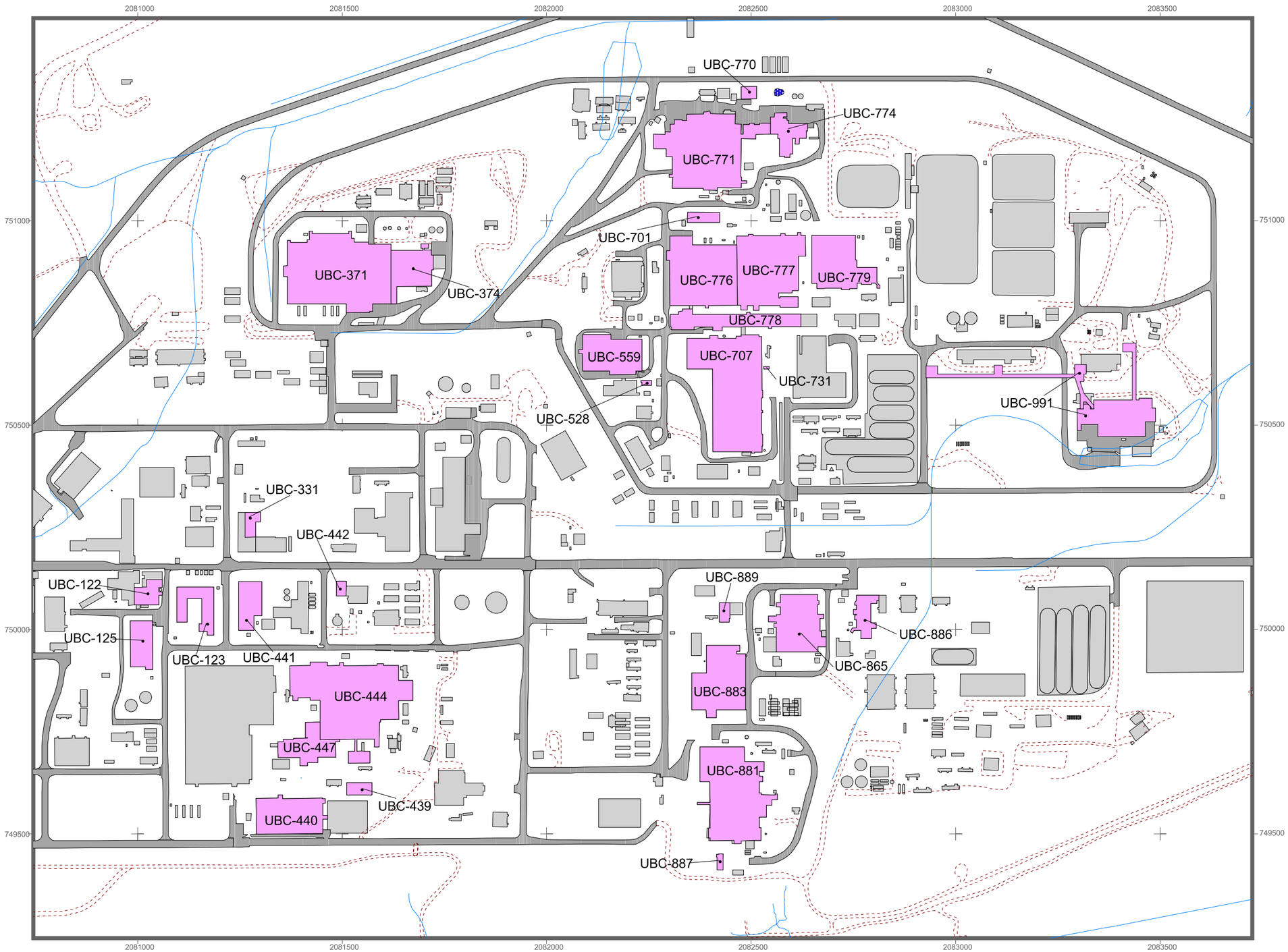

Figure 24
HRR UBCs

KEY

- Stream
- Dirt road
- UBC
- Lake
- Asphalt
- Building

N
W E
S

400 0 400 Feet

Scale = 1: 6000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\
hrr_ubcs.apr

PAC REFERENCE NUMBER: UBC 122

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	100-1
Unit Name:	Medical Facility

This Final Update to the HRR for UBC 122 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. This Final Update to the HRR for UBC 122 summarizes the disposition of the UBC. The following HRR volume contains UBC 122 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1953 to 2003

Historical Summary

The location of UBC 122 is shown on Figure 24. Building 122 housed the on-site medical facilities and the occupational health and internal dosimetry organizations. Emergency medical services, diagnosis, decontamination, first aid, x-ray, minor surgical treatment, and ambulatory activities were conducted in this building. The building also contained clinical facilities to support routine employee and subcontractor physical examinations. Lung counting, to measure radioactive material in the lung, was also conducted. The facility contained three general areas: administration, internal dosimetry, and medical/health.

Building 122 went into service in 1953. Major additions were made in 1967, 1969, and 1989. Other smaller additions and internal modifications were also made during the building's service life. The building was demolished during 2004 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2004a). The demolition included the removal of the building slab and all in-ground waste lines and other building components.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. However, very few chemicals were used in Building 122, and only small volumes of chemical wastes were generated (DOE 2004b). Chemicals used in Building 122 were principally related to development of x-ray film (for example, fixers and developers) and decontamination of workers (for example, water, Clorox, soap, and hydrogen peroxide). Fixers and developers consisted of inorganic chemicals, including silver. Developers and associated water were discharged into the sanitary sewer system. Decontamination fluids originally drained

to Tank T-1, an 800-gallon stainless steel storage tank. When the tank was full, waste was pumped out to a tank truck and then discharged to the OPWL system. Waste included trace radionuclides, bleach, soap, blood, and hydrogen peroxide. The tank was removed in January 1984, after the building was connected to the NPWL system. Tank T-1 is addressed under IHSS 000-121 in this Final Update to the HRR.

UBC Investigation

UBC 122 was characterized as part of IHSS Group 100-1 (October 12 to 14, 2004) in accordance with IASAP Addendum #IA-04-04 (DOE 2003). Surface and subsurface soil samples were collected from six sampling locations under the Building 122 slab (DOE 2004b). COCs included radionuclides and metals. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), with one exception. The arsenic concentration at sampling location BT39-007 (at 2.5 – 4.5 ft bgs) was 25.0 mg/kg, and the WRW soil AL is 22.2 mg/kg. Based on the SSRS, no soil removal from under the building was required. The area is not susceptible to significant erosion. Other metal concentrations were less than 10 percent of the WRW soil ALs. The highest uranium activities above background, which occurred in subsurface soil, are as follows:

- Uranium-234 was detected at 4.28 pCi/g where the WRW AL is 300 pCi/g.
- Uranium-235 was detected at 0.25 pCi/g where the WRW AL is 8 pCi/g.
- Uranium-238 was detected at 4.28 pCi/g where the WRW AL is 351 pCi/g.

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 122 based on the following:

- Surface soil analytical results were less than RFCA WRW soil ALs.
- Subsurface soil analytical results were all less than WRW soil ALs, with one exception.
- Results of the SSRS did not indicate additional action was necessary.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 100-1 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 122 on December 13, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 100-1, December 13.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-04-04, IHSS Group 100-1, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, Final Project Closeout Report for Buildings 122 and 122S, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004b, Data Summary Report for IHSS Group 100-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 123

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	100-4
Unit Name:	Health Physics Laboratory

This Final Update to the HRR for UBC 123 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 123 is summarized in this update. The following HRR volumes contain UBC 123 information:

Original Report – 1992 (DOE 1992);
Update Report – 1998 Annual (DOE 1998a);
Update Report – 2001 Annual (DOE 2001a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1953 to 1998

Historical Summary

The location of UBC 123 is shown on Figure 24. Building 123 was located on Central Avenue, between Third and Fourth Streets. The original building was constructed in 1953, with additions completed in 1968, 1972, and 1974. Building 123 housed the Site's Radiological Health Physics Laboratory, where water, biological materials, soil, air, and filter samples were analyzed for the presence of plutonium; americium; uranium; alpha, beta, and gamma radiation; tritium; beryllium; and organic constituents. In addition, personnel radiation dosimetry badges were counted and repaired in Building 123. Radioactive sources, including cesium, were stored in a below-grade concrete pit. Low-level liquid and chemical wastes were generated and transferred to on-site treatment systems through the process waste transfer and collection system (DOE 1992).

Portions of RCRA Unit 40, including sumps and pipes, were part of UBC 123. Some of the underground process waste lines associated with Building 123 were abandoned in place and plugged with cement in 1982 (that is, OPWL), while others remained in active use until laboratory operations were suspended in preparation for facility decommissioning (for example, NPWL).

Building 123 was decommissioned in 1998 in accordance with the PAM for the Decommissioning of Building 123 (DOE 1998b). At that time, the building structure and aboveground portions of the process waste system were removed, and the floor slab was sampled to assess areas of potential contamination. Contaminated portions of the slab that could not be decontaminated to meet the applicable unrestricted release criteria were encapsulated with epoxy paint to fix removable contamination and covered with steel plate. In addition, the underground sumps, pipe chases, and the process waste lines that ran from Room 156, through Rooms 157

and 158, to Valve Vault 18, were clean closed in place in accordance with the Closure Plan for the Building 123 Components of RCRA Unit 40 (DOE 1997). Partial closure was certified by a Colorado-registered professional engineer on May 28, 1998 (DOE 1998c). A contaminated sump, located in Room 125, was removed during decommissioning (DOE 1998d). Final disposition of the building slab, underground sumps, process waste lines (including the abandoned lines), and source pits was deferred to the ER Program.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 123 was characterized during 2000 and again during 2001 (DOE 2001b, 2001c, 2003b). During these two campaigns, 66 surface and subsurface locations were sampled. Soil samples were analyzed for radionuclides, metals, VOCs, and SVOCs. Analytical results indicated the following:

- Radionuclides and metals were detected at concentrations greater than background means plus two standard deviations;
- Lead was detected at a concentration greater than the RFCA Tier I soil AL (DOE et al. 1996) at one location in subsurface soil;
- Arsenic exceeding the RFCA Tier II soil AL (DOE et al. 1996) but below background was detected at one location in surface soil;
- Beryllium exceeding the RFCA Tier II soil AL (DOE et al. 1996) was detected at one location in surface soil;
- Methylene chloride was detected in subsurface soil at levels slightly above the RFCA Tier II soil AL (DOE et al. 1996); and
- At one location in surface soil, the SORs of measured concentrations of 2-4 dinitrotoluene and n-nitroso-di-n-propylamine compared to their respective Tier I soil ALs exceeded one.

A RFCA accelerated action (DOE et al. 1996) was conducted from February 5, 2002 through April 19, 2002 in accordance with ER RSOP Notification #02-01 (DOE 2002). Based on the adequacy of the previous sampling campaigns (DOE 2001b, DOE 1998c), additional characterization of UBC 123 was not conducted. During this time, the Building 123 slab was removed, as were below-grade features, including the building footers, source pits, sumps, process waste lines, and manholes. In addition, soil contaminated with lead and SVOCs was removed, and confirmation samples were collected from 29 surface and subsurface locations. Confirmation sampling results indicated all contaminant activities and concentrations were less than RFCA Tier I soil ALs (DOE et al. 1996) and proposed RFCA WRW soil ALs (DOE et al. 2002), which were subsequently approved and adopted (DOE et al. 2003). The highest residual radionuclide activities above background are listed below.

- Americium-241 – 0.19 pCi/g

- Plutonium-239/240 – 0.17 pCi/g
- Uranium-235 – 0.2 pCi/g
- Uranium-238 – 2.14 pCi/g

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 123 based on the following:

- Residual surface soil activities and concentrations were all less than RFACA WRW soil ALs.
- Residual subsurface soil concentrations were all less than WRW soil ALs.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 100-4 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 123 on April 22, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 100-4, April 22.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1997, Closure Plan for the Building 123 Components of RCRA Unit 40, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 1998a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1998b, Proposed Action Memorandum for the Decommissioning of Building 123, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 1998c, Closure Certification for the Building 123 Components of RCRA Unit 40, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 1998d, Final Close-Out Report, Building 123 Decommissioning Project, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Final Data Summary Report for the Characterization of UBCs 123 and 886, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001c, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 100-4, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2002, Proposed Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 125

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	100-2
Unit Name:	Standards Laboratory

This Final Update to the HRR for UBC 125 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 125 is summarized in this update. The following HRR volumes contain UBC 125 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002a).

Date(s) of Operation or Occurrence

1963 to 2002

Historical Summary

The location of UBC 125 is shown on Figure 24. Building 125 housed the Standards Laboratories as well as offices for Metrology management personnel. The Standards Laboratories provided analytical standards for the on-site laboratories and provided calibration and maintenance of metrology standards for Measurement and Test Equipment (M&TE) used at the Site. After calibration, M&TE was returned to the appropriate user groups. Building 125 was demolished during September 2002 as a Type 1 facility.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

The only RCRA-regulated hazardous waste routinely produced in Building 125 consisted of spent lithium, nickel-cadmium, and mercury batteries, which were used in the electrical calibration process and accumulated in a 90-day accumulation area. In addition, used fluorescent bulbs, incandescent bulbs, and lead-acid batteries were accumulated. Fluorescent bulbs and incandescent bulbs were removed by utilities and maintenance workers and taken to an approved 90-day accumulation area. Lead-acid batteries were collected and sent to Waste Operations PU&D for recycling. Infrequent, nonroutine RCRA hazardous wastes that were generated included waste mercury and wipes contaminated with mercury (from the Vacuum, Moisture, and Pressure Laboratories), and waste Freon generated by cleaning the inside of pressure gages (from the Pressure Laboratory).

Interviews with individuals who worked in the facility revealed that several small mercury spills occurred within Building 125. These spills were localized in the vicinity of the work areas, and

all were immediately cleaned up (within 2 hours) to the point that residual mercury was not visible. In some instances, the Fire Department was called to assist with the cleanup. In several cases, the releases did not make it to the floor (that is, the mercury was released in cabinets or on countertops). All spills were less than one half of the RQ of 1 lb.

UBC Investigation

During building D&D (reconnaissance-level) characterization, a Jerome Model 431 Mercury Vapor Analyzer was use to analyze for potential residual mercury vapors (in the ppb range) from the areas identified during the interviews as having had a mercury release (DOE 2002b). Readings at exact locations of known mercury releases were 0 milligrams per cubic meter (mg/m^3) (where 1 mg/m^3 mercury vapor equals 0.122 ppm). The readings obtained above zero were at or near the instrument's sensitivity limit of 0.003 mg/m^3, and those readings were only accurate to +/-5 percent (based upon 0.100 mg/m^3). Thus, all readings were essentially zero.

With regard to the releases of mercury within Building 125, the chemical and physical properties of mercury indicate it would not likely have migrated beyond the tile seams, which were in very good condition and did not appear to have been compromised. In the unlikely event that mercury could have migrated through the tile flooring, it would have had to penetrate the underlying mastic before reaching the concrete slab. Because mercury does not absorb into concrete, nor does it cut or penetrate concrete media, the potential for UBC at Building 125 is remote.

No Further Action Recommendation

In accordance with RFCA Attachment 6, UBC 125 was recommended for NFAA (DOE 2002a). Based on the evidence presented above, the potential for mercury contamination in under-building soil is low. Mercury spills occurred within the building and were promptly cleaned up, and the probability of mercury migrating to soil under the building slab was very low. The NFAA designation for UBC 125 was approved by CDPHE (the LRA) on April 2, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, and T. Rehder, EPA Region VIII, RE: No Further Action Justification for Bldg. 125 UBC, April 2.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Reconnaissance Level Characterization Report for Buildings 125, 763, and Trailer 900C, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

PAC REFERENCE NUMBER: UBC 331

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	300-2
Unit Name:	Filter Test Facility

This Final Update to the HRR for UBC 331 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 331 is summarized in this Final Update to the HRR. The following HRR volume contains UBC 331 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1953 to 2005

Historical Summary

The location of UBC 331 is shown on Figure 24. Building 331, originally constructed in 1953, was designed and used as a warehouse. When the building became too small for parts storage, a new warehouse was constructed at another Site location, and Building 331 then became the Site maintenance garage. Additions to the structure, including the Fire Department structure (the east-west wing of Building 331 south of PAC 300-134[S]), were completed in 1967.

At one time, the northeastern corner of the vehicle maintenance garage (the north-south section of Building 331 west of PAC 300-134[S]) housed technical staff and a uranium R&D laboratory. Rolling of enriched uranium foil was conducted there in 1964. This area may also have been used for the depleted uranium coating studies. After Building 865 came on line in 1970, the area was converted for the development of remote handling techniques such as robotics and remote manipulator arms.

Building 331 was demolished during 2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2005). The building slab and drain lines were completely removed.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 331 was characterized as part of IHSS Group 300-2 (August 16, 2004 to September 16, 2004) in accordance with IASAP Addendum #IA-03-08 (DOE 2003). Surface and subsurface

soil samples were collected from 15 sampling locations. COCs included radionuclides, metals, VOCs and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE 2004, DOE et al. 2003). The highest radionuclide activities above background, which occurred in surface soil, are listed below.

- Americium-241 – 0.2 pCi/g
- Plutonium-239/240 – 2.4 pCi/g
- Uranium-234 – 5.7 pCi/g
- Uranium-235 – 0.2 pCi/g
- Uranium-238 – 5.7 pCi/g

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 331 based on the following:

- Surface soil analytical results were all less than RFCA WRW soil ALs.
- Subsurface soil analytical results were all less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 300-2 (DOE 2004) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 331 on December 17, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 300-2, December 17.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-08, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Data Summary Report for IHSS Group 300-2, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005, Final Closeout Report for Building 331, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 371

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	300-3
Unit Name:	Plutonium Recovery

This Final Update to the HRR for UBC 371 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 371 is summarized in this update. The following HRR volumes contain UBC 371 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1981 to 2004

Historical Summary

The location of UBC 371 is shown on Figure 24. Building 371 was the Plutonium Recovery Facility and later became the Interim Plutonium Storage/Repackaging Facility. The building went into operation in 1981 with a mission to replace plutonium residue recovery and waste operations in Buildings 771 and 774, recover plutonium from weapons returned from the stockpile, and provide storage of plutonium and plutonium-bearing materials. Plutonium recovery operations in Building 371 were terminated in 1988. After 1988, the building was used for storage of plutonium and uranium metals, oxides, residues, TRU wastes, LLW, and RCRA-regulated mixed waste and residues. The building was also used for characterization, treatment and repackaging activities to support final disposition of special nuclear material (SNM) and TRU waste from the Site.

Materials entering the plutonium recovery process were received as pieces of impure plutonium metal, plutonium oxide, various compounds containing plutonium, and plutonium-contaminated residues. The plutonium content of these materials ranged from a few percent to almost pure plutonium metal. The recovery processes reduced the plutonium and americium content of the residues to levels below economic discard limits.

Plutonium recovery operations used two different systems to separate high-purity plutonium metal from production-generated wastes. Pyrochemical processing used furnaces and molten salts to separate high-purity plutonium in a dry process. Pyrochemical processing was very efficient, but could not be used with all types of plutonium-bearing materials. Aqueous processing used a series of wet and dry chemical steps to separate high-purity plutonium from production-generated wastes.

Building 371 originally had two incinerators and their afterburners located in separate concrete canyons that were designed to burn most of the combustible wastes generated by the plutonium recovery operations. One incinerator was for high-specific activity waste, and the other for

low-specific activity waste. Because of the size and shape of the incinerators, they spanned multiple levels of Building 371. These two incinerators were stripped out in the mid 1980s to make way for the installation of the Plutonium Recovery Operations Verification Exercise gloveboxes and plutonium processing equipment.

Because the metal recovery process used large quantities of nitric acid, the building also contained a nitric acid recovery process. The process consisted of tanks, gloveboxes, an evaporator, and distillation columns.

The Building 371 Caustic Waste Treatment System (CWTS), located in the subbasement of Building 371, processed both high- and low-level plutonium caustic and acidic waste solutions to meet the Building 374 waste acceptance criteria. The CWTS process provided for the treatment of RCRA-regulated hazardous waste and aqueous waste streams.

There were four plutonium analytical laboratories in the Building 371/374 Complex to support environmental, safeguards, and other regulatory requirements. They included the liquids laboratory, standards laboratory, analytical laboratory, and liquid waste sampling laboratory. Building 371 also housed plutonium analytical laboratories and a chemical standards laboratory, which supported operations throughout the Site.

The shipping, receiving, storing, and retrieval of SNM occurred daily in Building 371 operations. The receiving and shipping of on-site and off-site waste, residue and SNM occurred from Dock 18T of the Building 371/374 Complex Support Facility. Two additional shipping and receiving docks were in the Support Facility on the southeastern corner. SNM was stored in vaults or vault-type rooms in Building 371. The Central Storage Vault (CSV) extended through the subbasement and basement levels. The CSV was designed to be ventilated by a nitrogen atmosphere and accessed by the remotely controlled Stacker-Retriever (S-R). The S-R moved materials between the shipping and receiving areas, plutonium storage vault, and plutonium recovery processing areas. SNM received in liquid form was stored in the CWTS tanks.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. Several documented releases of materials occurred inside Building 371. Two releases, including approximately 55 gallons of wastewater released on the floor of Room 2217 on August 2, 1989, and approximately 55 gallons of dilute sulfuric acid solution released on the floor of Room 3811 on December 20, 1989, resulted in the filing of RCRA CPIRs (DOE 1992).

Building 371 was demolished during 2005 as a Type 3 facility in accordance with an approved DOP and as documented in the D&D Closeout Report (DOE 2005). The sub-basement slab, walls and ceiling, and the basement slab and walls were not removed and remain in place but are located more than 3 ft below final grade.

UBC Investigation

UBC 371 was characterized for the first time as part of IHSS Groups 300-3 and 300-4 (February 20, 2003 to April 19, 2003) in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Subsurface soil samples were collected from 28 UBC 371 sampling locations (at ground surface under the slab, below the basement, and below the subbasement)

(DOE 2003b). In addition, surface and subsurface samples were collected from three sampling locations associated with Building 371 foundation drains. COCs included radionuclides, metals, VOCs and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA soil ALs (DOE et al. 2003). The highest radionuclide activities above background within UBC 371 and UBC 374 are listed below.

- Americium-241 – 0.21 pCi/g
- Plutonium-239/240 – 0.18 pCi/g
- Uranium-235 – 0.37 pCi/g
- Uranium-238 – 5.52 pCi/g

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 371 based on the following:

- Subsurface soil analytical results were all less than RFCA WRW soil ALs. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Groups 300-3 and 300-4 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 371 on August 21, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Groups 300-3 and 300-4, August 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Groups 300-3 and 300-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Final Closeout Report for Buildings 371 and 374, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 374

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	300-4
Unit Name:	Waste Treatment Facility

This Final Update to the HRR for UBC 374 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 374 is summarized in this update. The following HRR volumes contain UBC 374 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1978 to 2004

Historical Summary

The location of UBC 374 is shown on Figure 24. Building 374 began operation in the late 1970s and housed several liquid process waste treatment systems for wastes generated from production facilities throughout RFETS. The systems included a number of ancillary storage tanks and gloveboxes and most notably filtration systems and an evaporator to remove radionuclides and volume reduce aqueous wastes. Several documented releases of materials occurred within the building:

- A solution of 40 percent dissolved nitrate salt overflowed Tank D-883-B in Room 3809 on June 15, 1989, and ran into the process waste floor drains.
- Process solution filled a glovebox in Room 3801, pushed out a window of the box, and approximately 50 gallons spilled onto the floor on November 23, 1989.
- Approximately 100 gallons of process waste solution leaked from a pump in Room 3810 and drained through a process floor drain on November 29, 1989.
- Approximately 500 gallons of pH 12.6 solution of hydroxide salt leaked from a tank in Room 4101; some ran through cracks in the concrete floor to a hallway beneath the room.
- Operator error led to a spill of brine concentrate in Room 3809; the spill was rinsed down the process drains.
- Due to an inoperative floor drain, 150 gallons of brine concentrate spilled onto the floor of Room 3810 (DOE 1992).

Soil and/or groundwater beneath the building may have become contaminated because of such releases. Building drains, sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

Building 374 was demolished in early 2005 in accordance with an approved DOP and as documented in the D&D Closeout Report (DOE 2005). The contaminated slab remains in place, but it is located more than 3 ft below final grade.

UBC Investigation

UBC 374 was characterized as part of IHSS Groups 300-3 and 300-4 (February 20, 2003 to April 19, 2003) in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Surface and subsurface soil samples were collected from 7 UBC 374 sampling locations (5 under the slab, 1 adjacent to the NPWL, and 1 adjacent to the foundation drain) (DOE 2003b). COCs included radionuclides, metals, VOCs and SVOCs. Analytical results indicated contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003) with one exception. The arsenic concentration at sampling location BZ45-003 at 0.0 - 0.5 ft below the building slab was 23.9 mg/kg, and the AL is 22.2 mg/kg. Based on the SSRS, no accelerated action soil removal was required. The highest radionuclide activities above background within UBC 371 and UBC 374 are listed below.

- Americium-241 – 0.21 pCi/g
- Plutonium-239/240 – 0.18 pCi/g
- Uranium-235 – 0.37 pCi/g
- Uranium-238 – 5.52 pCi/g

No Further Action Recommendation

In accordance with RFCA an NFAA was justified for UBC 374 based on the following:

- Surface and subsurface soil analytical results were all less than RFCA WRW soil ALs, with one subsurface exception noted above.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Groups 300-3 and 300-4 (DOE 2003b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for UBC 374 on August 21, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Groups 300-3 and 300-4, August 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Groups 300-3 and 300-4, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005, Final Closeout Report for Buildings 371 and 374, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 439

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-1
Unit Name:	Radiological Survey

This Final Update to the HRR for UBC 439 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 439 is summarized in this update. The following HRR volumes contain UBC 439 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1970 to 2004

Historical Summary

The location of UBC 439 is shown on Figure 24. Building 439, the Radiological Survey building, was a sheet metal structure built on an at-grade concrete slab approximately 100 ft by 50 ft. The structure was a maintenance building, and was later used for PU&D operations. Building 439 was used to receive, process, and ship surplus equipment and materials released by Site custodians, and housed small portable counters to monitor alpha, beta and gamma radiation. Sources were controlled through Site accountability procedures. Smear samples collected throughout RFETS were brought to Building 439 for counting. Prior to demolition, the building was used as the break area for Building 440 operations personnel. Building 439 was demolished in 2005 as a Type 1 facility.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills, may have led to under building contamination. Building floors and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. However, there were no process lines or foundation drains under the Building 439. There was one floor drain connected to the sanitary sewer system. The sewer line exited the building near the northwestern corner.

UBC Investigation

UBC 439 was characterized as part of IHSS Group 400-1 (June 7 and 8, 2004) in accordance with IASAP Addendum #IA-04-08 (DOE 2003). Surface and subsurface soil samples were collected from 5 sampling locations under the building slab (DOE 2004b). Because of refusal, none of the subsurface sampling intervals were completed to 2.5 ft. However, based on analytical data resampling was not required. COCs included radionuclides, metals and VOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW

soil ALs (DOE et al. 2003). The highest radionuclide activities above background, which occurred in surface soil, are listed below.

- Uranium – 4.8 pCi/g
- Uranium-235 – 2.7 pCi/g
- Uranium-238 – 4.8 pCi/g

No Further Action Recommendation

In accordance with RFCA an NFAA was justified for UBC 439 based on the following:

- Surface and subsurface soil analytical results were less than RFCA WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 400-1 (DOE 2004b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the NFAA status for UBC 439 on August 23, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 400-1, August 23.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-04-08, IHSS Group 400-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 400-1, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 440

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-2
Unit Name:	Modification Center

This Final Update to the HRR for UBC 440 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 440 is summarized in this update. The following HRR volumes contain UBC 440 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Late 1960s to 2004

Historical Summary

The location of UBC 440 is shown on Figure 24. Building 440 was constructed in the late 1960s for production control and shipping final assembly products and wastes for disposal. SNM and depleted uranium were staged and shipped out of this building by truck and railcar. For a brief period, Building 440 was used as a general warehouse and storage area for non-nuclear construction and fabrication materials.

In the early 1970s, Building 440 was used to modify and repair vehicles to meet specific DOE requirements for transport of SNM and radioactive wastes. Building 440 was expanded three times to include a railcar bay, high bay, paint booths, storage areas, and locker rooms in support of transport modification efforts. Armor, communication equipment, and comfort features were added to transport vehicles. Vehicle modification work in Building 440 continued until 1994, when the mission was transferred to another DOE facility. Most of the original equipment associated with this activity was shipped to other DOE plants.

Production processes in Building 440 included various welding, painting, machining, pipefitting, metalworking, and electrical work used to modify transports. Modification efforts focused on developing entry deterrents. Paint booths were used to coat fabricated, non-nuclear components and the transports. The gantry and 5-ton cranes were used to move materials associated with the transport modification effort.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

Building 440 was demolished during FY2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2005). A portion of the building slab was left in place.

UBC Investigation

UBC 440 was characterized as part of IHSS Group 400-2 (August 14, 2004 to August 20, 2004) in accordance with IASAP Addendum #IA-04-01 (DOE 2003). Surface and subsurface soil samples were collected from 20 sampling locations (10 under the Building 440 slab and 10 adjacent to the slab) (DOE 2004b). COCs included radionuclides, metals and VOCs. Analytical results indicated contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), with one exception. The arsenic concentration at sampling location BW34-042 (at 0.5 – 2.5 ft bgs) was 28 mg/kg, and the WRW soil AL is 22.2 mg/kg. The highest radionuclide activities above background are listed below.

- Americium-241 – 0.07 pCi/g
- Plutonium-239/240 – 0.07 pCi/g
- Uranium-234 – 4.9 pCi/g
- Uranium-235 – 0.27 pCi/g
- Uranium-238 – 4.9 pCi/g

No Further Action Recommendation

In accordance with RFCA an NFAA was justified for UBC 440 based on the following:

- Surface soil analytical results were less than RFCA WRW soil ALs.
- Subsurface soil analytical results were less than WRW soil ALs, with one exception.
- Results of the SSRS indicated that additional action was not necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 400-2 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 440 on September 27, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 400-2, September 27.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY 2003 Addendum #IA-04-01, IHSS Groups 400-2, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 400-2, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Final Closeout Report for Building 440, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 441

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-8
Unit Name:	Office Building

This Final Update to the HRR for UBC 441 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 441 is summarized in this update. The following HRR volumes contain UBC 441 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 2002

Historical Summary

The location of UBC 441 is shown on Figure 24. Building 441 was located in the northwestern portion of the 400 Area and was placed into service in 1952. The building footprint was approximately 17,075 ft^2. The building was originally used as a laboratory, and was converted into an office building in 1966. The building was demolished during 2003 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2004b). Because the footprint of the building overlapped PAC 400-122 (OPWL Tanks T-2 and T-3), the soil beneath the building was potentially affected by nitrates, volatiles, PCBs, and radioactive contaminants. Details on the tanks are presented in the PAC 400-122 writeup.

UBC Investigation

UBC 441 was characterized as part of the IHSS Group 400-8 accelerated action (April 7, 2003 to December 22, 2003) in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Surface and subsurface soil samples were collected from 11 sampling locations under the Building 441 slab (DOE 2004c). COCs included radionuclides, metals, VOCs, SVOCs, and nitrates. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). One location (BW38-003) has a subsurface lead concentration of 942 mg/kg, and the AL is 1,000 mg/kg. The next highest lead concentration was 100 mg/kg. The highest radionuclide activities above background are listed below.

- Uranium-234 – 4.6 pCi/g
- Uranium-235 – 0.27 pCi/g
- Uranium-238 – 4.6 pCi/g

In accordance with ER RSOP Notification #03-06 (DOE 2003), the Building 441 slab, condensate return sump, footers, and caissons were removed. The remaining contents of Tanks T-2 and T-3 and the tanks were sampled, removed, and disposed. The OPWL under the building were tapped, drained, and removed. OPWL manholes were removed and the ends of the remaining pipelines were grouted. One sanitary sewer system manhole was removed to 4 ft below grade. The remaining base of the manhole and its pipe connections were grouted.

During the accelerated action for IHSS Group 400-8, that included Building 441 slab removal, mercury was noted within the sanitary sewer and process waste lines. The mercury in the sanitary sewer and process waste lines was most likely derived from the laboratory operations, possibly from broken lab instruments or accidental releases from manometers.

The mercury was primarily found in the pipe joints on both lines. The joints are slightly lower than the adjacent piping and tend to trap heavy liquids. The mercury was removed during pipe removal and dispositioned appropriately. Mercury was detected at a few locations near UBC 441, but concentrations were well below RFCA WRW soil ALs.

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 441 based on the following:

- Surface and subsurface soil analytical results were less than RFCA WRW soil ALs.
- Results of the SSRS not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 400-8 (DOE 2004c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 441 on March 19, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-8, March 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, IHSS Group 400-8, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Final Project Closeout Report for Building 441, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004c, Closeout Report for IHSS Group 400-8, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 442

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-7
Unit Name:	Filter Test Facility

This Final Update to the HRR for UBC 442 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 442 is summarized in this update. The following HRR volume contains UBC 442 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1953 to 2000

Historical Summary

The location of UBC 442 is shown on Figure 24. Building 442 was originally used to launder uranium-contaminated protective clothing from Building 444 and then later used to test and store HEPA filters and respirator cartridges. Radioactive sources were used in some of the test equipment. The building was demolished during 2002 as a Type 1 facility.

Both radioactive and chemical materials from the laundry operations, including uranium, enriched uranium, and beryllium, potentially contaminated the soil beneath the building. Indoor unplanned events and routine operations, such as chemical spills and releases from waste lines, may have led to this contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. Soil in the vicinity of this building was also contaminated by radioactive release. In December 1963, liquid-containing barrels stored near the building leaked or spilled, and the liquid drained into the ditch on the northwestern side of the building (IHSS 400-157.1).

UBC Investigation

UBC 442 was characterized as part of IHSS Group 400-7 accelerated action (June 13, 2002 to October 25, 2004) in accordance with IASAP Addendum #IA-02-05 (DOE 2002a, DOE 2004). Surface and subsurface soil samples were collected from 13 sampling locations under the slab. COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). The highest residual radionuclide activities above background are listed below.

- Uranium-234 – 3.4 pCi/g
- Uranium-235 – 0.22 pCi/g
- Uranium-238 – 3.4 pCi/g

During the IHSS Group 400-7 RFCA accelerated action (DOE et al. 1996), the Building 442 slab and other subsurface building structural features, including footer walls, footers, two sumps, one scale pit, contaminated sections of sanitary waste lines, and asphalt around the building, were removed in accordance with ER RSOP Notification #02-06 (DOE 2002b, 2004). Approximately 30 ft of the remaining ends of the sanitary waste lines were grouted. The Building 442 excavation was backfilled and regraded.

No Further Action Recommendation

In accordance with RFCA, an NFAA was justified for UBC 442 based on the following:

- Surface soil analytical results were all less than RFCA WRW soil ALs.
- Subsurface soil analytical results were all less than RFCA WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 400-7 (DOE 2004) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 442 on January 10, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-7, January 10.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-05, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol Notification #02-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Closeout Report for IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 444

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-3
Unit Name:	Fabrication Facility

This Final Update to the HRR for UBC 444 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 444 is summarized in this update. The following HRR volumes contain UBC 444 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1953 to 2004

Historical Summary

The location of UBC 444 is shown on Figure 24. Originally called Plant A, Building 444 was one of the first buildings constructed at the Plant. Building 444 was the primary non-nuclear manufacturing facility at the Site. Manufacturing processes were used to fabricate weapons components and assemblies from a variety of materials, including depleted uranium, beryllium, stainless steel, aluminum, and vanadium (DOE 1992).

The production equipment located in Building 444 was used to support war reserve, special orders work, and manufacturing development. Operations included casting, machining, heat-treating, welding, brazing, chemical milling, plating, coating, and testing and inspection of weapons components made of depleted uranium, depleted uranium composites, beryllium, stainless steel, and ferric metals. Each material required different processing techniques.

When the Rocky Flats manufacturing and processing scope was expanded in 1956 and 1957, additions were made to Building 444. The expansion was motivated by changes in trigger design and subsequent increased fabrication requirements.

The original building area contained a foundry and numerous shops and laboratories. Shops within the original portion of the building included depleted uranium, beryllium, and carbon (graphite) machine shops; and heat treating, coating, tool grinding, welding and brazing, and building maintenance shops. A portion of the precision shop was also housed in this building. Laboratories included pressure- and leak-testing, plating, precision measuring, and nondestructive testing. Some of the former shop areas were converted into storage areas for excess tools and materials.

Building 444 was demolished during FY2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP notification and as documented in the D&D Closeout

Report for Buildings 444 and 447 (DOE 2005). The entire building slab was removed, including the basement slab.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 444 was characterized as part of the IHSS Group 400-3 accelerated action (May 27, 2003 to July 17, 2003) in accordance with IASAP Addendum #IA-03-06 (DOE 2003a, 2003b). Surface and subsurface soil samples were collected from 43 sampling locations. COCs included radionuclides, metals (including beryllium) and VOCs. Analytical results indicated contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with one exception. The lead concentration in surface soil at sampling location BY37-003 was 1,500 mg/kg, and the AL is 1,000 mg/kg (DOE 2003b). Soil was not removed from the area with the elevated lead concentration because the 95 percent UCL of the mean lead concentration across the area of concern divided by the soil AL was less than one (DOE 2001). The highest radionuclide activities above background are listed below.

- Uranium-234 – 35.27 pCi/g
- Uranium-235 – 0.74 pCi/g
- Uranium-238 – 35.27 pCi/g

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 444 based on the following:

- Contaminant activities and concentrations in surface soil were less than RFCA WRW soil ALs, with one minor exception that does not warrant further action based on the elevated measurement comparison (DOE 2001).
- Contaminant activities and concentrations in subsurface soil were less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 400-3 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 444 on December 18, 2003 (CDPHE 2003).

Comments

UBC 444 includes PIC 57.

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 400-3, December 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 447

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	400-3
Unit Name:	Fabrication Facility

This Final Update to the HRR for UBC 447 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 447 is summarized in this update. The following HRR volumes contain UBC 447 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004).

Date(s) of Operation or Occurrence

1956 to 2003

Historical Summary

The location of UBC 447 is shown on Figure 24. Building 447 was part of the 444 Complex and was a depleted uranium fabrication facility. Ingots and semi-finished/finished depleted uranium parts were heat-treated in the induction furnace. In 1956, the chip roaster in Building 447 became operational. Depleted uranium chips recovered from machining areas were collected in covered 55-gallon drums, transferred to Building 447, and burned to an oxide (more stable form) under controlled conditions in the chip roaster. The oxides were packaged and shipped offsite for disposal (DOE 1992). The building was demolished during 2004 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report for Buildings 444 and 447 (DOE 2005a). The slab was decontaminated to meet unrestricted release levels. Some of the slab and OPWL remain; however, all of the slab and OPWL under the basement were removed. The ends of the remaining OPWL were grouted.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 447 was characterized as part of the IHSS Group 400-3 accelerated action (May 27, 2003 to July 17, 2003) in accordance with IASAP Addendum #IA-03-06 (DOE 2003a, 2003b). Surface and subsurface soil samples were collected from 14 sampling locations. COCs included radionuclides, metals (including beryllium), and VOCs. Analytical results indicated all

contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003). The highest radionuclide activities above background are listed below.

- Uranium-234 – 18.09 pCi/g
- Uranium-235 – 0.41 pCi/g
- Uranium-238 – 18.09 pCi/g.

The storm drain sump and associated PCB-contaminated sediment were removed as part of the D&D of Building 447 in 2005. After removal, two soil samples were collected at this location and analyzed for PCBs. Results indicated Aroclor-1254 was present at an estimated concentration of 38 µg/kg and Aroclor-1260 was present at a concentration of 52 µg/kg. The manhole was filled with 10 to 15 ft of concrete starting from the bottom of the manhole.

The storm drain pipeline remains in place however, both ends were plugged with concrete at the manholes. The storm drain was disrupted in three places and plugged with flow fill south of Building 440 and north of Building 447. At the disruption north of Building 440 concrete was used to plug the pipe. This 8-inch diameter pipe was previously reported as perforated however, as determined during field activities, it is constructed of corrugated metal pipe. Approximately 10 yards of flow fill was used at each location. Soil at the outfall of this pipeline was also sampled. Results indicated PCB concentrations were less than WRW soil ALs (DOE 2005b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 447 based on the following:

- Contaminant activities and concentrations in surface soil were less than RFCA WRW soil ALs.
- Contaminant activities and concentrations in subsurface soil were less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 400-3 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 447 on December 18, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 400-3, December 18.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-06, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003b, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005a, Final Closeout Report for Buildings 444 and 447, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005b, Data Summary Report for IHSS Group 000-3, PAC 000-505 Storm Drains, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 528

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	500-3
Unit Name:	Temporary Waste Holding Building

This Final Update to the HRR for UBC 528 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 528 is summarized in this update. The following HRR volume contains UBC 528 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1969 to 2004

Historical Summary

The location of UBC 528 is shown on Figure 24. Constructed in 1969, Building 528 was a below-grade concrete vault structure holding two 2,000-gallon in-sump steel tanks designed to receive process waste from Building 559. These wastes were mainly aqueous solutions of hydrochloric acid, nitric acid, sulfuric acid, potassium hydroxide, detergent, radionuclides, and metals. Pesticides, herbicides, and PCBs may have been present as constituents of samples analyzed. Waste was held in the tanks until it was pumped to Building 374 for treatment.

Building 528 was demolished during 2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2005a).

Soil and/or groundwater beneath the building may have become contaminated because of leaks and releases associated with the waste handling system, including waste lines. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. Groundwater contaminated from other sources within the IA may have also contaminated soil under the structure.

UBC Investigation

UBC 528 was characterized as part of the IHSS Group 500-3 accelerated action (October 15, 2003 to April 15, 2005) in accordance with IASAP Addendum #IA-03-12 (DOE 2003). Subsurface soil samples were collected from 13 sampling locations (two under the slab and 11 around the building) (DOE 2005b). COCs included radionuclides, metals, VOCs, pesticides, herbicides, and PCBs. Analytical results indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003).

A RFCA accelerated action (DOE et al. 1996) was conducted in accordance with ER RSOP Notification #05-02 (DOE 2005c) and included removal of the Building 559 slab and footers, Building 528 Pit, and all OPWL, sanitary sewers, and storm drains beneath and adjacent to

Buildings 559 and 528. Following removal activities, the Building 528 excavation was backfilled with clean fill, and the area was regraded and reseeded. Residual contamination at levels less than the WRW soil ALs remains in surface and subsurface soil in the area. The highest residual radionuclide activities above background, which occur in the subsurface soil, are listed below.

- Americium-241 – 2.22 pCi/g
- Plutonium-239/240 – 12.68 pCi/g
- Uranium-234 – 4.67 pCi/g
- Uranium-235 – 0.22 pCi/g
- Uranium-238 – 4.67 pCi/g

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 528 based on the following:

- Contaminant activities and concentrations in subsurface soil were less than RFCA WRW soil ALs. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 500-3 (DOE 2005b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 528 on June 24, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 500-3, June 24.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-12, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Final Project Closeout Report for Building 559 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005b, Closeout Report for IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005c, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-02, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 559

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	500-3
Unit Name:	Service Analytical Laboratory

This Final Update to the HRR for UBC 559 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 559 is summarized in this update. The following HRR volume contains UBC 559 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1968 to 2004

Historical Summary

The location of UBC 559 is shown on Figure 24. Building 559, Service Analytical Laboratory, was constructed in 1967 and began operations in January 1968. Both the production support and Plant support laboratories were located in the building, which housed facilities for conducting spectrochemical, chemical, and mass spectrometric analyses on samples of recovered, cast, and purified materials from the Plant. The northern side of the building contained offices, radiation monitoring, a computer room, restrooms, a locker room, store rooms, and maintenance equipment. Four large bays in the remainder of the building housed laboratories, as well as mechanical equipment.

The Building 559 footprint was approximately 35,000 ft^2. An east-west air tunnel approximately 12 ft wide and 200 ft long ran beneath the laboratory bays in the southern portion of the building. A north-south air tunnel approximately 13 ft wide and 30 ft long connected the southeastern portion of Building 559 with the northeastern portion of Building 561, which housed filter plenums for Building 559. Air ducts constructed of transite pipe were present beneath the Building 559 slab.

Specific laboratories included the spectrochemical analysis laboratory, chemistry laboratory, and mass spectroscopy laboratory. Radioactive materials were received and shipped from a loading dock on the southern side of the building. A second loading dock at the western end of the building received other building supplies. The production support laboratory performed quantitative and qualitative chemical analyses for plutonium operations to ensure that raw materials, produced materials, and final products conformed to specifications. Samples consisted chiefly of plutonium and plutonium alloys, other metals and their alloys, plutonium and uranium oxides, solutions of plutonium and other elements, and various gases. Quantitative analyses included gallium in plutonium alloy, plutonium assay, carbon-hydrogen-nitrogen contents, ion analysis, tritium content, emission spectrometric analysis, atomic absorption, coulometric analysis, XRF, and identification of various isotopes.

The Plant support laboratory performed analyses on materials for functions indirectly related to production (for example, radiation monitoring and waste treatment). Specific tasks included Raschig ring analysis and certification, duct remediation, PCB analysis, and LLW characterization. In 1973, the construction of Building 561 expanded the capabilities of the laboratory. Later projects included the Waste Isolation Pilot Project Bin and Alcove test program, the WSRIC program, and consolidation and stabilization of nuclear materials. This group performed mass spectrometry analyses of isotopes of plutonium, uranium, lithium, and boron (thermal ionization); as well as organic compounds and gases. Other analyses included infrared analysis for impurities, thermal characterization analysis to determine phase changes as a function of temperature, and titrimetry to determine the water content of organic solvents.

Building 559 was demolished during 2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2005a). The demolition included removal of the building slab, the east-west air tunnel, and the tunnel between Buildings 559 and 561.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. The facility was originally built in 1968 with Pyrex glass process waste lines running under the building slab. Several documented releases occurred as a result of breakage of the glass lines (DOE 1992).

UBC Investigation

UBC 559 was characterized as part of the IHSS Group 500-3 accelerated action (October 15, 2003 to April 15, 2005) in accordance with IASAP Addendum #IA-03-12 (DOE 2003). Surface and subsurface soil samples were collected from 32 sampling locations (30 under the building slab and 2 adjacent to the building) (DOE 2005b). COCs included radionuclides, metals, VOCs, and PCBs. Analytical results indicated contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with five exceptions listed below.

- At sampling location CD44-005 (under Room 130) the surface soil americium-241 activity was 1,200 pCi/g, and the WRW soil AL is 76 pCi/g.
- At sampling location CD44-005 (under Room 130) the surface soil plutonium-239/240 activity was 8,130 pCi/g, and the WRW soil AL is 50 pCi/g.
- At sampling location CD44-009 the plutonium-239/240 activity at 5.0 – 5.3 ft near the east-west air tunnel was 60.53 pCi/g, and the WRW soil AL is 50 pCi/g.
- At sampling location CD44-012 the plutonium-239/240 activity at 9.0 – 9.3 ft near the east-west air tunnel was 74.67 pCi/g, and the WRW soil AL is 50 pCi/g.
- At sampling location CD44-015 the plutonium-239/240 activity at 9.0 – 9.3 ft near the east-west air tunnel was 157.83 pCi/g, and the WRW soil AL is 50 pCi/g.

A RFCA accelerated action (DOE et al. 1996) was conducted in accordance with ER RSOP Notification #05-02 (DOE 2005c) and included removal of the Building 559 slab and footers, Building 528 Pit, and all OPWL, sanitary sewers, and storm drains beneath and adjacent to Buildings 559 and 528. Soil remediation in the Room 130 and air tunnel areas and associated

confirmation sampling occurred in March and April 2005. The highest residual radionuclide activities above background are listed below.

- Americium-241 – 6.2 pCi/g
- Plutonium-239/240 – 45.2 pCi/g
- Uranium-234 – 5.14 pCi/g
- Uranium-235 – 0.30 pCi/g
- Uranium-238 – 5.14 pCi/g

Following building and soil removal activities, the Building 559 excavation was backfilled with clean fill, and the area was regraded and reseeded. Residual contamination at levels less than the WRW ALs remains in surface and subsurface soil in the area.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 559 based on the following:

- Residual contaminant activities and concentrations in surface soil were less than RFCA WRW soil ALs.
- Residual contaminant activities and concentrations in subsurface soil were less than WRW soil ALs.
- Results of the SSRS presented in the Closeout Report for IHSS Group 500-3 (DOE 2005b) did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 500-3 (DOE 2005b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 559 on June 24, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 500-3, June 24.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-12, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005a, Final Project Closeout Report for Building 559 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005b, Closeout Report for IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005c, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-02, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 701

IHSS Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: 700-3

Unit Name: Waste Treatment Research and Development

This Final Update to the HRR for UBC 701 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 701 is summarized in this update. The following HRR volume contains UBC 701 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1962 to 2002

Historical Summary

The location of UBC 701 is shown on Figure 24. Built in 1962, Building 701 was a research and design facility used to design, build, and evaluate bench-scale waste treatment processes. The building was located north of Building 776. The main purpose of the research and design group located in this building was to change the form of waste materials for off-site disposal. Information from the waste treatment research and design projects was applied to waste treatment processes throughout the Site. All process evaluations conducted in Building 701 were conducted using nonradioactive materials; once the processes were transferred to the production and waste treatment facilities, they were applied to radioactive waste. Treatment technologies evaluated included the following:

- Rotary-kiln incineration;
- Fluidized-bed incineration;
- Cementation of process waste and pond sludge;
- Thin-film evaporation; and
- Vitrification.

Building 701 was also used for waste storage, including storage of radioactive waste. The building was demolished during 2004 as part of the 776/777 Closure Project in accordance with an approved DOP and as documented in the Decommissioning Closeout Report for the 776/777 Closure Project (DOE 2005a).

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been

otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 701 was characterized as part of IHSS Group 700-3 (May 28, 2003 to December 1, 2004) in accordance with IASAP Addendum #IA-03-04 (DOE 2003). Surface and subsurface soil samples were collected from 11 sampling locations (10 under the building slab and one just north of the slab) (DOE 2005b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), with one exception. The americium-241 activity in the surface soil at sampling location CE46-019 was 3,438 pCi/g, and the WRW soil AL is 76 pCi/g. Based on this elevated activity, soil removal at the UBC was conducted.

A RFCA accelerated action (DOE et al. 1996) was conducted in accordance with ER RSOP Notification #04-04 (DOE 2004) and involved removal of the Building 701 concrete slab, the fuel-oil line and oil-stained soil located near the northwestern corner of the slab, and the radiologically contaminated surface soil found under the slab at sampling location CE46-019 (DOE 2005b). The excavation to remove the fuel-oil line and oil-stained soil was approximately 47 ft by 6 ft by 2.5 ft deep. The excavation to remove the radiologically contaminated soil discovered during building demolition was approximately 7.5 ft by 7 ft by 3 ft. Ten confirmation samples were collected from the excavation bottoms and sidewalls to confirm that remaining concentrations were less than RFCA WRW soil ALs and the RFCA TPH soil standard. Residual contaminants include radionuclides, metals, VOCs, SVOCs, and TPH, but all residual contaminant concentrations were less than WRW soil ALs and TPH soil standard (DOE et al. 2003). Residual plutonium-239/240 activities above background range from 0.11 to 37.1 pCi/g. The highest americium-241activity is 8.2 pCi/g, and the highest TPH concentration is 69.5 mg/kg. The highest residual uranium activities are listed below.

- Uranium-234 – 4.3 pCi/g
- Uranium-235 – 0.29 pCi/g
- Uranium-238 – 4.3 pCi/g

The fuel-oil line excavation was backfilled with clean fill from the T371 area, and the hot-spot excavation was backfilled with soil in the immediate area. After backfilling, the areas were graded. The site was reseeded after the removal of Buildings 776, 777 and 778 and the railroad spur. The concrete debris, fuel-oil line, oil-stained soil, and radiologically contaminated soil were disposed of as LLW.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 701 based on the following:

- Residual surface soil activities and concentrations were all less than RFCA WRW soil ALs.
- Residual subsurface soil activities and concentrations were all less than RFCA WRW soil ALs.

- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-3 Volume I (DOE 2005b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 701 (excluding UBCs 776, 777 and 778 and Tank T-18) on April 19, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-3 Volume I (B701) – Approval, April 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-04, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Decommissioning Closeout Report for the 776/777 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Closeout Report for IHSS Group 700-3 Volume I, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 707

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-2
Unit Name:	Plutonium Fabrication and Assembly

This Final Update to the HRR for UBC 707 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 707 is summarized in this update. The following HRR volume contains UBC 707 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1970 to 2002

Historical Summary

The location of UBC 707 is shown on Figure 24. Building 707 was a manufacturing facility for the fabrication of plutonium parts and assembly of parts made of plutonium and other materials into nuclear weapons components. Building 707 became the primary plutonium fabrication building at the Plant when operations commenced on May 25, 1970. A wing was added in 1971 to accommodate plutonium casting and fabrication processes moved from Building 776/777 as a result of the 1969 fire. In 1992, the production of weapons components ceased, and Building 707 was then used for the stabilization of plutonium and the processing and repackaging of plutonium residues.

Operations in Building 707 included metallurgy, parts fabrication, inspection and testing, assembly, and storage. Plutonium, particularly in finely divided forms, was subject to oxidation and spontaneous combustion, and required a controlled environment for processing and storage. Control was achieved by enclosing plutonium metal and associated equipment within gloveboxes and conveyors and by providing certain work areas with an inert atmosphere to control the pyrophoric nature of plutonium. The general flow of work and materials was from north to south within the building, starting with Modules A, J, and K, then sequentially from Module B to Module H.

Several locations in Building 707 were used to store nuclear and non-nuclear materials. The X-Y retriever, which began operations in 1971, was housed in Module K, and was used to sort and retrieve plutonium metal for distribution to other processes in Building 707. Using the X-Y retriever, operators retrieved plutonium metal from storage and conveyed it to the X-Y shuttle area where it was cut and weighed. The cut pieces were then conveyed to Modules A, J, or K for casting, or Module B for rolling and forming. Rooms 141 and 142 in Module J (the J vault) were used for storage of oxides, plutonium buttons received from other DOE facilities, and to some extent, Building 771 molten salt extracts.

Building 707 was demolished in early 2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the Decommissioning Closeout Report for the 707 Closure Project (DOE 2005a). Several small segments of OPWL P-19 were removed within UBC 707. The ends of segments of P-19 left in place were grouted. OPWL P-14 is shown on maps extending from southwest to northeast through UBC 707. During D&D it was determined that this line did not exist (DOE 2005b). Building caissons or beams may be present at depths of at least 3 ft bgs.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 707 was characterized as part of IHSS Group 700-2 (February 3, 2004 to December 15, 2004) in accordance with IASAP Addendum #IA-04-02 (DOE 2003a). Surface and subsurface soil samples were collected from 53 sampling locations (38 under the building slab and 15 around the building) (DOE 2005c). COCs included radionuclides, metals, VOCs, SVOCs, and PCBs. Analytical results indicated contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), with seven exceptions. There were six elevated arsenic concentrations (three in surface soil and three in subsurface soil) and one elevated benzo(a)pryrene concentration (in surface soil). Based on evaluation of analytical results, only one arsenic hot spot, with surface and subsurface exceedances at sampling location CE43-007, was removed (DOE 2005c). The concentration at this location was greater than three times the RFCA WRW soil AL. Soil was not removed at the other three surface soil sampling locations because concentrations were less than three times the WRW soil AL and because the 95 percent UCL of the mean arsenic concentrations across the area of concern divided by the soil AL was less than one. Soil was not removed at the three subsurface soil sampling locations based on the SSRS. The area is not susceptible to high erosion. Residual concentrations exceeding WRW soil ALs are presented below.

- The arsenic concentration in surface soil at sampling location CG42-008 is 27 mg/kg, and the WRW soil AL is 22 mg/kg.
- The arsenic concentration in subsurface soil at sampling location CE43-007 (at 0.5 to 2.5 ft) is 40.8 mg/kg.
- The arsenic concentration in surface soil at sampling location CG43-015 is 24.2 mg/kg.
- The arsenic concentration in subsurface soil at sampling location CG43-015 (at 0.5 to 2.5 ft) is 24.3 mg/kg.
- The benzo(a)pyrene concentration in surface soil at sampling location CG43-018 is 3700 µg/kg, and the WRW soil AL is 3,490 µg/kg.
- The arsenic concentration in subsurface soil at sampling location CG43-018 (at 0.5 to 2.0 ft) is 25.5 mg/kg.

Soil removal was conducted as a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #04-05 (DOE 2003b). An area, approximately 6 ft by 8 ft, was excavated to approximately 0.5 to 1 ft bgs. Arsenic concentrations in confirmation samples were below the WRW soil AL.

The Building 707 slab was removed as part of the D&D project, including the Module C pit and all Building 707 sumps. In addition, the six autoclave vaults located in Module H were removed to several feet below the slab. The remaining walls and floors of the 12-ft-deep autoclave vaults were left in place. The building footers and foundations were not removed. OPWL were left in place and completely grouted with the exception of two sections of lines that were removed following slab removal. The ends of all OPWL left in place were completely grouted. The coolant oil line was removed north of the Module C-Pit, and the line south of the pit was left in place. Foundation drains were interrupted every 40 ft and left in place. Water lines located under the Building 707 slab were left in place. All remaining lines are deeper than 3 ft below final grade. As part of the D&D project, 44 soil samples were collected to verify that residual radioactivities were below RFCA WRW soil ALs. Results of the D&D soil sampling indicate remaining activities were well below the ALs. Building demolition, slab removal, results of verification sampling, and site reclamation are presented in the Decommissioning Closeout Report for the 707 Closure Project (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 707 based on the following:

- Surface soil analytical results were less than RFCA WRW soil ALs, with three exceptions noted above.
- Results of the elevated measurement comparison indicted that additional action was not warranted.
- Subsurface soil analytical results were all less than WRW soil ALs, with three exceptions noted above.
- Results of the SSRS did not indicate additional action was necessary.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-2 (DOE 2005c) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 707 on March 15, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-2, March 15.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-04-02, IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol Notification #04-05, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005a, Decommissioning Closeout Report for the 707 Closure Project, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005b, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005c, Closeout Report for IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 731

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-2
Unit Name:	Building 707 Process Waste

This Final Update to the HRR for UBC 731 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 731 is summarized in this update. The following HRR volume contains UBC 731 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1970 to 2002

Historical Summary

The location of UBC 731 is shown on Figure 24. UBC 731 consisted of the basement area associated with Building 731, which was located in the courtyard east of Building 707. Building 731 was approximately 210 ft2 and consisted of a below-grade concrete vault that housed two 1,650-gallon fiberglass tanks (PAC 000-121 – OPWL, Tanks 11 and 30) and associated transfer pumps. Liquid process waste from Building 707 was stored in the tanks prior to being sent to Building 374 for treatment. The aqueous waste included water, acids, and chemical solutions that were potentially contaminated with plutonium and americium. The tanks underwent RCRA closure in 1995 (DOE 2000). Building 731 was demolished in early 2005 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the Decommissioning Closeout Report for the 707 Closure Project (DOE 2005a).

Soil and/or groundwater beneath the building may have become contaminated because of leaks and releases associated with the waste handling system, including waste lines. On August 28, 1991, the process waste tanks overflowed 750 gallons of process waste to secondary containment. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 731 was characterized as part of the IHSS Group 700-2 accelerated action (February 3, 2004 to December 15, 2004) in accordance with IASAP Addendum #IA-04-02 (DOE 2003). Subsurface soil samples were collected from two sampling locations adjacent to the structure (DOE 2005b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicate all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). The highest radionuclide activities above background are listed below.

- Uranium-234 – 5.9 pCi/g
- Uranium-235 – 0.31 pCi/g

- Uranium-238 – 5.9 pCi/g

Based on analytical results, no soil removal from under the building was required.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 731 based on the following:

- Subsurface soil analytical results were all less than RFCA WRW soil ALs. (Because the tanks in Building 731 were below grade, no surface soil samples were collected at UBC 731.)
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action is necessary.

After review of the Closeout Report for IHSS Group 700-2 (DOE 2005b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 731 on March 15, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-2, March 15.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2000, Reconnaissance-Level Characterization Report (RLCR), Building 707 Cluster, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-04-02, IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2005a, Decommissioning Closeout Report for the 707 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005b, Closeout Report for IHSS Group 700-2, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 770

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-5
Unit Name:	Waste Storage Facility

This Final Update to the HRR for UBC 770 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 770 is summarized in this update. The following HRR volumes contain UBC 770 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1965 to 2003

Historical Summary

The location of UBC 770 is shown on Figure 24. Building 770 was a metal, prefabricated, modular building constructed in 1965 on a concrete foundation. The building was used to store tools, materials, and supplies for Building 771 decommissioning operations. Historically, Building 770 was used for equipment storage and also as a facility for equipment assembly prior to equipment installation inside other Site buildings. Building 770 was also used to store radioactive waste. The building was demolished during 2004 as documented in the Decommissioning Closeout Report for the Building 771 Closure Project (DOE 2005). The slab was completely removed and managed as LLW.

In August 1972, a punctured scrap box stored inside Building 770 contaminated more than 3,000 ft^2 within the building and 500 ft^2 outside the building. Levels of radioactivity were measured up to 200,000 dpm. In September 1972, a 55-gallon drum containing spent radioactive ion exchange residue leaked onto the concrete floor inside Building 770. Also, drums with spent radioactive ion exchange residue (for processing in Building 771) and cargo containers were stored on the surface area located west of Building 770 from 1969 to 1974 when storage operations were moved to Building 776. Several contamination releases occurred on the ground surface located west of Building 770 between 1965 and 1971 and as discussed as part of PAC 700-150.1.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from waste containers, may have led to under building contamination. The building floor may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 770 was characterized as part of IHSS Group 700-5 (May 27, 2004 to June 1, 2004) in accordance with IASAP Addendum #IA-03-17 (DOE 2003). Surface and subsurface soil samples were collected from seven sampling locations (four under the building slab and three adjacent to the building (DOE 2004b). COCs included radionuclides, metals, VOCs, and PCBs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003). The highest radionuclide activities above background are listed below.

- Americium-241 – 6.7 pCi/g
- Uranium-234 – 5.0 pCi/g
- Uranium-235 – 0.31 pCi/g
- Uranium-238 – 5.0 pCi/g

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 770 based on the following:

- Surface and subsurface soil analytical results were less than RFCA WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 700-5 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 770 on September 7, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 700-5, September 7.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan FY 2003 Addendum #IA-03-17, IHSS Group 700-5, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Data Summary Report for IHSS Group 700-5, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Decommissioning Closeout Report for the Building 771 Closure Project, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 771

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-4
Unit Name:	Plutonium and Americium Recovery Operations

This Final Update to the HRR for UBC 771 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 771 is summarized in this update. The following HRR volumes contain UBC 771 information:

Original Report – 1992 (DOE 1992);
Update Report – 2001 Annual (DOE 2001a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 1999

Historical Summary

The location of UBC 771 is shown on Figure 24. Building 771, the primary facility for plutonium operations, was one of the four major plutonium buildings at RFETS. Building 771 operations included the chemical and physical operations for recovering plutonium and refining plutonium metal, plutonium chemistry and metallurgical research, and a radiochemical analytical laboratory. The building was originally designed to perform aqueous recovery of plutonium from scrap (residues) and to conduct foundry casting operations to produce the components for nuclear weapons. Building 771 operations included machining necessary to produce parts ready for assembly. Other operations included americium recovery, HEPA filter processing, sludge and resin cementing, Part V leaching, skull metal burning, molten salt extraction processing, laboratory waste processing, graphite and fire brick scarfing, equipment size reduction, metal leaching, glovebox glove washing, tantalum metal leaching, plastic washing, wet ash hydrofluorination, process glass and leaching, Raschig ring washing, and Oralloy metal leaching. These processes all created plutonium solutions, heels, and sludges that contributed to the recovery of plutonium and converting it to metal.

Building 771 was located in the north-central section of RFETS. The original building was a two-story structure built into the side of a hill with most of the three sides covered by earth. The fourth side, facing the north, provided the main entrance to the building. Since completion of the original building, six major additions were constructed. This series of expansion brought the total area of the building to approximately 151,000 ft^2. The first floor contained the administrative areas, plutonium recovery processing, analytical laboratories, standards laboratory, R&D area, metal fabrication workshop, maintenance workshop, and four available docks. The second floor contained a chemical preparation area and the HVAC utilities support equipment, including Zone I and Zone II filter plenums, supply and exhaust fans, emergency generator, steam supply,

plant and instrument air, supplied breathing air, a boiler to produce steam and heat in case the main steam plant was shutdown, and one dock.

In September 1957, a fire started in a glovebox in Room 180 of Building 771 from some plutonium chips from a machining operation. The gloveboxes at that time had an air atmosphere and contained combustible materials. The gloveboxes were all connected by a conveyor line and air locks. The exhaust air system caused the fire to spread rapidly through the system and upstairs to the filter plenums, where burning of the HEPA filters also occurred.

In May 1969, a large fire occurred in Building 776. The fire lasted about three weeks. The fire department could not extinguish the fire outright; however, they controlled the burn with large volumes of water. This was significant to Building 771 because the tunnel that connected Building 771 with Building 776 received contaminated water from the fire fighting activities.

At the end of 1989, the mission of the building changed to closure activities such as characterization, draining of solutions from pipes and tanks, SNM consolidation and storage, and decontamination. Solutions were sent to Building 774 for neutralization and cementation to meet Waste Isolation Pilot Plant (WIPP) waste acceptance criteria. Resins were removed from several ion exchange columns in the building. The resins were bagged out of the gloveboxes, placed in 55-gallon drums, and put into backlog residue storage. Resins were leached using 0.35 percent nitric acid to remove the plutonium. Then the resins were cemented as a low level waste to meet WIPP waste acceptance criteria. The liquids generated were neutralized and cemented as low level waste.

Building 771 was demolished during 2004 as a Type 3 facility in accordance with an approved DOP (DOE 2003) and as documented in the Decommissioning Closeout Report for the Building 771 Closure Project (DOE 2005). Structures above 6 ft beneath the final grade were demolished and removed. Structures remaining include the southern wall, all of the first floor slab, and associated foundation components. The site's original grade was restored with backfill, which was covered with top soil. All areas were seeded for revegetation.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills, releases from process equipment or waste lines, and firefighting activities may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or be otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 771 was characterized twice: during a preliminary UBC characterization at UBC 771 during 2001, and as part of IHSS Group 700-4 characterization during 2002 and 2003 in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Analytical results from 16 sampling locations during preliminary characterization (DOE 2001b) indicated plutonium-239/240 was present at an activity greater than WRW soil ALs at one location, location 12, at 2 - 4 ft below the building slab. The plutonium-239/240 activity was 157 pCi/g, and the WRW soil AL is 50 pCi/g. There were no other WRW soil AL exceedances.

During IHSS Group 700-4 characterization, subsurface soil samples were collected from 34 UBC 771 sampling locations (DOE 2004b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated contaminant activities and concentrations were less than the

RFCA WRW soil ALs (DOE et al. 2003) with one exception. Plutonium-239/240 activity at sampling location CE47-003 (0.0 - 0.5 ft below the building slab) was 56.6 pCi/g. The next highest plutonium-239/240 activity was 29.8 pCi/g, and the highest americium-241 activity was 6.6 pCi/g. The highest uranium activities are listed below.

- Uranium-234 – 6.2 pCi/g
- Uranium-235 – 0.63 pCi/g
- Uranium-238 – 6.2 pCi/g

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 771 based on the following:

- Subsurface soil analytical results were less than RFCA WRW soil ALs, with two exceptions noted above. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. The two locations with plutonium-239/240 activities exceeding the WRW soil AL are located under the building slab, which is located at least 6 ft bgs.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the ER RSOP Notification and Closeout Report for IHSS Groups 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 771 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Building 771 Phase 1 Under Building Contamination Characterization Sampling Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003, 771 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Groups 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005, Decommissioning Closeout Report for the Building 771 Closure Project, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 774

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-4
Unit Name:	Liquid Waste Process Treatment

This Final Update to the HRR for UBC 774 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 774 is summarized in this update. The following HRR volumes contain UBC 774 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 1999

Historical Summary

The location of UBC 774 is shown on Figure 24. Building 774 was designed to treat the liquid process wastes generated in Building 771. Building 774 was originally a two-story rectangular structure of poured-in-place concrete. By 1989, seven additions had been made to the building, resulting in multiple levels varying from one to four stories in height. The facility was built on a steeply sloping site. The first floor on the northern side was 7.5 ft below grade, and the fourth floor on the southern side was 4 ft above grade.

As RFETS expanded to accommodate increased production of nuclear weapon triggers, Building 774 began processing radioactive acidic wastes; caustics, aqueous and organic wastes; wastes oils; and nonradioactive waste photographic solutions. Buildings 111, 112, 130, 371, T371J, 441, 444, 460, 551, 559, 664, 707, 750, 771, 776, 777, 881, and 991 generated one or more waste streams that were processed in Building 774. In 1971, the waste treatment operations in Building 774 were enclosed to provide containment of radioactive airborne particles.

The goal of the Building 774 waste treatment process was to reduce liquid radioactive wastes and convert them into a form suitable for transport offsite for storage and disposal. In general, wastes were either piped directly into Building 774, or transferred in drums, containers, or other types of packaging. The waste entered a series of interconnected tanks designed to treat acidic, caustic, and radioactive wastes, and separate relatively low-level radioactive effluent from contaminated solids or sludges. Each of the four processes used in the building was tailored to meet certain characteristics of the waste. The waste may have passed through one or more of the following processes:

- Neutralization and filtration of acidic wastes containing large quantities of metal ions or chloride ions. The main purpose of this process was to remove the large quantities of metal hydroxide solids from the waste stream, as these solids hampered the decontamination ability of the succeeding flocculation and clarification processes.

- Batch neutralization, precipitation, and filtration of acidic wastes containing only small quantities of metal ions or basic wastes containing large quantities of undissolved solids.
- Continuous radioactive decontamination of neutral and caustic wastes.
- Solidification of aqueous wastes containing complexing agents, certain radioactive isotopes, or hazardous chemicals that were undesirable in the regular waste system. These wastes were mixed with an absorbent material and Portland cement in barrels for disposal. This process was eventually replaced by the organic and sludge immobilization system. The organic and sludge immobilization system accepted waste oils from any building at the Site that contained TRU material and converted the liquid waste into solid waste.

The role of Building 774 diminished with the inauguration of the new process waste treatment facility in Building 374. Building 774 continued to process contaminated organic wastes that could not be incinerated, and the liquid process wastes generated in Building 771.

Building 774 was demolished during 2004 as a Type 3 facility in accordance with an approved DOP (DOE 2003) and as documented in the Decommissioning Closeout Report for the Building 771 Closure Project (DOE 2005). The entire basement, including slab and foundation elements, remains except for the ceiling. The basement rooms were filled with flowable fill.

OPWL Tanks T-14 and T-16, southeast of Building 774, were removed and are addressed under PAC 000-121 (DOE 2004b).

Soil and/or groundwater beneath the building may have become contaminated because of leaks and releases associated with the waste handling systems, including waste lines and tanks. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 774 was characterized as part of IHSS Group 700-4 characterization during 2002 and 2003 in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Subsurface soil samples were collected from 14 UBC 774 sampling locations (DOE 2004b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003) with four exceptions. Plutonium-239/240 activities at sampling locations CG48-008 and CG48-009 (0.0 – 0.5 ft below the building slab) were 1,690 and 943.8 pCi/g, respectively, and the WRW soil AL is 50 pCi/g. Americium-241 activities at sampling locations CG48-008 and CG48-009 (0.0 – 0.5 ft below the building slab) were 1,220 and 116.4 pCi/g, respectively, and the WRW soil AL is 76 pCi/g. The next highest plutonium-239/240 and americium-241 activities were 14.2 and 24.1 pCi/g, respectively. The highest uranium activities are listed below.

- Uranium-234 – 5.3 pCi/g
- Uranium-235 – 0.34 pCi/g
- Uranium-238 – 5.3 pCi/g

Based on the analytical results and the SSRS, no accelerated action soil removal was required. After D&D activities were completed, the two locations exceeding the plutonium-239/240 and americium-241 ALs were at least 6 ft bgs. (Sample start depths for these locations are shown as

0.0 ft in the Soil Water Database [SWD]; however, these depths are the surface of the excavation bottom.)

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 774 based on the following:

- Subsurface soil analytical results were less than RFCA WRW soil ALs, with four exceptions noted above. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. Locations with americium-241 and plutonium-239/240 activities exceeding the WRW soil AL are located at least 6 ft bgs.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the ER RSOP Notification and Closeout Report for IHSS Groups 700-4 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 774 on February 6, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4, February 6.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003, 771 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, ER RSOP Notification and Closeout Report for IHSS Groups 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2005, Decommissioning Closeout Report for the Building 771 Closure Project, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 776

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-3
Unit Name:	Original Plutonium Foundry

This Final Update to the HRR for UBC 776 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 776 is summarized in this update. The following HRR volumes contain UBC 776 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1958 to 1999

Historical Summary

The location of UBC 776 is shown on Figure 24. Building 776/777, which went into service in 1958, was the main manufacturing facility for plutonium weapons components and housed plutonium foundry and fabrication operations (DOE 2005a). Following a major fire in Building 776/777 in 1969, the majority of the foundry and fabrication operations were transferred to Building 707. After the fire, the main focus of building operations was shifted to waste and residue handling, disassembly of retired weapons components, and special projects. Processes conducted in Building 776 included size reduction of contaminated gloveboxes and miscellaneous large equipment for waste disposal, pyrochemistry, coatings operations, and test runs of a fluidized-bed incinerator. Since the facility was first occupied, 10 major modifications/additions were made to update the building and/or provide increased safety.

In June 1964, an explosion in Building 776 resulted in the release of plutonium. One account claimed that an area approximately 1,500 ft^2 adjacent to the Building 776 gas-bottle dock was affected (western end of the northern side of Building 776). Radiological surveys showed activities exceeding 300,000 dpm/100 cm^2. A later account claimed that an area of approximately 40 ft^2 north of Building 776 was affected. Soil from the area with the highest counts was removed, a seal coat of oil was applied, and approximately 2 inches of gravel were added.

On May 11, 1969, at 2:27 p.m., a fire started in the Building 776 north plutonium foundry glovebox line as a result of spontaneous ignition of a briquette of scrap plutonium alloy metal. The fire spread through up to 150 connecting gloveboxes in Building 776 and the assembly line in Building 777. The fire was brought under control by 6:30 p.m. Fearing a breach in the building's outer walls, firefighters used water to control the blaze. This was the first time water was used directly on burning plutonium, and it did not create a nuclear criticality.

An airborne plutonium release of approximately 0.000012 g (0.0002 curie) was estimated, all of it contained on site. The operating areas in Building 776/777 suffered extensive damage and decontamination took 2 years to complete. The incident resulted in significant safety improvements in glovebox operations, including installation of water sprinklers and firewalls to control the spread of fire, and the use of inert atmospheres for plutonium operations to prevent spontaneous ignition.

UBC Investigation

UBC 776 was characterized in accordance with IASAP Addendum #IA-03-04 (DOE 2003b). Surface and subsurface soil samples were collected from 72 UBC 776 sampling locations (DOE 2005a). COCs included radionuclides, metals and/or VOCs based on sampling targets and process knowledge. Analytical results indicated americium-241 and plutonium-239/240 activities were greater than RFCA WRW soil ALs (DOE et al. 2003) at several surface and subsurface locations. All uranium activities and metal and VOC concentrations were less than WRW soil ALs.

Soil contamination indicated by the initial characterization and sampling conducted during building demolition was removed as part of the IHSS Group 700-3 RFCA accelerated action (DOE et al. 1996) in accordance with an approved ER RSOP Notification (DOE 2004). The most contaminated soil was removed during March and April 2005 while the 776/777 structure was still in place. Additional soil removal and sampling was conducted after the 776/777 structure was removed during July and August 2005. Most of the soil removal occurred within the Building 776 footprint where 2 - 3 ft of soil was removed at this time. Additional soil was removed when subsurface structures were being removed. Approximately 6,400 cy of soil were removed from UBCs 776, 777 and 778.

Thirty-seven confirmation samples were collected across the UBC to determine whether residual activities and concentrations were below the RFCA WRW soil ALs or were acceptable based on RFCA and the SSRS (DOE 2005a, DOE et al. 2003). Several of the sampling locations were statistical locations based on a 50-ft grid size. Samples were analyzed onsite using gamma spectroscopy, and 20 percent of the samples were analyzed offsite using alpha spectroscopy. Offsite alpha spectroscopy samples included those collected from areas believed to have the highest residual activities.

Characterization and confirmation results indicate most residual radionuclide activities were less than WRW soil ALs; however, 13 sampling locations, located more than 3 ft below final grade, had plutonium-239/240 activities greater than the AL (50 pCi/g) (DOE 2005a). Residual plutonium activities greater than the WRW soil AL range from 52.1 to 856.7 pCi/g. The location with the highest plutonium-239/240 activity also has an americium-241 activity greater than the WRW soil AL (76 pCi/g) (at 150.3 pCi/g measured using gamma spectroscopy). Areas with exceedances include the following.

- An area in the northwestern corner of UBC 776 associated with a pipe chase;
- The excavation area associated with removal of the elevator shaft;
- The excavation area associated with the removal of the 776/777 basement and C- and D-Pits;
- A small area associated with the removal of OPWL north of UBC 776; and
- A small area in the southwestern corner of UBC 776.

Residual activities exceeding WRW soil ALs are presented by sampling location below.

- At CF46-065, plutonium-239/240 was detected at 53.4 pCi/g at a depth of 8 to 9 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-073, plutonium-239/240 was detected at 66.5 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-074, plutonium-239/240 was detected at 52.1 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-075, americium-241 was detected at 150.3 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 76 pCi/g.
- At CE46-075, plutonium-239/240 was detected at 856.7 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-076, plutonium-239/240 was detected at 288.6 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-077, plutonium-239/240 was detected at 247.4 pCi/g at a depth of 9 to 9.5 ft bgs; the WRW soil AL is 50 pCi/g.
- At CE46-092, plutonium-239/240 was detected at 62.0 pCi/g at a depth of 0 to 0.3 ft (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CE45-114, plutonium-239/240 was detected at 57.1 pCi/g at a depth of 0 to 0.3 ft (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CE45-118, plutonium-239/240 was detected at 118.7 pCi/g at a depth of 0 to 0.3 ft (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CE45-128, plutonium-239/240 was detected at 183.0 pCi/g at a depth of 0 to 0.3 ft (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CF45-128, plutonium-239/240 was detected at 417.6 pCi/g at a depth of 15 to 16 ft bgs; the WRW soil AL is 50 pCi/g.
- At CF45-129, plutonium-239/240 was detected at 90.3 pCi/g at a depth of 3 to 15 ft bgs; the WRW soil AL is 50 pCi/g.
- At CF45-130, plutonium-239/240 was detected at 123.4 pCi/g at a depth of 3 to 15 ft bgs; the WRW soil AL is 50 pCi/g.

Soil with americium-241 and plutonium-239/240 activities exceeding WRW soil ALs did not require additional excavation because exceedances occurred at depths between 3 and 6 ft below final grade and were less than 1 nCi/g, or exceeded 1 nCi/g but occurred at a depth greater than 6 ft below final grade (DOE et al. 2003).

Structural components and drain lines associated with Buildings 776 and 777, including the 776/777 slab, basement, equipment pits, waste lines, pipe chases, sumps, and foundation features such as caissons and footer walls, were removed as part of the 776/777 Closure Project in accordance with an approved DOP and as documented in the Decommissioning Closeout Report for the 776/777 Closure Project (DOE 2005b).

Several large, deep excavations were required for the 776/777 Closure Project (DOE 2005a). The excavation depths associated with the basement, C-Pit, D-Pit and E-Pit were 20 - 25, 16, 30, and 12 ft deep, respectively. A large excavation was also required to remove the elevator shaft located in the northwestern part of UBC 776. Soil samples were collected from these excavations, and some soil was removed. Confirmation samples were collected from these areas, and excavations were backfilled with clean soil from under the building slabs and clean imported fill.

To reduce the amount of groundwater flow through the tunnel between Buildings 776 and 771, the tunnel entrance on the Building 776 side was blocked by crushing the end of the existing tunnel and placing approximately 30 cy of concrete onto the crushed end, forming a layer 1.5 to 2 ft thick. A bentonite cutoff wall was then placed in front of the tunnel opening that extended laterally beyond the fill material underlying and surrounding the tunnel. These steps will minimize groundwater flow both within the tunnel and within the associated fill material surrounding the tunnel. After the cutoff wall was installed, the excavation was backfilled (DOE 2005a).

During building demolition, a significant amount of water was applied to control dust and the spread of contamination. This water was collected by temporary trenches into a central sump and pumped through a pipeline to a temporary, lined retention pond located at the site of former Building 779. The water was then re-applied to control dust during demolition activities. The pond was roughly 100 ft by 100 ft, and the berms were 8 ft high. After the demolition, the water in the pond was removed and appropriately treated. The pond liner and remaining sediment were removed and disposed of as LLW. The bermed area and surrounding areas were sampled, and soil with contaminant activities and concentrations greater than RFCA WRW soil ALs were removed. After confirmation sampling was completed, the berms were graded to conform to final land configuration (DOE 2005a).

During both demolition and soil removal activities, erosion controls were used to prevent wind and rain from spreading contamination (DOE 2005a). This included placing an earthen berm around the entire project site and restricting access. Wattles were also placed outside the berm to control runoff from the area.

The excavated contaminated soil was temporarily staged to facilitate railcar loading in the northeastern corner of the Building 777 footprint in an area approximately 100 by 100 ft. Water was also applied to the waste pile as necessary to control dust and minimize contaminant migration. The waste was shipped out in railcars to Envirocare. The area was then sampled, and soil with contaminant activities and concentrations greater than RFCA WRW soil ALs were removed. After confirmation sampling was completed, the area was graded (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 776 based on the following:

- Analytical results were less than RFCA WRW soil ALs with the exceptions noted above.
- Results of the SSRS did not indicate additional action was necessary because locations with americium-241 and plutonium-239/240 activities exceeding the WRW soil ALs occurred at depths between 3 and 6 ft below final grade or greater, and were less than 1 nCi/g. Also, the area is not susceptible to high erosion.

- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Groups 700-3, Volume II (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for the UBC 776 on October 12, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 700-3. Volume II, October 12.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-04, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume II, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Decommissioning Closeout Report for the 776/777 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 777

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-3
Unit Name:	General Plutonium Research and Development

This Final Update to the HRR for UBC 777 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 777 is summarized in this update. The following HRR volumes contain UBC 777 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1958 to 1999

Historical Summary

The location of UBC 777 is shown on Figure 24. Building 776/777, which went into service in 1958, was the main manufacturing facility for plutonium weapons components and housed plutonium foundry and fabrication operations (DOE 2005a). Following a major fire in Building 776/777 in 1969, the majority of the foundry and fabrication operations were transferred to Building 707. After the fire, the main focus of building operations was shifted to waste and residue handling, disassembly of retired weapons components, and special projects. Processes conducted in Building 776 included size reduction of contaminated gloveboxes and miscellaneous large equipment for waste disposal, pyrochemistry, coatings operations, and test runs of a fluidized-bed incinerator. Since the facility was first occupied, 10 major modifications/additions were made to update the building and/or provide increased safety.

On May 11, 1969, at 2:27 p.m., there was a fire started in the Building 776 north plutonium foundry glovebox line as a result of spontaneous ignition of a briquette of scrap plutonium alloy metal. The fire spread through up to 150 connecting gloveboxes in Building 776 and the assembly line in Building 777. The fire was brought under control by 6:30 p.m. Fearing a breach in the building's outer walls, firefighters used water to control the blaze. This was the first time water was used directly on burning plutonium, and it did not create a nuclear criticality.

An airborne plutonium release of approximately 0.000012 g (0.0002 curie) was estimated, all of it contained onsite. The operating areas in Building 776/777 suffered extensive damage and decontamination took 2 years to complete. The incident resulted in significant safety improvements in glovebox operations, including installation of water sprinklers and firewalls to control the spread of fire, and the use of inert atmospheres for plutonium operations to prevent spontaneous ignition.

UBC Investigation

UBC 777 was characterized in accordance with IASAP Addendum #IA-03-04 (DOE 2003b). Surface and subsurface soil samples were collected from 45 UBC 777 sampling locations (DOE 2005a). COCs included radionuclides, metals and/or VOCs based on sampling targets and process knowledge. Analytical results indicated plutonium-239/240 activities were greater than RFCA WRW soil ALs (DOE et al. 2003) at six surface and subsurface locations. All americium and uranium activities and metal and VOC concentrations were less than WRW soil ALs.

Soil contamination indicated by characterization was removed as part of the IHSS Group 700-3 RFCA accelerated action (DOE et al. 1996) in accordance with an approved ER RSOP Notification (DOE 2004). Much of the surface soil within the western part of the Building 777 footprint was removed at this time. Additional soil was removed when subsurface structures were being removed. Approximately 6,400 cy of soil were removed from UBCs 776, 777, and 778.

Thirty-seven confirmation samples were collected across the UBC to determine whether residual activities and concentrations were below the RFCA WRW soil ALs or were acceptable based on RFCA and the SSRS (DOE 2005a, DOE et al. 2003). Several of the sampling locations were statistical locations based on a 50-ft grid size. Samples were analyzed on site using gamma spectroscopy, and 20 percent of the samples were analyzed offsite using alpha spectroscopy. Offsite alpha spectroscopy samples included those collected from areas believed to have the highest residual activities.

Characterization and confirmation results indicate most residual radionuclide activities are below WRW soil ALs; however, six subsurface sampling locations within UBC 777 have plutonium-239/240 activities greater than the WRW soil AL (50 pCi/g) (DOE 2005a). Residual plutonium activities range from 62.2 to 292.9 pCi/g. Exceedances occur in the excavation area associated with the removal of the 776/777 basement. Residual activities exceeding the WRW soil AL are presented below.

- At CF45-118, plutonium-239/240 was detected at 215.0 pCi/g at a depth of 0 to 0.3 ft bgs (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CF45-119, plutonium-239/240 was detected at 252.1 pCi/g at a depth of 0 to 0.3 ft bgs (measured from the bottom of an excavation); the WRW soil AL is 50 pCi/g.
- At CF45-154, plutonium-239/240 was detected at 292.9 pCi/g at a depth of 30 to 32 ft bgs; the WRW soil AL is 50 pCi/g.
- At CF45-155, plutonium-239/240 was detected at 103.9 pCi/g at a depth of 30 to 32 ft bgs; the WRW soil AL is 50 pCi/g.
- At CF45-156, plutonium-239/240 was detected at 289.1 pCi/g at a depth of 30 to 32 ft bgs; the WRW soil AL is 50 pCi/g.
- At CF45-172, plutonium-239/240 was detected at 62.2 pCi/g at a depth of 11.5 to 11.8 ft bgs; the WRW soil AL is 50 pCi/g.

Because plutonium-239/240 activities were less than 1 nCi/g and occurred at depths greater than 3 ft below final grade, and 3 ft of soil had already been removed, additional excavation of this soil was not required (DOE et al. 2003).

Structural components and drain lines associated with Buildings 776 and 777, including the 776/777 slab, basement, equipment pits, waste lines, pipe chases, sumps, and foundation features such as caissons and footer walls, were removed as part of the 776/777 Closure Project in accordance with an approved DOP and as documented in the Decommissioning Closeout Report for the 776/777 Closure Project (DOE 2005b).

Several large, deep excavations were required for the 776/777 Closure Project, including the basement (DOE 2005a). The excavation associated with the basement was 20 – 25 ft. Soil samples were collected from this large excavation, and some soil was removed. Confirmation samples were collected from the area, and the excavation was backfilled with clean soil from under the building slabs and clean imported fill.

During building demolition, a significant amount of water was applied to control dust and the spread of contamination. This water was collected by temporary trenches into a central sump and pumped through a pipeline to a temporary, lined retention pond located at the site of former Building 779. The water was then re-applied to control dust during demolition activities. The pond was roughly 100 ft by 100 ft, and the berms were 8 ft high. After the demolition, the water in the pond was removed and appropriately treated. The pond liner and remaining sediment were removed and disposed as waste. The bermed area and surrounding areas were sampled, and soil with contaminant activities and concentrations greater than RFCA WRW soil ALs were removed. After confirmation sampling was completed, the berms were graded to conform to final grade specifications (DOE 2005a).

During both demolition and soil removal activities, erosion controls were used to prevent wind and rain from spreading contamination (DOE 2005a). This included placing an earthen berm around the entire project site and restricting access. Wattles were also placed outside the berm to control runoff from the area.

The excavated contaminated soil was temporarily staged to facilitate railcar loading in the northeastern corner of the Building 777 footprint in an area approximately 100 by 100 ft. Water was also applied to the waste pile as necessary to control dust and minimize contaminant migration. The waste was shipped out in railcars to Envirocare. The area was then sampled, and soil with contaminant activities and concentrations greater than RFCA WRW soil ALs were removed. After confirmation sampling was completed, the area was graded (DOE 2005a).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 777 based on the following:

- Analytical results were less than RFCA WRW soil ALs with the exceptions noted above.
- Results of the SSRS did not indicate additional action was necessary because residual plutonium-239/240 activities exceeding the WRW soil ALs were less than 1 nCi/g and occurred at depths greater than 3 ft below final grade, and the area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Groups 700-3, Volume II (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 777 on October 12, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 700-3. Volume II, October 12.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-04, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume II, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Decommissioning Closeout Report for the 776/777 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 778

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	700-3
Unit Name:	Plant Laundry Facility

This Final Update to the HRR for UBC 778 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 778 is summarized in this update. The following HRR volume contains UBC 778 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1957 to 2000

Historical Summary

The location of UBC 778 is shown on Figure 24. Building 778 was a metal building, located between Building 707 and Building 776/777. It was constructed in 1957 as a support facility for the 700 Complex plutonium production buildings (DOE 2005a). The building provided all-weather access to Buildings 707 and 776/777 through two enclosed corridors. It also contained a portion of the chainveyor that was used to transport material between production areas in Buildings 707 and 776/777. In addition, the building housed the maintenance shops (electric, machine, sheet metal, paint, and pipe shops) and the locker/shower facilities for those buildings. A laundry facility was added to the building when plutonium laundry operations were consolidated on site. Laundry wastewater was sent to Building 774 and later to Building 374.

Structural components and drain lines associated with Building 778, including the slab, waste lines, and foundation features such as caissons and footer walls, were removed during 2005 as part of the 707 Closure Project in accordance with an approved Facility Disposition RSOP Notification and as documented in the Decommissioning Closeout Report for the 707 Closure Project (DOE 2005b).

UBC Investigation

UBC 778 was characterized in accordance with IASAP Addendum #IA-03-04 (DOE 2003). Surface and subsurface soil samples were collected from 27 UBC 778 sampling locations (DOE 2005a). COCs included radionuclides, metals and/or VOCs based on sampling targets and process knowledge. Analytical results indicated plutonium-239/240 activities were greater than RFCA WRW soil ALs (DOE et al. 2003) at one surface location within the UBC (at 55 pCi/g versus the WRW AL of 50 pCi/g) and at two surface locations just north of the UBC (at 56 pCi/g and 68 pCi/g vs the WRW AL of 50 pCi/g). All americium-241 and uranium activities and metal and VOC concentrations were less than WRW soil ALs.

Soil contamination indicated by the initial characterization and sampling conducted during building demolition was removed as part of the IHSS Group 700-3 RFCA accelerated action (DOE et al. 1996) in accordance with an approved ER RSOP Notification (DOE 2004, DOE 2005a). Much of the surface soil within the northern part of the Building 778 footprint was removed. Fourteen confirmation samples were collected to ensure that residual activities were less than the RFCA WRW soil AL (DOE 2005a, DOE et al. 2003). All contaminant activities were less than WRW soil ALs with one exception. The plutonium-239/240 activity at sampling location CE45-134, at a depth greater than 3 ft bgs, was 51.9 pCi/g, and the WRW soil AL is 50 pCi/g. The next highest plutonium-239/240 activity was 38.5 pCi/g, and the highest americium-241 activity is 29.2 pCi/g. The highest uranium activities are listed below.

- Uranium-234 – 16.4 pCi/g
- Uranium-235 – 0.89 pCi/g
- Uranium-238 – 61.4 pCi/g

The excavation was backfilled with clean soil from under the building slab and clean imported fill.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 778 based on the following:

- Residual activities and concentrations were less than RFCA WRW soil ALs, with the one subsurface exception noted above.
- Results of the SSRS do not indicate additional action was necessary because the area is not susceptible to high erosion. The one sample with the plutonium-239/240 activity greater than the AL is located more than 3 ft bgs.
- Results of the stewardship evaluation do not indicate additional action was necessary.

After review of the Closeout Report for IHSS Groups 700-3, Volume II (DOE 2005a) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 778 on October 12, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO, from C. Spreng, CDPHE, RE: Closeout Report for IHSS Group 700-3. Volume II, October 12.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Final Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-04, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005a, Closeout Report for IHSS Group 700-3, Volume II, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005b, Decommissioning Closeout Report for the 707 Closure Project, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 779

IHSS Number: Not Applicable

Current Operable Unit: Not Applicable

Former Operable Unit: Not Applicable

IHSS Group: 700-7

Unit Name: Main Plutonium Components Production Facility

This Final Update to the HRR for UBC 779 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 779 is summarized in this update. The following HRR volumes contain UBC 779 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1965 to 1998

Historical Summary

The location of UBC 779 is shown on Figure 24. Building 779 was the former weapons R&D laboratory, built in 1965 to support plutonium production and recovery processes. The building mission changed in 1989 to research and non-nuclear production support activities, such as liquid carbon dioxide cleaning, waste minimization, and characterization, stockpile reliability evaluation, and surface analyses.

Research, development, and support operations consisted of process chemistry technology, physical metallurgy, machining and gauging, joining technology, and hydriding (plutonium recovery) operations. The Process Chemistry Technology group engaged in weapons process development, stockpile reliability testing, testing of various material compatibilities, plutonium aging under various environmental conditions, and methods development for recovering, separating, and purifying actinides from waste streams and residues. The Physical Metallurgy group conducted research on various metals, alloys, and other materials, which involved tensile testing, study of casting dynamics, electron microscopy, x-ray analyses, hardness testing, and dimensional dynamics. The Machining and Gauging group was involved in manufacturing of special order parts and test components, and had two shops and a laboratory for tool making, maintenance operations, and high-precision machining for special orders and tests. The Joining group developed sophisticated joining techniques, including welding and brazing, for nuclear materials. The Hydriding group was involved in plutonium recovery experiments.

Building 779 was demolished to its main foundation in FY2000. Building components that were not removed at the time included the building slab, an extensive network of OPWL, process waste trenches, tank and equipment pits, sanitary drains, two elevator shafts, and various site utilities. Process waste drains penetrating the foundation were filled to grade with grout. Pipe conduit openings in the building slab were plugged and grouted at the foundation level. Contaminated groundwater was encountered in Pit 1A.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

After building demolition, based on elevated activity levels detected during demolition, a 35-ft by 2.5-ft area of concrete slab was removed at the northern sides of Rooms 131 and 133 (central portion of the building slab). Soil samples were collected from beneath the concrete prior to backfilling the area with grout. Plutonium-239/240 was detected in soil at activities of up to 97,320 pCi/g (DOE 2000). No soil remediation was conducted at that time.

UBC 779 was fully characterized as part of the IHSS Group 700-7 acceleration action (September 30, 2003 to August 18, 2004) in accordance with IASAP Addendum #IA-03-15 (DOE 2003a). Surface and subsurface soil samples were collected from 41 sampling locations (DOE 2004b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003) with the following six exceptions:

- Plutonium-239/240 activities exceeded the WRW soil AL (50 pCi/g) at CH45-094 (670.32 pCi/g at 0.0 to 0.5 ft bgs and 149.63 pCi/g at 0.5 to 1.0 ft bgs).
- Plutonium-239/240 activities exceeded the WRW soil AL (50 pCi/g) at CH45-112 (299.08 pCi/g at 0.0 to 0.5 ft bgs and 119.17 pCi/g at 12 to 13.5 ft bgs).
- Americium-241 activities exceeded the WRW soil AL (76 pCi/g) at CH45-094 (117.6 pCi/g at 0.0 to 0.5 ft bgs).
- Arsenic concentration exceeded the WRW soil AL (22.2 mg/kg) at CI45-012 (24 mg/kg at 0.5 to 2.5 ft bgs).

During the RFCA accelerated action (DOE et al. 1996), the Building 779 slab and most of the other building structural features, including footer walls (except one), some of the structural upgrades, the top 4 ft of the basement walls, and waste trenches and pits, were removed in accordance with ER RSOP Notification #03-10 (DOE 2003b). Water and waste lines, including OPWL and sanitary lines under the Building 779 slab, were also removed.

Extensive soil removal was also conducted to remove contaminated soil detected during historical and accelerated action characterization and during removal of structural features. More than 150 cy were removed from beneath the building contamination area, and approximately 5 cy were removed from an area adjacent to a vertical sanitary line. Confirmation sampling results indicate plutonium activities exceed the WRW soil AL (50 pCi/g) at three subsurface locations:

- 87 pCi/g at 5.0 to 5.5 ft bgs at CH45-106;
- 79.6 pCi/g at 5.0 to 5.5 ft bgs at CH45-146; and
- 59.3 pCi/g at 4.0 to 4.5 ft bgs at CH45-147.

However, activities were less than 1 nCi/g at a depth greater than 3 ft from the ground surface. Based on RFCA Attachment 5 and the SSRS, additional soil removal at these locations was not required. The area is not susceptible to high erosion.

Additional soil removal was also conducted east of the UBC, as listed below:

- Removed approximately 12 cy of radiologically contaminated soil around the section of OPWL that was broken near the Building 784 slab during the accelerated action. The depth of the excavation was approximately 3.5 ft. Refer to the PAC 700-149.2 HRR writeup.
- Removed approximately 81 cy of PCB-contaminated soil around and under the PCB transformer pads. The depth of the excavation was approximately 5 to 6 ft and covered an area approximately 20 by 20 ft. Refer to PAC 700-1105 HRR writeup.
- Approximately 12 cy of radiologically contaminated soil was removed around three "hot spots" detected in the area of the former SEP Auxiliary Pond 2 (at sampling locations CI46-013, CI46-014 and CI46-029). The approximate depths of the excavations were 2.5 ft at sampling locations CI46-013, 3.5 ft at sampling location CI46-014, and 3.5 ft at sampling location CI46-029. The soil was disposed of as LLW. Confirmation sampling results at the three "hot spots" indicate that residual plutonium-239/240 activities exceed the WRW AL; however, activities are located at depths greater than 3 ft below final grade and at activities less than 1 nCi/g (at sampling locations CI46-041, CI46-043, CI46-044 and CI46-046). Activities range from 79.6 to 527 pCi/g.

Building components remaining bgs include some Building 779 structural upgrade foundations (intact or lower portions), caissons for the structural upgrade foundations and elevator pits, the lower portion of the Building 779 basement, the footer wall supporting the basement staircase, the Building 779 sub-basement, the footer wall on the western side of the Building 779 slab, and the Building 782 tunnel/utility corridor and pit. The Building 779 basement and sub-basement and the Building 782 tunnel and pit were filled with flowable-fill concrete to prevent subsidence in the future, prevent groundwater intrusion, and immobilize any fixed contamination in the Building 779 sub-basement pits.

Clean fill was brought to the project site and used to backfill excavations and smooth out the surface to prevent large-scale ponding of precipitation. Additional fill was later brought in to bring the area to final grade and ensure that all remaining structural features (remaining structural upgrades and the Building 782 tunnel) were 3 ft below final grade. Final grading and subsequent seeding occurred as part of the Sitewide land reconfiguration. Reconfiguration resulted in surface runoff from the IHSS Group draining south into the South Walnut Creek drainage.

No Further Action Recommendation

Accelerated action data indicated residual COC concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with eight exceptions. As indicated above, plutonium-239/240 activities exceeded the WRW soil AL (50 pCi/g) at eight subsurface locations. However, activities were less than 1 nCi/g at a depth greater than 3 ft below final grade. Based on RFCA and the SSRS, additional soil removal at these locations was not required. IHSS Group-specific, near-term management techniques required included: bringing in clean fill to ensure that all remaining structural features are at least 3 ft below final grade, continuing water quality monitoring at

GS32 and SW093 (and along South Walnut Creek after land reconfiguration), and installing erosion controls as necessary as part of land reconfiguration.

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 779 based on the following:

- Residual contaminant activities and concentrations in surface soil were less than WRW soil ALs.
- Residual contaminant activities and concentrations in subsurface soil were less than WRW soil ALs with eight exceptions. Plutonium activities exceed the WRW soil AL (50 pCi/g) at eight locations; however, activities were less than 1 nCi/g at a depth greater than 3 ft below final grade.
- Results of the SSRS did not indicate additional action was necessary.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 700-7 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 779 on October 1, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7, October 1.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2000, Decommissioning Closeout Report for the 779 Closure Project, Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-15, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol Notification #03-10, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 865

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-1
Unit Name:	Materials Process Building

This Final Update to the HRR for UBC 865 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 865 is summarized in this update. The following HRR volumes contain UBC 865 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1970 to 2000

Historical Summary

The location of UBC 865 is shown on Figure 24. Building 865, built in 1970, was part of the Plant R&D program. The building housed metalworking equipment for the study of non-plutonium metals and the development of alloys and prototype hardware. Operations included metalworking, machining, and metallurgical laboratory operations. The most common metals processed were depleted uranium, steel, and aluminum. Other metals worked in the building included copper, molybdenum, beryllium, titanium, silver, niobium, tantalum, gold, iridium, platinum, vanadium, tungsten, and alloys of these metals.

All metalworking operations were conducted in the high-bay area. Metalworking processes included arc and vacuum induction melting, hammer forging, press forming, hydrospinning, swaging, extruding, drawing, rolling, diffusion bonding, furnace heat treating, salt bath and glovebox operations, and cutting and shearing.

Operations involving beryllium were conducted inside and outside gloveboxes. High-purity beryllium was produced and canned (sealed in a can) in gloveboxes. Beryllium chips from lathe operations were processed in two types of mills (ball mill and fluid energy mill) to form a powder. The powder was then sealed into stainless steel containers in preparation for further processing.

Machining operations included milling, grinding, drilling, and cutting. The machine shop was equipped with standard equipment, including surface grinders, drill presses, and saws. Other equipment in the machine shop was specialized; lathes and milling machines in the shop were equipped with tracers.

Personnel in the metallurgy laboratory, located in the northeastern corner of the building, conducted mechanical testing of metals and prepared metal samples for examination. Samples

were prepared for macroscopic and microscopic examination by sawing, cutting, mounting, grinding, polishing, and etching operations.

The final use of the building was to conduct metallography laboratory work and decontamination activities for the product R&D group.

Building 865 was demolished to its main foundation slab as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification during 2003 and as documented in the Final Project Closeout Report for the Building 865 Cluster (DOE 2004b). A portion of the High Bay slab was contaminated with depleted uranium (DOE 2004c), and that portion of the slab was sprayed with Instacote™ prior to building demolition. Process waste drains penetrating the foundation were filled to grade with grout prior to building D&D. Pipe conduit openings in the building slab were plugged and grouted at the foundation level.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building. Uranium and beryllium contamination was found throughout building surfaces; however, remaining contamination after decontamination was fixed prior to building demolition.

UBC Investigation

UBC 865 was characterized as part of IHSS Group 800-1 (August 14, 2003 to December 12, 2003) in accordance with IASAP Addendum #IA-03-01 (DOE 2002). Surface and subsurface soil samples were collected from 55 sampling locations under the building slab (DOE 2004c). COCs included radionuclides, metals, and VOCs. Analytical results indicated contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2003), except for one subsurface arsenic concentration. The arsenic concentration was 25.5 mg/kg between 18.5 and 20.5 ft bgs, and the WRW AL is 22.2 mg/kg. The highest radionuclide activities above background are listed below.

- Americium-241 – 0.06 pCi/g
- Plutonium-239/240 – 0.16 pCi/g
- Uranium-234 – 7.1 pCi/g
- Uranium-235 – 0.52 pCi/g
- Uranium-238 – 7.1 pCi/g

The Building 865 slab and other structural features were removed from October 7 to December 18, 2003, as a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #03-12 (DOE 2003). Activities included removal of concrete slabs, foundation walls, process waste lines, and equipment pits associated with Building 865 (DOE 2004c). All contaminated structural features were removed, including slab sections, pits, and waste lines. Remaining features include the bottom of building caissons, the bottom of the footer wall for the western side of the High Bay, a large equipment pedestal 3 ft bgs, and sections of foundation drains. Clean fill was brought to the project site and used to backfill excavations and bring the area to final grade.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 865 based on the following:

- Surface soil analytical results were all less than RFCA WRW soil ALs.
- Subsurface soil analytical results were less than WRW soil ALs, with one exception noted above.
- Results of the SSRS did not indicate additional action was necessary. The elevated arsenic concentration is located between 18.5 and 20.5 ft bgs, and the area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 800-1 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 865 on March 19, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1, March 19.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-03-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #03-12, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Final Project Closeout Report for the Building 865 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004c, Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 881

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-2
Unit Name:	Laboratory and Office

This Final Update to the HRR for UBC 881 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 881 is summarized in this update. The following HRR volumes contain UBC 881 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1953 to 2001

Historical Summary

The location of UBC 881 is shown on Figure 24. Initially known as Plant B, Building 881 was one of the four original Plant manufacturing buildings in the early 1950s. Beginning in 1953, this structure housed the Plant's only enriched uranium component manufacturing and recovery operations. The original purpose of Building 881 was the processing and machining of enriched uranium (Oralloy) into finished weapons components. The Oralloy process consisted of chemical recovery and foundry operations, including continuous material dissolution, peroxide precipitation, calcination of uranium peroxide, leaching of powdered solids, graphite incineration, and Oralloy parts decontamination. Production of Oralloy components was phased out between 1964 and 1966. Limited enriched uranium recovery operations for site returns (weapons returned to the Plant for upgrade, reprocessing, or retirement) continued until the mid-1970s.

Stainless steel manufacturing (fabrication and testing) began in 1966 and continued until 1985. Stainless steel work consisted primarily of fabrication of the reservoirs, tubes, and fasteners associated with the trigger delivery system, and the sealing of beryllium ingots into stainless steel containers as part of the beryllium wrought process. Production operations included machining, cleaning, assembling, inspection and testing, and support. Conventional tools, such as lathes, mills, borers, and presses, were used in stainless steel machining operations. After machining, fabricated parts were cleaned using solvents, acids, and aqueous detergents. Equipment associated with the cleaning process included two vapor degreasers, and an ultrasonic cleaning unit. After machining and cleaning, the parts were inspected and tested. Inspection and testing operations included dimensional inspection (precise measurements), nondestructive testing, and destructive testing of representative samples. As part of nondestructive testing, parts were visually inspected for flaws and x-rayed to identify internal structural flaws.

A number of special projects ranging from ongoing R&D to one-time operations were conducted in Building 881 between 1953 and 1966. These projects included tracer components (processing of neptunium, curium, and cerium), uranium-233 processing, lithium fabrication, recovery of fuel rods, distillation, and cadmium plating of uranium parts.

Assembly operations were conducted in Building 881 and included matching, brazing, and welding. The parts were physically matched together, then assembled and joined by brazing or welding (tungsten-inert gas, electron-beam, or resistance). Welding machines were maintained in vacuum chambers. Other assembly operations consisted of clinching pressure fittings, tube bending, wire winding, solid film applications, fixture assembly, vacuum bakeout, resin molding, and adhesive assembly.

After stainless steel manufacturing was moved out of Building 881, the building became a multipurpose facility for R&D, computer support, analytical support, and administrative functions. Building 881 housed the Plant's central computing facilities and general chemistry laboratory. The laboratory provided general analytical and standards calibration, as well as development operations including waste technology development and testing of mechanical systems for weapons systems. After the Plant's mission changed to environmental remediation in 1989, a reduced amount of R&D continued in Building 881.

The building was demolished during 2004 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the Decommissioning Closeout Report for the 881 Closure Project (DOE 2004). OPWL P-7 was completely removed from beneath Building 881, and OPWL P-54 was removed except for a short section, which was plugged with epoxy at both ends. Two OPWL manways associated with Building 881 were completely removed (DOE 2005). After the Building 881 walls and floors were decontaminated, they were imploded onto the building slab and foundation. The debris was then buried with backfill, and the area was graded to achieve final grade.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 881 was characterized as part of IHSS Group 800-2 (July 16, 2002 to September 5, 2002) in accordance with IASAP Addendum #IA-02-04 (DOE 2002). Subsurface soil samples were collected from 77 sampling locations (68 under the building slab and 9 adjacent to the slab) (DOE 2003b). COCs included radionuclides, metals, VOCs, SVOCs, and PCBs. Analytical results indicated contaminant activities and concentrations were less than the proposed and final RFCA WRW soil ALs (DOE et al. 2002, 2003), with two exceptions.

- The lead concentration at location CF34-018 (0 – 0.5 ft below the Building 881 slab) was 1,150 mg/kg, and the WRW soil AL is 1,000 mg/kg.
- The benzo(a)pyrene concentration at location CF35-035 (0 – 0.5 ft below the Building 881 slab) was 15,000 µg/kg, and the WRW soil AL is 3,490 µg/kg.

These elevated soil concentrations were not removed because they occur below the Building 881 slab many feet below final grade.

In addition, a barium concentration (44,500 mg/kg) in surface soil near the UBC (sampling location CG34-016, PAC 800-1205) exceeded the WRW soil AL of 26,400 mg/kg. However, the soil at this location was not removed because the 95% UCL of the mean of the COC across the area of concern divided by the WRW soil AL was less than 1 (DOE 2003b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 881 based on the following:

- Subsurface soil analytical results were all less than RFCA WRW soil ALs, with three exceptions. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. Soil and residual contaminants beneath the building slab, located many feet below final grade, will not be susceptible to significant erosion and transport.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Data Summary Report for IHSS Group 800-2 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 881 on July 16, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-2, July 16.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Addendum #IA-02-04, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Data Summary Report for IHSS Group 800-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004, Decommissioning Closeout Report for the 881 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2005, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2002, Proposed Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 883

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-3
Unit Name:	Roll and Form Building

This Final Update to the HRR for UBC 883 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 883 is summarized in this update. The following HRR volume contains UBC 883 information:

Original Report – 1992 (DOE 1992).

Date(s) of Operation or Occurrence

1957 to 1994

Historical Summary

The location of UBC 883 is shown on Figure 24. Building 883 was a nuclear facility constructed in 1956 to accommodate fabrication of enriched and depleted uranium parts used in weapons, specifically rolling and forming operations. Additions to Building 883 began in 1958 with the construction of storage and uranium component manufacturing spaces. In 1972, a valve room was added. From 1983 to 1985, additions were constructed to support the manufacturing of armor plates for M1A1 tanks. Starting in 1989, Building 883 operations began to diminish. In 1994, Building 883 operations ceased, and the building was closed. In 2005, Building 883 was demolished as a Type 2 facility in accordance with an approved Facility Disposition Notification and as documented in the Final Project Closeout Report for the Building 883 Cluster (DOE 2005a).

Enriched uranium was processed in Building 883, Side B, from 1957 to 1964. These operations were moved to the Oak Ridge Reservation between 1964 and 1966. After 1967, metalworking operations in the building primarily involved depleted uranium, in Side A, and binary metal (uranium-238 alloyed). Some stainless steel and aluminum work also occurred in the building on a routine basis. Beryllium, copper, and other metals and alloys were occasionally worked on in the building. Beryllium-forming operations took place in Side A from 1962 to the mid-1980s.

Operations included rolling, shearing, forging, pressing, roller leveling, grinding, punching, bending, welding, heating, annealing, and cleaning. Metal was annealed in salt baths or in furnaces with argon atmospheres. Vapor degreasing, grit blasting, water washing, and nitric acid etching were used during the cleaning process. Other processes conducted in Building 883 included inspection, nondestructive testing, weighing, shipping of fabricated parts, and receipt of raw materials used to fabricate, inspect, and clean the parts.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under

building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 883 was characterized as part of IHSS Group 800-3 (August 5, 2004 to April 19, 2005) in accordance with IASAP Addendum #IA-04-06 (DOE 2004). Surface and subsurface soil samples were collected from 38 sampling locations under the building slab (DOE 2005b). COCs included radionuclides, metals, VOCs, SVOCs, and PCBs. Several of the soil sampling locations specified in the IASAP Addendum could not be sampled because of the large amount of gravel (1-inch and smaller) located underneath much of Building 883. Much of the gravel extended down to bedrock. Instead, the sampling team inspected the area after the building slab was removed to identify areas with gravel staining and to sample soil at those locations. However, no staining was observed. Soil samples were collected as possible where exposed (for example, underneath waste lines, pits, and other deep features) or where there was evidence that the gravel layer was relatively thin. The gravel was also surveyed for radiological contamination. In addition, water in the building excavation and mud/sediment in the gravel were sampled.

Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE 2005b, DOE et al. 2003). The highest radionuclide activities above background are listed below.

- Americium-241 – 0.15 pCi/g
- Plutonium-239/240 – 0.18 pCi/g
- Uranium-234 – 10.3 pCi/g
- Uranium-235 – 0.75 pCi/g
- Uranium-238 – 7.5 pCi/g

Analytical results from the water sample indicated all activities and concentrations were less than RFCA Tier II groundwater ALs, with one exception. Uranium-238 was detected at 1.74 pCi/L, and the Tier II AL is 0.768 pCi/L (the Tier I AL is 76.8 pCi/L); however, uranium isotopic ratios in the downgradient well have a natural signature. Analytical results for the mud/sediment sample indicated all contaminant activities and concentrations were less than RFCA WRW soil ALs. No elevated instrument readings were detected during radiological surveys of the remaining gravel.

In accordance with ER RSOP Notification #05-04 (DOE 2005c), the following RFCA accelerated action was conducted (DOE 2005b, DOE et al. 1996):

- The Building 883 slab and numerous equipment pads were removed. Building 883 OPWL Tanks T-25 and T-26 were removed prior to building D&D.
- Equipment pits were removed, including the Room 138 pit, the Room 139 pit, the steam line pit, the Cincinnati shear pit, and three transformer pits. Two 2,000-ton press pits were also removed. Four caissons under the eastern 2,000-ton press pit remain, but are deeper than 3 ft bgs.

- The Loewy rolling mill foundation was partially removed. The remaining foundation ranges from 14 to 20 ft bgs. The associated four roller table pits were also removed.
- The hydraulic elevator shaft was removed, but the casing around the cylinder remains. The casing is approximately 15 inches in diameter. The top of the casing is approximately 20 ft bgs, and the casing is approximately 12 to 13 ft in length.
- Foundation column pads attached to bedrock remain, but all columns were removed. The buttress beams on the southern and western sides of Building 883 were also removed.
- The air tunnels and air tunnel connections to the plenum building were removed; however, the tunnel between Building 883 and Building 881 remain. Both ends of the tunnel were sealed to disrupt the groundwater pathway. A cinder block wall was constructed at the inner door of each end. A small section of the building foundation was left in the southwestern corner of Building 883 to provide structural support to the tunnel. The top of the tunnel is 3 ft bgs.
- NPWL from Valve Vault 2 to Building 883 and from Valve Vault 2 to Valve Vault 1 were removed. NPWL from Valve Vault 2 to Valve Vault 3 was not removed, but RCRA clean-closed. Valve Vault 2 was removed to greater than 4 ft bgs and grouted. The remaining pipe stub in the valve vault wall was hand-packed with grout.
- All OPWL under Building 883 was removed as well as OPWL from approximately 4 ft east of Valve Vault 2 to Building 883. Remaining OPWL was grouted. OPWL from Valve Vault 2 north to the manway at Eighth Street and Central Avenue and the OPWL from Valve Vault 2 south to the manway were grouted at the manways.
- Sanitary lines under and adjacent to Building 883 were removed as well as the lift station south of the building.
- Storm and roof drains under and adjacent to Building 883 were removed. The storm drain southeast of Building 883 remains. The remaining drain is PVC piping.
- A clay pipe along the western side of Building 883, which was approximately 20 ft bgs, was removed. It is not clear from the as-built drawings or the excavation what this pipe was used for.
- At least the first foot of gravel under all removed structures, including the building slab, sumps, pits, and process waste lines, was removed.

All of the remaining structures are uncontaminated as indicated by in-process radiological surveys. After removal activities were completed, backfilling the Building 883 excavation commenced. The uncontaminated gravel that had been removed to allow structural features to be removed was mixed with clean soil and put back into the excavation. The source of clean soil is Functional Channel 1 (the Trailer T371 area).

NPWLs and valve vaults are addressed under PAC 000-504.

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 883 based on the following:

- Surface soil analytical results were all less than WRW soil ALs.

- Subsurface soil analytical results were all less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 800-3 (DOE 2005b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 883 on June 7, 2005 (CDPHE 2005).

Comments

None

References

CDPHE, 2005, Correspondence to J. Legare, DOE RFPO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-3, June 7.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2004, Industrial Area Sampling and Analysis Plan Addendum #IA-04-06, IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2005a, Final Project Closeout Report for the Building 883 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2005b, Closeout Report for IHSS Group 800-3, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2005c, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #05-04, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 886

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-4
Unit Name:	Critical Mass Laboratory

This Final Update to the HRR for UBC 886 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 886 is summarized in this update. The following HRR volumes contain UBC 886 information:

Original Report – 1992 (DOE 1992);
Update Report – 2001 Annual (DOE 2001a); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1965 to 1998

Historical Summary

The location of UBC 886 is shown on Figure 24. Building 886 was constructed to enable the Nuclear Safety Group to perform criticality experiments in one facility. The primary mission of the Critical Mass Laboratory was to perform criticality measurements on a variety of fissile material configurations in support of Plant activities. The criticality experiments and measurements were performed to establish criticality limits and ensure the safe handling and processing of fissile materials. A simplified sequence of events in performing a typical critical mass measurement involved removing the fissile material from storage, placing it in one of the Reactivity Addition Devices, operating the device remotely until criticality was achieved, measuring the slightly supercritical parameters, reversing the operation of the device to slightly subcritical and measuring these parameters, completing the reversal to well below subcritical, and returning the fissile material to storage. This effort supported the Plant's activities and assisted the Nuclear Regulatory Commission in setting industry safety standards. The measurements were essential to validate computer models that were, in turn, used to establish nuclear criticality safety limits now called Criticality Safety Operating Limits. The Nuclear Safety Group performed approximately 1,700 critical mass experiments using uranium and plutonium in solutions (900 tests), compacted powder (300), and metallic forms (500).

Building 886 was decommissioned during the late 1990s, and demolished during 2002 (DOE 2002a). Removal included the Building 886 slab, the Building 828 pit, and OPWL, and was conducted as a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #02-03 (DOE 2002b) and the IM/IRA Plan for the 886 Cluster (DOE 1998). OPWL were drained and the ends grouted closed. Items remaining include portions of the ventilation tunnel that ran between Building 886 and Building 875 (walls and floor of tunnel >3 ft bgs), an electrical manway (>3 ft bgs), the grouted foundation drain (>3 ft bgs), and the grouted sanitary line running west from the midpoint on the west side of Building 886 to approximately the

midpoint between Buildings 886 and 865, then north to a manway in the driveway leading to Building 865 where it is disconnected and grouted (approximately 6 ft bgs).

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 886 was characterized during April 2001 (DOE 2001a, 2003b). Only a limited portion of the UBC was characterized at this time. The presence of a thick layer of gravel under the building prevented additional sampling. Thirteen surface soil samples were collected, and analyzed for radionuclides, metals, and VOCs. Results indicated all activities and concentrations were less than the proposed RFCA WRW soil ALs (DOE et al. 2002), which were subsequently approved and adopted (DOE et al. 2003).

UBC 886 was further characterized as part of IHSS Group 800-4 (March 13, 2002 to June 13, 2002) in accordance with IASAP Addendum #IA-02-03 (DOE 2001b). Surface and subsurface soil samples were collected from 24 sampling locations (DOE 2003b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA WRW soil ALs (DOE et al. 2002).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 886 based on the following:

- Surface soil analytical results were all less than RFCA WRW soil ALs.
- Subsurface soil analytical results were all less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 800-4 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 886 on May 15, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-4, May 15.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1998, Interim Measure/Interim Remedial Action Plan for the 886 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2001a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001b, Industrial Area Sampling and Analysis Plan Addendum #IA-02-03, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2002a, Final Project Closeout Report for the 886 Cluster Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-03, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 800-4, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2002, Proposed Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 887

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-5
Unit Name:	Process and Sanitary Waste Tanks

This Final Update to the HRR for UBC 887 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 887 is summarized in this update. The following HRR volumes contain UBC 887 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1953 to 2002

Historical Summary

The location of UBC 887 is shown on Figure 24. Building 887 housed process and sanitary waste holding tanks. In 1989, a worker discovered that the process waste tanks had overflowed onto the floor. Investigation of the release determined that the release was excess water from the acid scrubbers in Room 266. This incident resulted in the filing of a RCRA CPIR. The building and the attached pump station was demolished during 2004 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the Decommissioning Closeout Report for the 881 Closure Project (DOE 2004b). The building slab remains. All OPWL within the building and running between Buildings 881 and 887 were completely removed (DOE 2005).

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 887 was characterized as part of IHSS Group 800-5 (March 12, 2003 to April 12, 2004) in accordance with IASAP Addendum #IA-02-04 (DOE 2002). Subsurface soil samples were collected from five sampling locations (one under the building slab and four at the slab corners (DOE 2004c). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant activities and concentrations were less than the RFCA ALs (DOE et al. 2003). The highest radionuclide activities above background are listed below.

- Uranium-235 – 0.22 pCi/g

- Uranium-238 – 2.56 pCi/g

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 887 based on the following:

- Subsurface soil analytical results were less than RFCA WRW soil ALs. (No surface soil samples were collected.)
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.

After review of the Data Summary Report for IHSS Group 800-5 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 887 on June 21, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 800-5, June 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #IA-02-04, IHSS Groups 800-2 and 800-5, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Decommissioning Closeout Report for the 881 Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004c, Data Summary Report for IHSS Group 800-5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2005, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 889

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	800-6
Unit Name:	Decontamination and Waste Reduction

This Final Update to the HRR for UBC 889 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 889 is summarized in this update. The following HRR volumes contain UBC 889 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2003 Annual (DOE 2003a).

Date(s) of Operation or Occurrence

1966 to 2000

Historical Summary

The location of UBC 889 is shown on Figure 24. Building 889 was placed into service in 1966. Building 889 housed decontamination and waste reduction operations for wastes originating outside the PA. Wastes entering Building 889 included surplus equipment that would be decontaminated by steam cleaning for reuse on site or sale offsite. HEPA filters, combustible wastes, and non-reusable equipment were compacted, placed in crates, and shipped offsite for disposal.

Building 889 contained two concrete sumps within the concrete slab. The sumps were designated as Tank 28 and were connected to the OPWL, which ran to Tank 40, which was located west of UBC 889.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 889 was characterized as part of IHSS Group 800-6 (May 8, 2002 to October 16, 2002) in accordance with IASAP Addendum #IA-02-01 (DOE 2001). Surface and subsurface soil samples were collected from 11 sampling locations under the building slab (DOE 2003b). COCs included radionuclides, metals, VOCs, and SVOCs. Analytical results indicated all contaminant concentrations were less than the proposed RFCA WRW soil ALs (DOE et al. 2002), which were subsequently approved and adopted (DOE et al. 2003).

The Building 889 slab, Tank 28, waste lines, and other subsurface structural features, including footer walls, footers and sumps, were removed as a RFCA accelerated action (DOE et al. 1996) in accordance with ER RSOP Notification #02-02 (DOE 2002). P-10, a stainless steel OPWL line beneath Building 889 and extending from Building 889 to Valve Vault 4, was completely removed as part of the accelerated action. Four OPWL manways associated with Building 889 were also completely removed (DOE 2005). Activities were conducted between May and July 2002, and ended with site grading and vegetation (DOE 2003b).

No Further Action Recommendation

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 889 based on the following:

- Surface soil analytical results were all less than RFCA WRW soil ALs.
- Subsurface soil analytical results were all less than WRW soil ALs.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 800-6 (DOE 2003b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 889 on March 25, 2003 (CDPHE 2003).

Comments

None

References

CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-6, March 25.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2001, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #02-02, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2003a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005, Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2002, Proposed Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PAC REFERENCE NUMBER: UBC 991

IHSS Number:	Not Applicable
Current Operable Unit:	IA
Former Operable Unit:	Not Applicable
IHSS Group:	900-1
Unit Name:	Weapons Assembly and R&D

This Final Update to the HRR for UBC 991 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this UBC in accordance with the RFCA accelerated action process. The disposition of UBC 991 is summarized in this update and includes Buildings 991, 996, 997, 998 and 999, and the interconnecting tunnels (991 Tunnel, Tunnel 996, and Tunnel 998). Buildings 996, 997, 998, and 999 were Building 991 vaults. The following HRR volumes contain UBC 991 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1952 to 2003

Historical Summary

The location of UBC 991 is shown on Figure 24. Building 991, constructed between 1951 and 1952, was the first major building to be completed at RFETS. Building 991 was designed for shipping and receiving, and final assembly of weapon components. Plutonium, enriched uranium, and depleted uranium components fabricated on site, along with components manufactured from the Hanford Site and the Oak Ridge Reservation, were assembled into final products, inspected, tested, and placed back in storage prior to off-site shipment in Building 991. Radioactive and nonradioactive raw materials, special-order items, packaging items, components, and samples were stored in the Building 991 vaults. Administrative services for the Plant were also carried out in Building 991 until Building 111 was completed in 1953.

In 1957 final trigger assembly was moved to the newly constructed Building 777. Assembly of older uranium-based weapons continued in Building 991 until the 1960s. A limited number of plutonium-based triggers may have been assembled in Building 991 during the early 1960s. After 1957, the mission of Building 991 focused on shipping, receiving, and storage. Materials handled included special nuclear, nonradioactive raw, and classified materials; other metal components; partially finished products; purchase-order items; special-order items; samples; instruments; and documents. All radioactive materials received and stored in Building 991 were in DOT, DOE, or intra-plant-approved shipping containers.

In addition to material shipping, receiving, and storage, a number of Research and Development (R&D) projects were conducted in Building 991 from the 1960s to the mid-1970s. These projects included radiation studies, beryllium-coating processes, and an explosives-forming project. Most special projects and R&D operations were moved out of the building by 1976.

A metallographic laboratory in Building 991 was used to test the quality of non-nuclear raw material and non-nuclear, nonclassified parts fabricated by off-site vendors. In the mid-1970s, Building 991 took over storage and inventory functions from Building 881 for these non-nuclear raw materials and non-nuclear, nonclassified parts. In the late 1980s, handling of nonclassified materials and parts was moved to Buildings 130 and 460. Materials and parts ready for assembly were moved directly to Building 460.

Until the mid-1980s, materials were shipped and received from the eastern dock areas. The western dock was added in the mid-1980s to provide a covered shipping area specifically designed for the safe, secure transports used to ship production materials. Until 1994, when a special loading dock was added to Building 371, Building 991 had the only shipping/receiving dock at the Plant capable of handling off-site shipments of special nuclear and classified materials.

The final activity in Building 991 was waste storage. However, all waste was removed from the building during the fall of 2003.

The building was demolished during 2004 as a Type 2 facility in accordance with an approved Facility Disposition RSOP Notification and as documented in the D&D Closeout Report (DOE 2005). The basement, vaults and most of the tunnels were left in place. The foam fire that occurred during building removal did not adversely impact soil at the UBC (DOE 2004b). After the building was demolished, the excavation was backfilled and the site was graded as necessary to minimize erosion and prevent any large-scale ponding of precipitation. The site was later graded to conform to the Site's land configuration plan.

Soil and/or groundwater beneath the building may have become contaminated because of activities conducted within the building. Indoor unplanned events and routine operations, such as chemical spills and releases from process equipment or waste lines, may have led to under building contamination. Building sumps, floors, and foundation walls may have cracked or been otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

UBC Investigation

UBC 991 was characterized as part of IHSS Group 900-1 (February 4, 2003 to January 19, 2004) in accordance with IASAP Addendum #IA-03-03 (DOE 2003). Surface and subsurface soil samples were collected from 24 sampling locations (19 under the building slab and 4 adjacent to the slab (DOE 2004b). COCs included radionuclides, metals, and VOCs. Analytical results indicated contaminant concentrations were less than the RFCA ALs (DOE et al. 2003), with three exceptions. One surface sample and two subsurface samples had arsenic concentrations greater than the AL. The surface concentration was 25.2 mg/kg, the subsurface concentrations were 25.1 and 40.0 mg/kg, and the AL is 22.2 mg/kg. The highest radionuclide activities above background are listed below.

- Uranium-234 – 6.1 pCi/g
- Uranium-235 – 0.34 pCi/g
- Uranium-238 – 6.1 pCi/g

Based on the accelerated action characterization results and the SSRS evaluation, no accelerated removal action was necessary (DOE 2004b). The area is not susceptible to high erosion.

No Further Action Recommendation

Accelerated action data indicated contaminant activities and concentrations were less than RFCA WRW soil ALs (DOE et al. 2003), with three exceptions. As indicated above, one surface sample and two subsurface samples had arsenic concentrations greater than the AL. However, results of the SSRS indicated additional action was not necessary. Results of the stewardship evaluation also indicated additional action was not necessary. Additionally, no long-term stewardship activities were recommended for the UBC beyond the generally applicable Site requirements that may be imposed on this area in the future.

In accordance with RFCA (DOE et al. 1996), an NFAA was justified for UBC 991 based on the following:

- Surface soil analytical results were less than RFCA WRW ALs with one arsenic exception. The elevated arsenic concentration in surface soil was 25.2 mg/kg, and the AL is 22.2 mg/kg. The 95 percent UCL of the mean arsenic concentration across the area of concern divided by soil AL was less than one.
- Subsurface soil analytical results were less than WRW ALs with two arsenic exceptions. Concentrations were 25.1 and 40 mg/kg, and the 40 mg/kg concentration was detected at a depth of over 20 ft bgs, beneath the Building 998 vault.
- Results of the SSRS did not indicate additional action was necessary. The area is not susceptible to high erosion.
- Results of the stewardship evaluation did not indicate additional action was necessary.

After review of the Closeout Report for IHSS Group 900-1 (DOE 2004b) by the regulatory agencies, DOE received approval from CDPHE (the LRA) of the NFAA status for UBC 991 on March 31, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. H. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1, March 31.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

DOE, 2004a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Closeout Report for IHSS Group 900-1, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2005, Final Project Closeout Report for the 991 Cluster Closure Project, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, CDPHE, and EPA, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

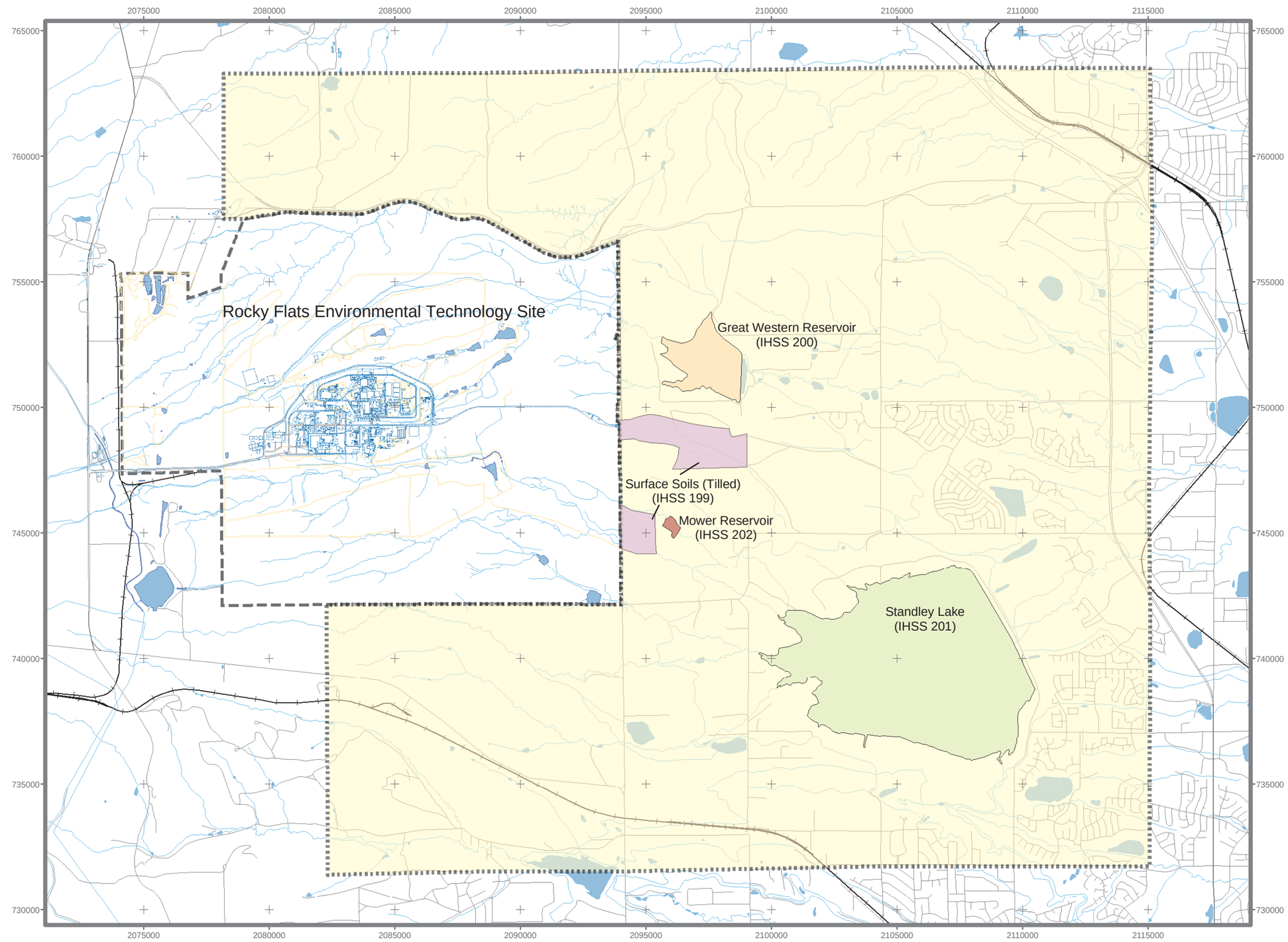

Figure 25

Operable Unit 3 Location Map

Key

- Road
- Major Road
- Rail Road
- Stream
- Site Boundary
- Lake
- Demolished Structure
- OU3 Study Area
- IHSS 199 (Tilled Area)
- IHSS 200
- IHSS 201
- IHSS 202

N
W E
S

0 2,400 4,800 Feet

Scale 1:48,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 10.05.2005

File: W:\Projects\fy2005\05-0216\Fig25.mxd

PAC REFERENCE NUMBER: OFF-SITE AREAS 1, 2, 3, and 4

IHSS Number:	199 (Contamination of the Land's Surface) 200 (Great Western Reservoir) 201 (Standley Lake) 202 (Mower Reservoir)
Current Operable Unit:	Not Applicable
Former Operable Unit:	3
IHSS Group:	Not Applicable
Unit Name:	Off-Site Areas

The Final Update to the HRR for IHSSs 199, 200, 201, and 202 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of these IHSSs in accordance with the RFCA accelerated action process. The disposition of the Off-Site Areas is summarized in this update. The following HRR volumes contain Off-Site Area information:

Original Report – 1992 (DOE 1992); and
Update Report – 1997 Annual (DOE 1997a).

Date(s) of Operation or Occurrence

1952 to 1997

Historical Summary

RFETS OU 3, Off-Site Areas, consists of four contaminated off-site areas where contamination is associated with Rocky Flats operations: IHSS 199 (Contamination of the Land's Surface), IHSS 200 (Great Western Reservoir), IHSS 201 (Standley Lake), and IHSS 202 (Mower Reservoir) as shown on Figure 25. These four IHSSs are all located downwind and downgradient of RFETS in relatively close proximity to the Site's eastern boundary. For purposes of simplifying the HRR, these off-site IHSSs have been aggregated into this single write up under PAC Reference Number Off-Site Areas 1, 2, 3, and 4. However, they are discussed separately below because they have been separately investigated and characterized in previous studies (DOE 1992, 1997a).

The studies concluded that some hazardous substances from historical RFETS activities were transported to the Off-Site Areas through surface water and air pathways; however, in-depth analyses of the study results led to a "no action" remedy identification for OU 3.

IHSS Investigations

The following sections summarize the historical release information and site conditions as presented in the original HRR (DOE 1992) and supplemented by information presented in the OU 3 RFI/RI Report (DOE 1996a) and the OU 3 CAD/ROD (DOE 1997b).

OU 3 RFI/RI

IHSSs 199, 200, 201, and 202 were investigated in accordance with the Final RFI/RI Work Plan for OU 3 (DOE 1991). The OU 3 RFI/RI concluded that only surface soil and surface sediment

media contained COCs for which a remedy should be evaluated. The following number of samples and media were collected to support the OU 3 RFI/RI field investigations and COC determination:

- 334 soil samples (radionuclides);
- 76 surface water samples (radionuclides and metals);
- 345 sediment samples (radionuclides, VOCs, and metals); and
- 8 groundwater samples (radionuclides and metals).

Based on data usability assessments, statistical evaluations, and weight-of-evidence evaluations, only two radionuclides (plutonium-239/240 and americium-241) were determined to be COCs in surface soil and surface sediment. To address the ecology, qualitative and quantitative sampling was performed to characterize, determine biotic components, and measure bioaccumulation of COCs. Terrestrial and aquatic ecosystem sampling and analyses indicated minimal risk to either the terrestrial or aquatic ecology as a result of the presence of the COCs within the soil and sediment.

The HHRA portion of the OU 3 RFI/RI evaluated both residential and residential-based exposure scenarios for COCs and source areas for IHSSs 199 and 200. The HHRA identified dermal contact, inhalation, ingestion, and external radiation as the potential exposure routes (DOE 1996a).

Corrective Action Decision/Record of Decision

Following public review and comment of the Proposed Plan, the CAD/ROD was finalized on June 3, 1997. The CAD/ROD selected a No Action remedy for OU 3 (DOE 1997b).

IHSS 199 – Contamination of the Land's Surface

IHSS 199, Contamination of the Land's Surface, was delineated by the nature and extent of off-site surface contamination described in the RFI/RI. The IHSS 199 COCs were identified as plutonium-239/240 and americium-241, in surface soil. A combination of surface and subsurface soil samples were collected for the RFI/RI. The surface soil samples consisted of 61 10-acre square plots, spaced approximately 1,000 meters apart. The subsurface soil investigations consisted of sampling undisturbed soil from a vertical profile to a depth of approximately 100 cm. Eleven trenches east of Indiana Street were sampled. Air sampling was also part of the IHSS 199 field investigation. The OU 3 air program had two components: a wind-tunnel study and an air sampling program. Data were collected from both to characterize the health impacts from dispersion of potentially radioactive sediment and soil (DOE 1996a).

As summarized in the CAD/ROD, the highest calculated excess cancer risk from radionuclides for IHSS 199 was 3×10^{-6}. This risk estimate assumed a reasonable maximum exposure to a hypothetical resident (DOE 1997b). Historical data, as well as data collected to support RFI/RI conclusions were used to assess the risk posed by the IHSS. Based on documents on airborne plutonium releases from RFETS, the following were considered to be the most probable sources of IHSS 199 contamination: (1) a September 11, 1957, fire in Building 771; (2) a May 11, 1969 fire in Building 776; (3) leaking drums of plutonium-contaminated lathe coolant at the 903 Pad (PAC 900-112); and (4) low-level contamination contained in building filtered exhaust system stack effluent. Other possible sources included on-site burning of flammable wastes for disposal purposes, including waste oils contaminated with trace amounts of uranium (PAC 300-128,

PAC 900-153, and PAC 300-171). Less plausible potential sources include a fire in Building 444 that breached the building exhaust filters, possibly releasing airborne beryllium to the environment (PAC 400-157.2), and entrainment by high velocity winds of waste water from the SEP (PAC 000-101). SEP waste water contained nitrates and trace amounts of radionuclides, primarily uranium isotopes and nonradioactive metals. Studies concluded that the great majority of the plutonium at IHSS 199 originated as windborne particulates from the 903 Pad, rather than the 1957 and 1969 fires, and chronic stack emissions, or other sources (DOE 1997b).

Also included within IHSS 199 are lands adjoining the eastern and southern RFETS boundaries (the "lawsuit acreage"), which were the subject of a 1975 lawsuit filed by the land owners against the Site contractors at the time, alleging contamination of the land's surface by historical RFETS releases. Several technical investigations and studies of the lawsuit acreage were conducted by the various parties to the lawsuit to provide supporting evidence in the case. Under a July 1985 settlement agreement, remedial action was to be implemented on those portions of the land containing plutonium-239/240 in surface soil in concentrations exceeding the CDPHE construction standard of 0.9 pCi/g. Two contiguous tracts of land immediately east of RFETS totaling 350 acres (the "remedy acreage"), then owned by the City of Broomfield and Jefferson County, were targeted for remediation. Remediation design primarily consisted of tilling to reduce surface concentrations and revegetating to stabilize the soil (DOE 1992, 1996a). According to the Final RFI/RI (approved June 1996), at the time of its writing, approximately 120 acres of the Jefferson County land had been remediated and the City of Broomfield did not request that RFETS remediate their portion of the remedy acreage. The Jefferson County land, approximately 250 acres, was acquired by the City of Westminster in February 1995 (DOE 1996a).

IHSS 200 – Great Western Reservoir

IHSS 200 encompasses Great Western Reservoir, off-site reaches of Walnut Creek (which formerly flowed into the reservoir from RFETS), and downstream surface water features possibly impacted by outflow from the reservoir.

Great Western Reservoir is located less than 1 kilometer from the RFETS eastern boundary. The reservoir is owned by the City of Broomfield and is used solely for irrigation. Great Western Reservoir receives most of its water through the McKay Ditch Bypass from Coal Creek. Coal Creek is west of RFETS and is not believed to be impacted by Rocky Flats activities. In the past, Great Western Reservoir also received influent from Walnut Creek, which flows from RFETS. A chromic acid release at RFETS in 1989 (DOE 1992) prompted construction of a Walnut Creek diversion around Great Western Reservoir, known as the Broomfield Diversion Ditch, which now prevents surface water flowing from RFETS from reaching Great Western Reservoir (DOE 1992).

During the operating history of RFETS, various waste streams were discharged through the on-site A-Series (A-1, A-2, A-3 and A-4) (PACs NE-142.1, NE-142.2, NE-142.3, and NE 142.4) and B-Series (B-1, B-2, B-3, B-4, and B-5) (PACs NE-142.5, NE-142.6, NE-142.7, NE-142.8, and NE-142-9) Ponds to Walnut Creek. Since September 1974, Rocky Flats has participated in and complied with the NPDES permitting process. The effluents contained metals, radionuclides, and inorganic ions (especially nitrate) within concentration limits considered acceptable at the time. Contaminants from these discharges accumulated in varying amounts in the sediments of the on-site ponds, Walnut Creek, and Great Western Reservoir. Radioactive materials released

from RFETS may also have been transported to Great Western Reservoir as airborne particulates (fugitive dust) (DOE 1992). Sediment removal from Ponds B-1, B-2, and B-3 was completed in March 2005 (DOE 2005).

Available data from on-site RFETS OUs, particularly OU 6 (Walnut Creek Drainage), provide an indication of contaminants other than plutonium that could conceivably have impacted Great Western Reservoir through surface water transport from Rocky Flats. Leaks from the SEP (PAC 000-101) are known to have contaminated groundwater and surface water in the Walnut Creek Drainage, primarily with nitrate and other inorganic ions. Inorganic ions, nonradioactive metals, VOCs, and uranium were detected in the Walnut Creek B-Series Ponds. Herbicides applied in the past at various locations on Rocky Flats have also been detected in RFETS surface water. Other potential RFETS-derived contaminants in IHSS 200 other than plutonium-239/240 and americium-241 have not been extensively studied; however, a 1973 EPA study measured concentrations of beryllium and select radionuclides other than plutonium-239/240 in Great Western Reservoir sediments. No significant variations in the concentrations of these potential Rocky Flats contaminants were observed throughout the reservoir or between Great Western Reservoir and Standley Lake (IHSS 201).

An accidental release of tritium from Rocky Flats into Walnut Creek and Great Western Reservoir occurred in 1973. Tritium concentrations in Great Western Reservoir water returned to approximately background levels by 1977. Tritium was one of the radionuclides routinely monitored in RFETS surface water effluents up until FY2004, at which point the history of tritium nondetections resulted in the decision documented in the IMP to cease monitoring for this analyte (DOE 2004). Tritium contamination in reservoir sediments has not been studied; however, tritium is not expected to concentrate in sediments because of its high mobility in the environment (DOE 1992).

Numerous sampling programs were conducted at Great Western Reservoir, focusing primarily on plutonium-239/240 and americium-241 contamination in reservoir bottom sediments. The results have shown that a discrete layer of sediment containing plutonium-239/240 greater than the EPA estimated baseline (worldwide atmospheric fallout) level of less than or equal to 0.1 pCi/g is present throughout the bottom of the reservoir. Samples collected from Colorado Front Range reservoirs believed to be unaffected by RFETS activities have corroborated this estimated baseline concentration. The highest concentrations of plutonium-239/240 were detected in the deepest areas of the reservoir. The plutonium-239/240-bearing sediment layer corresponds with historical RFETS releases, and was buried to varying depths by subsequent sedimentation. Sedimentation rates based on core samples vary from greater than 3.5 cm/yr in the eastern, deeper areas of the reservoir to less than 0.25 cm/yr in the shallowest areas (DOE 1992).

Characterization samples at IHSS 200 were collected during the OU 3 RFI/RI. The RFI/RI Report substantiated the findings from previous investigations concluding that waterborne transport from RFETS was the most likely means of plutonium-239/240 deposition to Great Western Reservoir sediments. Comparing data gathered during the RFI/RI in 1992 to data gathered in 1983 and 1984, in general, plutonium-239/240 concentrations in sediments decreased from 30 to 10 percent in similar locations. The two data sets exhibit very similar vertical plutonium-239/240 profiles, however, indicating vertical migration of plutonium-239/240 in reservoir sediments is not occurring (DOE 1997b). This conclusion is consistent with previous studies of plutonium-239/240 behavior in RFETS surface water environs that demonstrated the clay fraction of typical RFETS-area sediments has an extremely high affinity for

plutonium 239/240. Related laboratory studies have shown that the adsorption of plutonium 239/240 onto these sediments is rapid and essentially irreversible. The studies demonstrated that plutonium-239/240 in surface water impoundments (for example, reservoirs) is not readily transported from the impoundments. It has been previously concluded that no evidence of plutonium-239/240 migration through the sediment column exists at Great Western Reservoir (DOE 1992).

Since the Plant's inception, RFETS has monitored Walnut Creek water quality immediately inside the RFETS boundary. IHSS 200 surface water quality is also extensively monitored by the City of Broomfield and CDPHE. Water samples from Great Western Reservoir and off-site reaches of Walnut Creek were routinely analyzed for gross alpha and beta radiation, select radionuclides, VOCs, pesticides, herbicides, metals, and base neutral acids (DOE 1992).

The nature and extent of contamination associated with IHSS 200 was delineated in the OU 3 RFI/RI (DOE 1996a). IHSS 200 COCs consisted of radionuclides in surface sediment. Historical data, as well as data collected to support RFI/RI conclusions, were used to assess the risk posed by the IHSS. As summarized in the CAD/ROD, the highest calculated excess cancer risk for IHSS 200 was 9×10^{-7}. This risk estimate assumed a reasonable maximum exposure to a hypothetical resident (DOE 1997b).

IHSS 201 – Standley Lake

IHSS 201 encompasses Standley Lake, off-site reaches of Woman Creek (which previously flowed into the reservoir from RFETS), and downstream surface water features possibly impacted by outflow from the reservoir.

Standley Lake is a large reservoir located approximately 3 kilometers southeast of the RFETS eastern boundary. Uses of the reservoir include municipal water supply and recreation. Approximately 67 percent of the water is used as water supply for the cities of Westminster, Northglenn, and Thornton. The remaining 33 percent is transported through irrigation ditches to agricultural areas northeast of the reservoir, primarily between Broomfield and Fort Lupton. Standley Lake receives approximately 96 percent of its water from Coal Creek through an irrigation ditch, but has also been fed by Woman Creek, which drains the southern side of RFETS (DOE 1992). Woman Creek flows into Woman Creek Reservoir, which was constructed in 1996 as a major component of the Option B water management project. The 400 acre-foot reservoir was constructed to capture Woman Creek surface water from RFETS before it flows into Standley Lake (DOE 1996b).

During the operating history of RFETS, various waste streams were discharged to the Woman Creek drainage (PAC SE-142.10 and PAC SE-142.11 [C-Ponds]). Since September 1974, RFETS participated and complied with the NPDES permitting process. The effluents contained metals, radionuclides, and inorganic ions within concentration limits considered acceptable at the time. Contaminants from these discharges accumulated in varying amounts in the sediments of the on-site holding ponds, Woman Creek, and Standley Lake. Radioactive materials released from RFETS may also have been transported to Standley Lake as airborne particulates (fugitive dust) (DOE 1992).

Prospective RFETS sources of contaminants other than plutonium-239/240 to Standley Lake, particularly VOCs and uranium, existed at OU 1 (881 Hillside) and OU 2 (903 Pad, Mound, and

East Trenches). Herbicides, which have been applied in the past at various locations within RFETS, have also been detected in RFETS surface water (DOE 1992).

Sampling programs at Standley Lake have focused primarily on plutonium-239/240 and americium-241 contamination in reservoir bottom sediments. The results suggest that a discrete layer of sediment containing plutonium-239/240 greater than the EPA estimated baseline (worldwide atmospheric fallout) level of less than or equal to 0.1 pCi/g is present in some areas of the reservoir. As in Great Western Reservoir, the highest plutonium-239/240 concentrations appear to exist in the deepest areas of Standley Lake. The plutonium-239/240-bearing sediment corresponds with historical RFETS releases, which appear to have peaked in 1969. The affected sediments were buried to varying depths by subsequent sedimentation. Sedimentation rates based on a core sample from the deeper area of the reservoir are estimated to be 3.4 cm/yr (DOE 1992). As summarized in the OU 3 RFI/RI, the maximum plutonium-239/240 value in Standley Lake surficial sediments peaked at 0.55 pCi/g and averaged 0.03 pCi/g. The subsurface sediment maximum was 0.38 pCi/g. Additional sampling of IHSS 201 surface water was also conducted during the OU 3 RFI/RI, and concentrations were observed to be either below background or not detected (DOE 1996a, 1997b).

Historical data, as well as data collected to support RFI/RI conclusions, were used to identify COCs associated with IHSS 201. None were identified and risk estimates were not deemed necessary for IHSS 201 (DOE 1996a).

IHSS 202 – Mower Reservoir

IHSS 202 encompasses Mower Reservoir, off-site reaches of the irrigation ditch which feeds the reservoir from Woman Creek, and downstream surface water features possibly impacted by outflow from the reservoir (DOE 1992).

Little documentation exists for Mower Reservoir. Mower Reservoir is a small, privately-owned impoundment located just southeast of RFETS. The reservoir was historically fed by Woman Creek through Mower Ditch, an irrigation ditch located in the RFETS BZ. However, the flow from Woman Creek into Mower Ditch has been completely shutoff since September 1997. Mower Reservoir is used for agricultural purposes, primarily cattle watering and irrigation. It covers an area of approximately 9 acres. Intermittent discharge from Mower Reservoir flows southeast from the reservoir, eventually discharging to Standley Lake (IHSS 201) (DOE 1992).

In contrast to the extensive historical sampling data available for IHSSs 200 and 201, only very limited data have been collected to characterize Mower Reservoir. Mower Reservoir sediment samples collected in 1970 slightly exceeded EPA's expected plutonium-239/240 baseline concentration of less than or equal to 0.1 pCi/g. Because the reservoir is not a public water supply, water quality is not monitored and has not previously been evaluated (DOE 1992). Additional sampling, conducted during the OU 3 RFI/RI, of surficial sediments in the reservoir indicated a maximum plutonium-239/240 activity of 0.49 pCi/g with an average of 0.291 pCi/g. The subsurface sediment concentration maximum was 1.11 pCi/g (DOE 1996a, 1997b).

RFETS-derived contaminants in Mower Reservoir are believed to have been transported primarily as airborne particulates and, to a lesser degree, by surface water through Woman Creek. Numerous investigations of IHSS 199 (Contamination of the Land's Surface) have shown elevated plutonium-239/240 concentrations in surface soil around Mower Reservoir. It is expected that Mower Reservoir received similar amounts of plutonium-239/240 through airborne

transport of dust from the nearby land surface (DOE 1992). These conclusions were affirmed by the OU 3 RFI/RI (DOE 1996a).

Historical data, as well as data collected to support RFI/RI conclusions, were used to identify COCs associated with IHSS 202. None were identified and risk estimates were not deemed necessary for IHSS 202 (DOE 1996a).

No Further Action Recommendation

A No Action CAD/ROD for OU 3 (that is, IHSSs 199, 200, 201 and 202) was approved by EPA (the LRA) and CDPHE. A CERCLA, Section 121(c), 5-year review was also completed from October 2001 through May 2002 with participation of EPA and CDPHE Staff. The No Action decision for OU 3 was determined to be adequately protective (DOE 1997b) (AR Reference number SW-A-004535).

Comments

CERCLA Five Year Review

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants or contaminants remaining at a Site shall be periodically reviewed no less than every 5 years (Five-Year Review) to assure adequate protection of human health and the environment. Comprehensive Five-Year Review Guidance was also issued by EPA in June 2000 and provided such reviews are to be conducted on a Site-wide basis for response actions that did not result in levels of contamination that allow unrestricted and unlimited use. The CAD/ROD for OU 3, signed in May 1997, although a no action decision, stipulated that a Section 121 (c) review would be required for that OU because the completion of the then ongoing review of interim soil ALs for radionuclides was not complete at that time. This date was considered the trigger for this first periodic Site review.

DOE conducted the review from October 2001 through May 2002, with participation of EPA and CDPHE Staff. The Final Report (DOE 2002), which includes a Protectiveness Statement, as required by EPA guidance, was concurred with by EPA on September 26, 2002.

Pursuant to the Protectiveness Statement, DOE's ongoing custody and control of RFETS, ongoing monitoring programs and restriction of public access serve to adequately control risks posed by contamination at RFETS. The no action decision for OU 3, which lies to the east of the RFETS property boundary and outside DOE custody and control, was determined to be adequately protective. In addition, it was recognized that DOE was continuing cleanup under RFCA and proceeding towards a final remedy that is expected to be adequately protective when implemented.

It was also concluded that final remedy for OU 1 is protective and that the accelerated actions addressed the immediate hazards presented prior to the actions and for the most part are functioning as intended. The potential bypassing of the Solar Pond Plume Reactive Barrier by contaminated ground water was identified an area where the system may not be properly functioning, but this did not result in contaminated ground water impacting surface water that left the Site above water quality standards.

Recommendations to address issues and deficiencies noted were also made.

References

DOE, 1991, Final RFI/RI Work Plan for OU 3, Rocky Flats Plant, Golden, Colorado, December.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996a, Phase 1 RFI/RI for Operable Unit 3, Offsite Releases, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 1996b, Final Construction Report for the Woman Creek Dam and Reservoir Project, prepared by CH2M Hill, Rocky Flats Plant, Golden, Colorado, February.

DOE, 1997a, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1997b, Final Corrective Action Decision/Record of Decision Declaration, Operable Unit 3 The Offsite Areas, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002, First Five-Year Review Report For Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004, Integrated Monitoring Plan FY 2004, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2005, Closeout Report for IHSS Group NE-1 (Ponds B-1 [IHSS NE-142.5], B-2 [IHSS NE-142.6], and B-3 [IHSS NE-142.7]), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

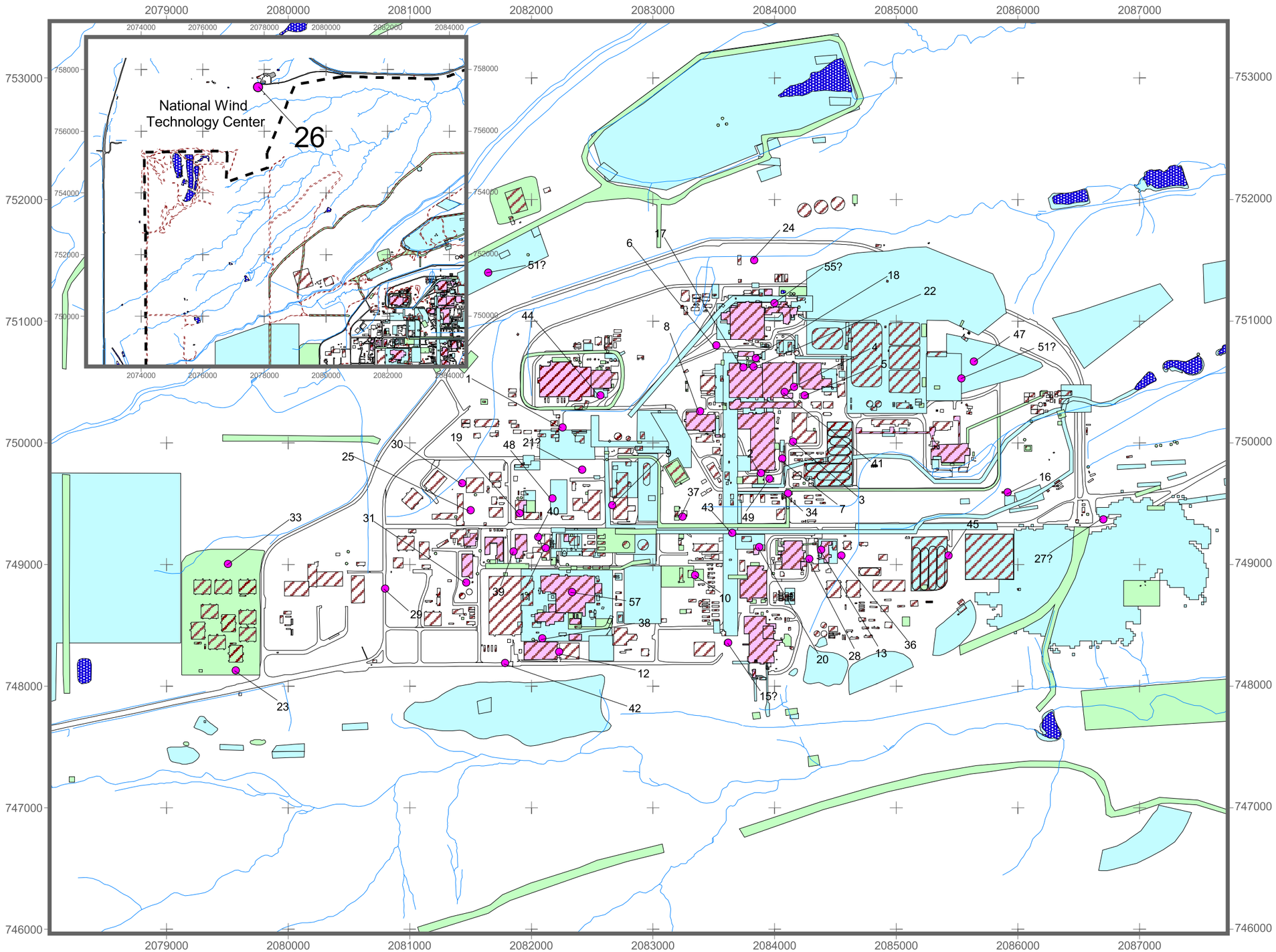

Figure 26
Rocky Flats Environmental Technology SIte
PIC Locations

KEY

- Approximate PIC location
- ? Assumed location using available information
- Stream
- Pond
- Demolished building or removed structure
- IHSS
- UBC
- PAC

(Inset Shows Location 26)

Insufficient Information Exists to Identify Location for Following PICs

14
32
35
46
50 (may coincide with NPWL/OPWL)
51 may have been PU&D Yard (IHSS 170) or S&W Yard (IHSS 165)
52
53
54
56 Rio Grande Motorways leak (occurred offsite)
58
59
60
61

N
W E
S

150 0 150 Feet

Scale = 1: 2100

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\hrr_fig_26.apr

PIC REFERENCE NUMBER: 1

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Leak – Portal 2

The Final Update to the HRR for PIC 1 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 1 is summarized in this update. The following HRR volumes contain PIC 1 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November and December 1988

Historical Summary

The approximate location of this PIC is shown on Figure 26. During the week ending November 5, 1988, a hydraulic system pressure gauge on the Portal 2 gate failed, spraying oil onto the equipment cabinet and leaking oil onto the ground. On December 7, 1988, a spill of less than 5 gallons of hydraulic fluid from the Portal 2 gate mechanism was reported to Environmental Management (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 1 was identified detailing the fate of the constituents released or the location.

The material safety data sheet (MSDS) for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case-by-case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 1-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 1 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was believed to have been cleaned up and very likely to asphalt given the nature of Portal 2. It is not likely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 2

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Gasoline Spill South of Building 707

The Final Update to the HRR for PIC 2 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 2 is summarized in this update. The following HRR volumes contain PIC 2 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 26, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. A can of gasoline fell from a truck and spilled approximately 1 gallon onto the ground beside a road. The soil was removed and placed into a drum as a response to this occurrence (DOE 1992). The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91 percent, thus this material was handled as a RCRA-regulated hazardous waste. No additional documentation was found that further details responses to this occurrence.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 2 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 2-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 2 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on discussions at that meeting, it was agreed that an NFA was justified for PIC 2 because the spill was cleaned up; and it did not further impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 3

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Battery Acid Spill – Building 750

The Final Update to the HRR for PIC 3 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 3 is summarized in this update. The following HRR volumes contain PIC 3 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 10, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. A battery was dropped outside the entrance to Building 750. Liquid spilled from the battery onto the concrete walkway. Sodium bicarbonate was used to neutralize the acid and the residue was disposed of in the Present Landfill (PAC NW-114) (DOE 1992).

The event was designated as a PIC, during the HRR investigation in 1992, because the reference was not clear regarding the specific entrance to Building 750. No additional documentation was identified for PIC 3 detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 3-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 3 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on discussions at the meeting, it was agreed that an NFA was justified for PIC 3 because the spill was cleaned up and was to either an asphalt or concrete surface. This spill did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 4

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Process Cooling Water Spill – Buildings 776/777

The Final Update to the HRR for PIC 4 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 4 is summarized in this update. The following HRR volumes contain PIC 4 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

February 6, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. On February 6, 1989, an alarm indicated a high liquid level in an unused production pit outside Buildings 776 and 777. A pipe froze and broke, spilling 1,200 gallons of process cooling water into the pit. The exact location of the pipe break could not be determined from documentation reviewed. Process cooling water with an activity of 51 pCi/L of an unknown material was released into the pit; however, the pit is believed to have prevented a release to the environment. In response, the supply and return valves to the production pit were closed, thereby isolating the pit from the system. The water in the production pit was analyzed and a determination was made to pump the liquid to the process waste drains. No additional documentation was found that further details response to this occurrence (DOE 1992).

PIC Investigations

When the original HRR was prepared, the exact location of this occurrence could not be determined from documentation reviewed. However, two SOEs from Buildings 776/777, who were in the building at the time of the release, recently reported (2004) that the process cooling water spilled into the Building 781 Pit (DOE 2004b). B781 is a small, below-grade concrete building/pit located just southeast of Building 777 that contained a helium compressor system for Building 777. It was out of service in 1989 according to the SOEs. There was a liquid level alarm in Building 781 that sounded in Building 777. The SOEs stated that the water filled the pit but did not release to the environment, and the water was pumped out of the pit into a process waste drain in Building 777 (DOE 2004b).

The concentration of radionuclides in the process cooling water released into the pit was very low relative to the WRW ALs. The water had a radionuclide concentration of 51 pCi/L, or 0.051 picocuries per milliliter (pCi/mL) (0.051 pCi/g) (DOE 2004b).

In accordance with the IASAP Addendum #IA-03-04 (DOE 2003), several samples were collected in the vicinity of PIC 4. Analytical results for these samples were less than RFCA WRW soil ALs.

No Further Action Recommendation

This spill was into a pit; and it did not impact soil or water. It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation, sampling and analysis, where appropriate, would be performed for PIC 4 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 4 on April 30, 2004 (CDPHE 2004). The primary reason for NFA approval of PIC 4 was based upon the very low radiological activity (0.051 pCi/mL).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 5

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Coolant Spill – Building 729

The Final Update to the HRR for PIC 5 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 5 is summarized in this update. The following HRR volumes contain PIC 5 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November 13, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. Due to a faulty thermostat, the cooling system in Building 729 failed during routine testing of the emergency generator. Five gallons of coolant flowed out of the radiator and onto the ground outside the building. The coolant consisted of 50 percent ethylene glycol in water. The generator was shut down and the faulty thermostat was replaced (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 5 was identified detailing the fate of the constituents released or the location.

Using the Integrated Risk Information System (IRIS) reference dose of 2 milligrams per kilogram per day (mg/kg/day) and a hazard quotient (HQ) of 1.0, the calculated WRW soil AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

PIC Investigations

No other PIC 5-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 5 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was believed to have been cleaned up and not a reportable quantity. It

is not likely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 6

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Fuel Oil Spill – Building 707

The Final Update to the HRR for PIC 6 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 6 is summarized in this update. The following HRR volumes contain PIC 6 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

April 6, 1987

Historical Summary

The approximate location of this PIC is shown on Figure 26. A construction contractor was drilling a fence post-hole when he struck a fuel oil line. The line ruptured and spilled approximately 28 gallons of diesel fuel. CDH and the Colorado Oil Inspector were notified of the spill (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

Additional research was completed regarding PIC 6 for the Annual Update to the HRR for 2004 (DOE 2004a). Pictures associated with the spill reveal that the spill actually took place on the northern side of Building 776 and was not associated with Building 707 (DOE 2004a). The photos of the spill indicate the diesel flowed a short distance north and then west. The entire area was paved in the vicinity of the spill as a radiation control measure in response to the Building 776 fire. It is unlikely that a release of 28 gallons of oil migrated to an unpaved area (DOE 2004a).

PIC Investigations

No other PIC 6-specific investigation was deemed necessary.

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 6 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report

(DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 6 on April 30, 2004 (CDPHE 2004).

An NFA was justified for PIC 6 because the spill was onto asphalt; and it did not adversely impact soil or water. Further, it was agreed that the spill was likely cleaned up for practical/safety purposes because the area is heavily used by Plant personnel.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 7

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Spill – Building 707

The Final Update to the HRR for PIC 7 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 7 is summarized in this update. The following HRR volumes contain PIC 7 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

December 7, 1990

Historical Summary

The approximate location of this PIC is shown on Figure 26. Approximately 2.5 gallons of hydraulic oil were released from a broken line on a forklift and spilled onto the asphalt outside Building 707. The hydraulic oil was cleaned up and disposed of per procedures (DOE 1992). No documentation was found that further detailed response to this occurrence.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 7 was identified detailing the fate of the constituents released or the location.

The MSDS for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case by case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 7-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 7 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up. It is very unlikely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 8

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Diesel Oil Spill North of Building 559

The Final Update to the HRR for PIC 8 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 8 is summarized in this update. The following HRR volumes contain PIC 8 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 2, 1985

Historical Summary

The approximate location of this PIC is shown on Figure 26. A portable air compressor was tipped off of its leveling blocks spilling approximately 1 gallon of No. 2 diesel fuel onto the roadway north of Building 559. A truck driver spread sand on the spill and the sand was to be cleaned up the following day (DOE 1992). No further information could be found detailing the response to this incident.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 8 has been identified, detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 8-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 8 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was believed to have been cleaned up and was to a roadway (not directly to soil). It is very unlikely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 9

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: 500-2

Unit Name: Building 551 Chemical Leaks

The Final Update to the HRR for PIC 9 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 9 is summarized in this update. The following HRR volumes contain PIC 9 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

April 1, 1965, and May 1974

Historical Summary

The approximate location of this PIC is shown on Figure 26. On April 1, 1965, an unspecified amount of aqueous ammonia leaked from drums onto the ground at Building 551. The drums were inside a railroad car at the time they were observed leaking. A leaking drum of carbon tetrachloride was found outside Building 551 during an inspection in May 1974. Both ammonia and carbon tetrachloride were released to the environment. The leaking drum of carbon tetrachloride found outside Building 551 was disposed of at an unidentified location (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

According to its MSDS, aqueous ammonia is extremely alkaline (pH=11.6). At this pH, more than 99 percent of the total ammonia (dissolved NH_3 and NH_4^+[ammonium]) exists as dissolved NH_3. The dissolved NH_3 is quickly released as NH_3 gas, which has an intense, pungent, and suffocating odor (DOE 2004b). Recognizing this potential danger, the worker unloading the ammonia from the railroad car wore a full-face respirator. It is likely that most of the ammonia released from the drum entered the atmosphere at the time of the release (DOE 2004b).

A large number of surface and subsurface soil samples were collected and analyzed around Building 551 as part of IASAP Addendum #IA-03-07 for IHSS Group 500-2 (IHSS 500-158) (DOE 2003). Samples were analyzed for VOCs (DOE 2004a). These locations were based on a statistical grid sampling design and adequately characterized this area including the associated PIC 9.

As described in the Closeout Report for IHSS Group 500-2 (DOE 2004c), no sampling locations had exceedances of VOCs. However, one sampling location had 2,600 mg/kg chromium, which exceeded the RFCA WRW soil ALs for chromium VI (268 mg/kg). The chromium hot spot was remediated in 2004 (DOE 2004c).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, at CDPHE that PIC 9 and 12 other PICs would undergo further analysis, and an Action/No Action Recommendation Report would be completed. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the No Action status for PIC 9 on April 30, 2004 (CDPHE 2004). The decision to approve PIC 9 for NFA was based on the review of extensive analytical data collected in this area as part of the IHSS Group 500-2 characterization activities.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, Closeout Report for IHSS Group 500-2, IHSS 500-158 Radioactive Site - Building 551, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PIC REFERENCE NUMBER: 10

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Gasoline Spill East Side of Building 662

The Final Update to the HRR for PIC 10 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 10 is summarized in this update. The following HRR volumes contain PIC 10 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

January 12, 1990

Historical Summary

The approximate location of this PIC is shown on Figure 26. An unspecified quantity of gasoline leaked from an electrician's truck near the east side of Building 662. The HAZMAT Response Team responded to the spill and the situation was corrected. The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91 percent, thus this material was handled as a RCRA-regulated hazardous waste. Details of the spill and corrective actions were not included in the documentation (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 10 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 10-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 10 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team. It is very unlikely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 11

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Ethylene Glycol Spill – Building 443

The Final Update to the HRR for PIC 11 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 11 is summarized in this update. The following HRR volumes contain PIC 11 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

June 25, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. Approximately 15 gallons of ethylene glycol (antifreeze) was released from the Building 443 No. 1 emergency cooling system generator. Some of the liquid was contained on the concrete pad; however, there was evidence that some drained into the rocks surrounding the pad. The antifreeze that was contained on the pad was cleaned up. The RCRA and Environmental Management Groups were notified to respond to and evaluate the release (DOE 1992). No other information could be found pertaining to this release.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004. The release to soil appeared to be minor. That is, most of the ethylene glycol was contained on the concrete pad (DOE 2004a). Ethylene glycol is not a RCRA Appendix VIII hazardous constituent, nor is it a uranium- or plutonium-chemical product that, if spilled, would make the contaminated soil a hazardous waste. The MSDS for ethylene glycol also indicates that if the product is discarded, it does not meet the definition of a characteristic hazardous waste (DOE 2004a).

Using the IRIS reference dose of 2 mg/kg/day and a HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004a).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 11 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the NFA status for PIC 11 on April 30, 2004 (CDPHE 2004). The rationale for the NFA concurrence was that a majority of the ethylene glycol was cleaned up while the release was on the concrete pad.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 12

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Air Compressor Rupture – Building 440

The Final Update to the HRR for PIC 12 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 12 is summarized in this update. The following HRR volumes contain PIC 12 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 6, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. A small fuel oil leak occurred due to the rupture of the fuel line of a portable air compressor. The fuel spilled onto the ground east of Building 440 on July 6, 1989. The spill was immediately absorbed using "Oil-Dri®." The final disposition of the Oil-Dri® is not known (DOE 1992). No further information could be found detailing the response to this incident.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 12 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 12-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 12 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was immediately absorbed with Oil-Dri® and did not adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 13

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Oil Spill – Building 886

The Final Update to the HRR for PIC 13 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 13 is summarized in this update. The following HRR volumes contain PIC 13 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 1988

Historical Summary

The approximate location of this PIC is shown on Figure 26. A portable air compressor leaked compressor oil onto a concrete slab at Building 886. When the compressor was moved, oil-stained concrete was observed (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 13 was identified detailing the fate of the constituents released or the location.

The MSDS for compressor oil (SX68 Diester) indicates very low toxicity effects from inhalation, eye contact, skin contact and ingestion (eCompressed Air 2002). Compressor oil is non-hazardous according to the MSDS and no special warning labels are required under OSHA CFR 1910.1200. There are no referenced exposure limits for compressor oil and degradation products are carbon monoxide and carbon dioxide (eCompressed Air 2002).

PIC Investigations

No other PIC 13-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 13 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill is believed to have been minor in nature and confined to the concrete compressor slab. This release did not adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

eCompressed Air, 2002, MSDS; Compressor Oil, sales@eCompressed Air.com.

PIC REFERENCE NUMBER: 14

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Cooling Tower Water Discharge – Building 447

The Final Update to the HRR for PIC 14 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 14 is summarized in this update. The following HRR volumes contain PIC 14 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

December 2, 1958

Historical Summary

The approximate location of this PIC is shown on Figure 26. Cooling tower water from the Building 447 cooling tower was pumped into a surface ditch and allowed to flow across Plant site. Liquid was noticed in a ditch along the roadway south of Building 991. No documentation was found that further details the location of this occurrence. Building 447 cooling tower water contained sodium chromate. The liquid sampled near Building 991 contained 29 mg/L hexavalent chromium or 81 mg/L sodium chromate (DOE 1992). A temporary dam was placed across the ditch (in an unknown location) to contain the chromate-contaminated water and allow it to seep into the ditch bottom.

Aerial photographs and a site visit did not provide definitive information on the location of this discharge. It is thought that the cooling tower water was discharged into the ditch located south of Building 447 then flowed east to the railroad tracks, north to Cottonwood Avenue, and then east under Sixth Street to the western edge of Parking Lot Number 444. From this point, it is believed to have flowed north under Cottonwood Avenue and then east along the northern side of Cottonwood Avenue to Seventh Street. The flow is believed to have gone north along the western side of Seventh Street to a point adjacent to Tank 224, where it crossed under Seventh Street and flowed northeast into the Central Avenue Ditch at a point northwest of Building 675. The flow is then believed to have traveled east in the Central Avenue Ditch to a point south of Building 991. It is unknown how far beyond this point the water traveled (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 14 was identified detailing the fate of the constituents released or the location.

PIC Investigations

A review of available documentation was conducted in 2004. The measurement of 29 ppm of hexavalent chromium in water near Building 991 is likely representative of the concentration of this compound that was released at Building 447. Because the release took place in December, a generally dry and cold month, there would have been little to no water flowing in the ditches to dilute the cooling tower water. The fact that "liquid was noticed in a ditch along the roadway south of Building 991" implies there was no other flow except the released cooling tower water. A typical concentration of zinc chromate used in cooling towers as a corrosion inhibitor is 20 mg/L, which further indicates the measured concentration of hexavalent chromium at Building 991 is representative of the hexavalent chromium in the cooling tower water.

Chromate is an anion and is weakly sorbed to soil (that is, it would not tend to concentrate). If the cooling tower water saturated the soil (filled the void space), the concentration of chromate per unit weight of soil would be less than the concentration in water because the water only occupies a fraction of the total volume of saturated soil (DOE 2004b).

No Further Action Recommendation

There is no hexavalent chromium contamination in groundwater near the cooling tower water flow pathway exceeding the RFCA Tier I AL (10 mg/L). Figure 2.19 of the 2004 HRR Update (DOE 2004a) identifies locations where metals have exceeded the Tier I ALs for groundwater. Chromium only exceeded its Tier I AL near the SEP, which is nowhere near the flow path of the released cooling tower water.

After review of the PICs Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the No Action status for PIC 14 on April 30, 2004 (CDPHE 2004). Rationale for NFA approval was based on the review of analytical data.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 15

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Process Waste Leak between Buildings 881 and 559

The Final Update to the HRR for PIC 15 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 15 is summarized in this update. The following HRR volumes contain PIC 15 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

January 1981

Historical Summary

The approximate location of this PIC is shown on Figure 26. Liquid was observed in a valve pit (the valve pit location is unknown) that services a process waste pipeline located between Buildings 881 and 559. After pumping out the pit, flow was observed between the inner pipeline and the outer containment pipeline. A leak was found in the inner process waste pipeline near Eighth Street and Central Avenue west of Building 881. Even though the leak was indicated to be in the inner pipeline, airborne radioactivity was detected during the excavation. One total long-lived alpha activity concentration from a portable air sampler exceeded the shutdown level (DOE 1992). The response to this incident included pumping the liquid out of the valve pit, excavating and locating the inner pipeline leak, and repairing the pipeline (DOE 1992).

The event was designated as a PIC because the location of the release (and valve pit) could not be determined during the HRR investigation in 1992. The references indicate the release occurred from the new process waste transfer system (that is, secondary containment is mentioned). Also, the references describe the excavation as being extensive along Eighth Street, indicating the release was likely from either Valve Vault 1 or Valve Vault 2.

PIC Investigations

PIC 15 is described in the 1992 HRR for IHSS 000-162 text (DOE 1992). PIC 15 is located within IHSS 000-162 and was addressed during characterization sampling for IHSS Group 000-4 (refer to IHSS Group 000-4 Closeout Report; DOE 2005). Based on the overall description of PIC 15, the most likely location of the NPWL line break has been removed under IHSS Group 000-4 field activities.

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 15 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action status for PIC 15 on April 30, 2004 (CDPHE 2004). The decision for approving PIC 15 was based on the overlapping IHSS 000-162 and PAC 000-504 approved sampling and characterization activities in the immediate area of Valve Vaults 1 and 2.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-11, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2005, Closeout Report for IHSS Group 000-4, New Process Waste Lines, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

PIC REFERENCE NUMBER: 16

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Picric Acid Burn Site

The Final Update to the HRR for PIC 16 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 16 is summarized in this update. The following HRR volumes contain PIC 16 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

June 1956

Historical Summary

The approximate location of this PIC is shown on Figure 26. Picric acid from Building 771 was disposed of by burning in a small open pit. This took place at an unknown location east of the patrol fence (PSZ inner fence). The reference describes 0.5 lb of picric acid being disposed of by burning. The concentration of the acid was not known (DOE 1992). Picric acid was used in the laboratories; however, no specific use could be identified. In addition the acid can be highly explosive if undiluted and was likely burned as a safe method of disposal. No other documentation was identified pertaining to this occurrence.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 16 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 16-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 16 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the amount of picric acid (0.5 lb) did not likely adversely impact soil or water when burned in 1956. Additionally, PIC 16 and IHSS 900-153 (Oil Burn Pit No. 2) are believed to be overlapping sites and IHSS 900-153 was characterized and remediated in accordance with IHSS Group 900-2 (DOE 2005). See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Closeout Report for IHSS Group 900-2, IHSS 153 - Oil Burn Pit No. 2, and IHSS 154 - Pallet Burn Site, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

PIC REFERENCE NUMBER: 17

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Sewer Line Break – Building 771

The Final Update to the HRR for PIC 17 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 17 is summarized in this update. The following HRR volumes contain PIC 17 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

Approximately November 1977

Historical Summary

The approximate location of this PIC is shown on Figure 26. A water sample was collected near Gate 20 of Building 771 to determine the total long-lived alpha activity and gross beta activity of water released from a sewer line break. Results indicated 27 pCi/L total long-lived alpha activity and 68 pCi/L gross beta activity (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

PIC 17 is part of IHSS 000-500 (Sanitary Sewer System). The Sanitary Sewer System was approved for NFAA on March 21, 2005 (CDPHE 2005). In addition, PIC 17 is within PAC 150.2N and was sampled in accordance with the IASAP Addendum for IHSS Group 700-4. There were no detections above the RFCA WRW soil ALs (DOE 2004a).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 17 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 17 on April 30, 2004 (CDPHE 2004c). NFA approval was based upon review of analytical data (mentioned above) and the fact that there were no detections above the RFCA WRW soil ALs (DOE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

CDPHE, 2005, Approval Letter for NFAA Request of the Sanitary Sewer System, PAC 000-500, IHSS Group 000-3, March 21.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

DOE, 2004c, ER RSOP Notification and Closeout Report for IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

PIC REFERENCE NUMBER: 18

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Carbon Tetrachloride Spill – Building 776

The Final Update to the HRR for PIC 18 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 18 is summarized in this update. The following HRR volumes contain PIC 18 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

July 21, 1964

Historical Summary

The approximate location of this PIC is shown on Figure 26. Radioactively contaminated carbon tetrachloride spilled from a 5-gallon can in the Building 776 solvent storage area during sampling. Two square feet of ground were contaminated. The 5-gallon can of solvent was double-bagged and sent to Building 771. The contaminated ground was covered with gravel (DOE 1992). No additional documentation was found pertaining to this occurrence.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004. The 5-gallon can was used to sample solvent in the Building 776 solvent storage area. The solvent storage area is believed to be within or very near PAC 700-118.1 (Multiple Solvent Spills West of Building 730) located on the western side of Building 730 and north of Building 776. Numerous releases of carbon tetrachloride have occurred in this area both to the subsurface and ground surface (DOE 2004a). IHSS 118.1 is part of IHSS Group 700-3, and the area was characterized and remediated through implementation of IASAP Addendum #IA-03-04 for IHSS Group 700-3 (DOE 2003) and ER RSOP Notification #04-04 for IHSS Group 700-3.

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002 that additional research/investigation and where appropriate, sampling and analysis would be performed for PIC 18 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report

(DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the no action status for PIC 18 on April 30, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-04, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

PIC REFERENCE NUMBER: 19

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Contaminated Vehicles – Building 331

The Final Update to the HRR for PIC 19 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 19 is summarized in this update. The following HRR volumes contain PIC 19 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

May 1954

Historical Summary

The approximate location of this PIC is shown on Figure 26. While conducting a radiation survey at Building 331, several vehicles were found to be radiologically contaminated. The highest maximum direct count activity (1,200 cpm) was found on a truck used for transporting contaminated barrels. Two surveys were conducted and a total of 10 smears were collected (DOE 1992). No other information could be found relating to this incident.

The event was designated as a PIC because the source of the contamination was unknown and could not be determined during the HRR investigation in 1992. No additional documentation for PIC 19 has been identified detailing the disposition of the vehicles.

PIC Investigations

No other PIC 19-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 19 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the contamination appeared to be confined to the vehicle(s) rather than the building location, no source could be identified, and the radionuclides resulting in the elevated count were very likely decontaminated from the vehicle(s). See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 20

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Battery Acid Leak – Building 889

The Final Update to the HRR for PIC 20 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 20 is summarized in this update. The following HRR volumes contain PIC 20 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 18, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. During the transfer of batteries to Building 889, a small amount of battery acid leaked onto the asphalt near the building. The acid was neutralized and cleaned up by Waste Operations. It was determined that the amount of acid spilled was less than a reportable quantity (DOE 1992). No additional documentation was found pertaining to this incident.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 20 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 20-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 20 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up; was to asphalt, and did not adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 21

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – Building 334

The Final Update to the HRR for PIC 21 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 21 is summarized in this update. The following HRR volumes contain PIC 21 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 22, 1990

Historical Summary

The approximate location of this PIC is shown on Figure 26. Approximately 1 gallon of ethylene glycol (antifreeze) leaked from a private vehicle onto the asphalt parking lot near Building 334. The leak was stopped and the spill was cleaned up and "disposed of properly" (DOE 1992). No additional documentation was found pertaining to this incident.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW soil AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No Further Action Recommendation

PIC 21 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up, was not a reportable quantity, was to asphalt and not soil, and did not adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 22

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Diesel Oil Spill North of Building 776

The Final Update to the HRR for PIC 22 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 22 is summarized in this update. The following HRR volumes contain PIC 22 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

March 19, 1986

Historical Summary

The approximate location of this PIC is shown on Figure 26. One gallon of diesel oil (fuel) was spilled in the alley north of Building 776 (DOE 1992). No other documentation was available pertaining to this incident.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 22 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 22-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 22 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was most likely absorbed (this area is heavily used by Plant personnel) and to an asphalt surface. Also, it is not likely that this spill adversely impacted soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 23

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – Building 130D Parking Lot

The Final Update to the HRR for PIC 23 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 23 is summarized in this update. The following HRR volumes contain PIC 23 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 14, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 2 quarts of antifreeze was discovered in the parking lot south of Building 130D. A hose had ruptured on a privately owned automobile releasing the material to the asphalt. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. The HAZMAT team responded and the spill was cleaned up with Oil-Dri®, packaged, and removed from the area. RCRA CPIR No. 91-011 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release. Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW soil AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 23-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 23 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team, was to an asphalt surface and did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 24

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – Building 771 Parking Lot

The Final Update to the HRR for PIC 24 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 24 is summarized in this update. The following HRR volumes contain PIC 24 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 23, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1.5 pints of antifreeze was discovered in the parking lot north of Building 771. A hose had ruptured on a privately owned automobile releasing the material to the asphalt. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. The HAZMAT team responded. The spill was contained and absorbed with Oil-Dri®, packaged, and removed from the area. RCRA CPIR No. 91-012 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW soil AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 24-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 24 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up, was not a reportable quantity; and was to an asphalt surface. The spill did not likely have an adverse impact on soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report, for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 25

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – 205 Parking Lot

The Final Update to the HRR for PIC 25 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 25 is summarized in this update. The following HRR volumes contain PIC 25 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 23, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 3 quarts of antifreeze was discovered in Parking Lot 205, east of Building 111. A hose had ruptured on a privately owned automobile releasing the material to the asphalt. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. The HAZMAT team responded and the spill was contained, absorbed with Oil-Dri®, packaged, and removed from the area. RCRA CPIR No. 91-013 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 25-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 25 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up, was not a reportable quantity; and was to an asphalt surface. The spill did not likely have an adverse impact on soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report, for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 26

IHSS Reference Number: Not Applicable

Current Operable Unit: BZ

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Leak – Building 250

The Final Update to the HRR for PIC 26 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 26 is summarized in this update. The following HRR volumes contain PIC 26 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 26, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 2 quarts of hydraulic oil occurred south of Building 250 (the Windsite Facility). A hose on a tractor leaked releasing the material to the soil. The HAZMAT team responded and the spill was contained and removed from the area. Approximately 1.5 ft^3 of contaminated material was packaged. RCRA CPIR No. 91-014 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 (DOE 1992) and was properly disposed of through the Site's waste management program.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 26 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 26-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 26 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up and was not a reportable quantity. The spill did not likely have an adverse impact on soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 27

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Fluid Leak – East Access Road

The Final Update to the HRR for PIC 27 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 27 is summarized in this update. The following HRR volumes contain PIC 27 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 24, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. The hose on a contractor's backhoe broke allowing hydraulic fluid to spill onto the gravel, and 2 to 3 gallons of hydraulic fluid were released to the environment (DOE 1992). No additional documentation could be found pertaining to this occurrence.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 27 was identified detailing the fate of the constituents released or the location.

The MSDS for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact, and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case by case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 27-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 27 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill is believed to have been cleaned up in accordance with established Plant procedures and the RCRA Staff in place in 1989. It is unlikely that the spill had any adverse effects to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 28

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Air Compressor Oil Spill – Building 865

The Final Update to the HRR for PIC 28 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 28 is summarized in this update. The following HRR volumes contain PIC 28 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 29, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A release of 1 quart of air compressor oil occurred on the pavement west of Building 865 resulting from routine oil changing operations. The air compressor oil was determined to be a RCRA-regulated hazardous waste containing lead and chromium. The HAZMAT team responded to the spill and the contaminated oil was cleaned up with absorbent material, packaged, marked, and stored in accordance with RCRA regulatory requirements. Approximately 1.2 ft^3 of contaminated material were generated during the cleanup. RCRA CPIR No. 91-017 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 (DOE 1992) and was properly disposed of through the Site's waste management program.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 28 was identified detailing the fate of the constituents released or the location.

The MSDS for compressor oil (SX68 Diester) indicates very low toxicity effects from inhalation, eye contact, skin contact, and ingestion (eCompressed Air 2002). Compressor oil is non-hazardous according to the MSDS and no special warning labels are required under OSHA CFR 1910.1200. There are no referenced exposure limits for compressor oil and degradation products are carbon monoxide and carbon dioxide (eCompressed Air 2002).

PIC Investigations

No other PIC 28-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 28 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up, was not a reportable quantity; and was to an asphalt surface. The spill did not likely have an adverse impact on soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

eCompressed Air, 2002, MSDS; Compressor Oil, sales@eCompressed Air.com.

PIC REFERENCE NUMBER: 29

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Transmission Fluid Spill - Building 331

The Final Update to the HRR for PIC 29 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 29 is summarized in this update. The following HRR volumes contain PIC 29 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 4, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 3 gallons of transmission fluid occurred in an area east of Building 131. Transmission failure of a contractor's vehicle resulted in the release of the material to the asphalt and concrete. Approximately 2 ft^3 of waste material was removed and handled as RCRA-regulated hazardous waste containing lead and chromium. The contaminated soil was containerized and removed from the area. RCRA CPIR No. 91-019 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The packaged material was transferred to the Building 331 90-day accumulation area and was properly disposed of through the Site's waste management program. The report states that no threat to the environment should remain (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 29 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 29-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 29 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up, was not a reportable quantity; and was to an asphalt/concrete surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 30

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Spill – Building 115

The Final Update to the HRR for PIC 30 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 30 is summarized in this update. The following HRR volumes contain PIC 30 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 12, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1 gallon of hydraulic oil occurred in an area west of Building 115. The release was from a broken oil line on a contractor's backhoe which released the material to the surrounding soil. The spill consisted of roughly 1 gallon of hydraulic oil that was determined to be a RCRA-regulated hazardous waste. Approximately 3 ft^3 of waste material was generated, containerized, and removed from the area. RCRA CPIR No. 91-020 was submitted to CDH as required per 6 CCR 1007-3, 265.56(j). The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 and was properly disposed of through the Site's waste management program. The report states that no threat to the environment should remain (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 30 was identified detailing the fate of the constituents released or the location.

The MSDS for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case by case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 30-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 30 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was

justified because the spill was cleaned up by the HAZMAT Response Team and was not a reportable quantity (that is, approximately 1 gallon). The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 31

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Spill – Building 125

The Final Update to the HRR for PIC 31 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 31 is summarized in this update. The following HRR volumes contain PIC 31 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 17, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1 gallon of hydraulic oil occurred south of Building 125. A leaking hose on a trash truck resulted in a release of the material to the asphalt. The spill consisted of roughly 1 gallon of hydraulic oil that was determined to be a RCRA-regulated hazardous waste. The HAZMAT team responded. The spill was absorbed and approximately 1.5 ft^3 of waste material was containerized and removed from the area. RCRA CPIR No. 91-021 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 and was properly disposed of through the Site's waste management program. The report states that no threat to the environment should remain (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 31 was identified detailing the fate of the constituents released or the location.

The MSDS for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact, and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case by case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 31-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 31 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was

justified because the spill was cleaned up by the HAZMAT Response Team, was not a reportable quantity, and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 32

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Hydraulic Oil Spill Between the 904 Pad and Building 331

The Final Update to the HRR for PIC 32 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 32 is summarized in this update. The following HRR volumes contain PIC 32 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 24, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 10 gallons of hydraulic oil occurred while a trash truck was in transit between Building 331 and the 904 Pad. The majority of the spill occurred southwest of the 904 Pad near the contractor's trailers. Less than 1 pint of oil was released to the Building 331 parking lot. Approximately 75 ft^3 of waste material was removed. The contaminated material at the 904 Pad was containerized in ten 55-gallon drums and removed from the area. An oil pan was placed beneath the vehicle at Building 331 to containerize the rest of the leak. The truck was repaired on September 25, 1991. RCRA CPIR No. 91-022 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The packaged material was transferred to a 90-day accumulation area near Building 331 and was properly disposed of through the Site's waste management program. The report states that no threat to the environment should remain (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 32 was identified detailing the fate of the constituents released or the location.

The MSDS for hydraulic oil indicates low toxicity effects from inhalation, eye contact, skin contact, and ingestion (Millipore 2005). Hydraulic oil is not considered a listed hazardous waste (40 CFR, Part 261D) by EPA and used hydraulic oil is handled on a case by case basis. Further, hydraulic oil does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity and does not have TCLP characteristics (Millipore 2005).

PIC Investigations

No other PIC 32-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 32 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team and was partially to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

Millipore, 2005, Millipore Environment, Health and Safety, MSDS; Hydraulic Oil.

PIC REFERENCE NUMBER: 33

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Gasoline Leak – T130 Parking Lot

The Final Update to the HRR for PIC 33 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 33 is summarized in this update. The following HRR volumes contain PIC 33 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 30, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 0.5 gallon of gasoline occurred in the north parking lot of the 130- trailer complex. The fuel pump failed on a private vehicle, releasing gasoline onto the pavement. The spill consisted of roughly 0.5 gallon of gasoline. Approximately 1 ft^3 of waste material was removed and handled as a RCRA-regulated hazardous waste because of its benzene content. The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91 percent. The spill was contained and removed from the area. RCRA CPIR No. 91-024 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was released to the pavement and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 and was properly disposed of through the Site's waste management program.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 33 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 33-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 33 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 34

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – Portal 1

The Final Update to the HRR for PIC 34 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 34 is summarized in this update. The following HRR volumes contain PIC 34 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 10, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1 gallon of a 50 percent antifreeze/50 percent water mixture occurred at the north entrance to Portal 1. A small cut was found on the hose of a privately owned automobile releasing the material to the asphalt. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. The HAZMAT team responded and the spill was contained. Approximately 4 pounds of material was removed from the area. RCRA CPIR No. 91-025 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment. The packaged material was transferred to Building 334 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 34-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 34 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 35

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Decontamination Water Spill

The Final Update to the HRR for PIC 35 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 35 is summarized in this update. The following HRR volumes contain PIC 35 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 9, 1991

Historical Summary:

The approximate location of this PIC is shown on Figure 26. While transporting decontamination water from the decontamination facility to the Building 231 storage tanks, a tanker truck spilled approximately 5 gallons of the liquid. Because the clamp-down device on the tanker's port fill had not been tightened, water splashed out onto the pavement when the tanker stopped. A witness described 1 to 2 gallons spilling out at one such stop. The route taken by the vehicle required five stops; therefore, it was assumed a total of 5 gallons was released. Analytical results of the water indicated 18 ppb trichloroethene. At the decontamination facility, workers had just previously decontaminated drilling equipment that had been used at the OU 1 and OU 2 sites. During decontamination procedures, approximately 1.5 lbs of waste were generated and handled as a hazardous waste for spent halogenated solvents (DOE 1992).

Because the exact locations of the spills were not known, and the material had evaporated before cleanup could take place, the asphalt was not remediated. The tanker truck was cleaned with Kimwipes and samples of the decontamination water were taken and sent to a laboratory. The material used to clean the tanker was packaged, marked, and stored according to RCRA requirements (DOE 1992). RCRA CPIR No. 91-026 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that there did not appear to be any threat to the environment due to the small quantities of hazardous material released.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 35 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 35-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 35 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spilled decontamination rinse water evaporated on the asphalt street before the HAZMAT Response Team could be notified. Also, the highest known contaminant in the water was 18 ppb trichloroethene. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 36

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Leak – Building 886 Parking Lot

The Final Update to the HRR for PIC 36 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 36 is summarized in this update. The following HRR volumes contain PIC 36 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 11, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. An antifreeze leak occurred from a private vehicle at the parking lot east of Building 886 because of a loose hose clamp. The release consisted of approximately 1.5 gallons of a 50 percent water/50 percent ethylene glycol solution. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. The HAZMAT team responded to the spill and the material was contained, removed, and packaged according to RCRA regulatory requirements. Roughly 0.5 ft^3 of material was generated during the cleanup. The vehicle was repaired so it could be moved offsite. RCRA CPIR No. 91-027 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release. Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS further states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 36-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 36 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 37

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Gasoline Leak Near 555 Power Substation

The Final Update to the HRR for PIC 37 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 37 is summarized in this update. The following HRR volumes contain PIC 37 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 17, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 0.5 gallon of gasoline occurred from a private vehicle in the ditch east of the 555 Power Substation. The angle at which the vehicle was parked allowed the material to leak out the filler spout onto the ground. The spill was contained and approximately 40 gallon containers of saturated soil was removed. The benzene content of unleaded gasoline typically ranges from 0.4 to 4.91 percent, thus this material was handled as a RCRA-regulated hazardous waste. RCRA CPIR No. 91-028 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 (DOE 1992) and was properly disposed of through the Site's waste management program.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 37 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 37-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 37 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up and consisted of approximately 2 quarts of gasoline. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 38

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Air Compressor Leak - Building 440

The Final Update to the HRR for PIC 38 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 38 is summarized in this update. The following HRR volumes contain PIC 38 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 21, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1.5 gallons of motor oil from an air compressor occurred north of Building 440. The oil reservoir was overpressurized allowing the oil to be forced out through the dipstick tube onto the pavement. Approximately 1.5 gallons of 10W40 motor oil was released. The oil was cleaned up with an absorbent material, containerized, and removed from the area. During the cleanup, roughly 3 ft^3 of material was generated that was to be handled as a RCRA-regulated hazardous waste with toxicity characteristics for chromium and lead (not confirmed by laboratory analysis). RCRA CPIR No. 91-029 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was released to the asphalt and that there did not appear to be any threat to the environment (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 38 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 38-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 38 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 39

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Motor Oil Leak – 441 Parking Lot

The Final Update to the HRR for PIC 39 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 39 is summarized in this update. The following HRR volumes contain PIC 39 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 29, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 1 quart of motor oil occurred at the 441 Parking Lot. The engine oil pan of a vehicle had been severely damaged allowing the release of oil to the asphalt. The HAZMAT team responded to the release and the contaminated soil was containerized and removed from the area. The material was to be handled as a RCRA-regulated hazardous waste because it may have exceeded the TCLP standard for lead. RCRA CPIR No. 91-032 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that no threat to the environment should remain (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 39 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 39-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 39 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up by the HAZMAT Response Team and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 40

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Automatic Transmission Fluid Leak – Building 443

The Final Update to the HRR for PIC 40 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 40 is summarized in this update. The following HRR volumes contain PIC 40 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

October 29, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill of approximately 3 gallons of automatic transmission fluid from an air compressor occurred northwest of Building 443. The compressor was over-pressurized allowing the oil to spill out onto the ground. Approximately 3 gallons of automatic transmission fluid were released. The oil and contaminated soil was cleaned up, containerized, and removed from the area. The cleanup generated roughly 21 ft^3 of material that was to be handled as a RCRA-regulated hazardous waste because it could have exceeded the TCLP standards for lead and chromium. RCRA CPIR No. 91-033 was submitted to CDH as required in accordance with 6 CCR 1007-3, 265.56(j). The report states that the material was removed and that there did not appear to be any threat to the environment. The packaged material was transferred to 90-Day Accumulation Area No. 331-1743 (DOE 1992) and was properly disposed of through the Site's waste management program.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 40 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 40-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 40 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 41

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Leaking Transformer – 777-1

The Final Update to the HRR for PIC 41 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 41 is summarized in this update. The following HRR volumes contain PIC 41 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

1980 to August 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. In 1980 it was reported that Transformer 771-1 was leaking at the drain valve. In November 1985 and again in June and September 1986, Transformer 771-1 was again reported as leaking. Based upon review of the references (DOE 1992), it is apparent that the transformer in question is 777-1 and not 771-1. This updated information is documented within the 2004 HRR (DOE 2004a).

The dielectric fluid in Transformer 777-1 was analyzed (unknown date) and contained 56 ppm PCBs. The drain valve and case near the valve of the transformer was scheduled for recleaning in October 1986. Further cleanup of Transformer 777-1 took place in 2003.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992 (that is, Transformer 771-1 versus 777-1).

PIC Investigations

A review of available documentation was conducted in 2004. Transformer 777-1 contained mineral oil with PCBs at levels slightly greater than the TSCA limits to be classified as PCB-contaminated (50 to 500 ppm). In 1986, leaks were repaired and cleaned up, and PCB-contaminated transformers were drained and refilled with clean mineral oil. The replacement oil in Transformer 777-1 had a PCB concentration of 2.9 ppm (DOE 2004a).

Although Transformer 777-1 was scheduled for cleanup on August 14, 1989, the transformer was not removed until November 2003 (DOE 2004a). Analysis of the transformer oil in 1992 indicated a PCB concentration of only 2 ppm. An inspection of the area on March 4, 2004, indicated no visible signs of significant contamination on the pad or surrounding soil (DOE 2004a). The low concentration of PCBs in the original oil, combined with the reported

cleanup operation in 1986, was confirmed by the noted absence of staining on the pad in March 2004.

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 41 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 41 on April 30, 2004 (CDPHE 2004). The NFA decision was made on the basis of lack of staining on the transformer concrete pad and analytical data.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 42

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Diesel Fuel Leak – Building 460

The Final Update to the HRR for PIC 42 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 42 is summarized in this update. The following HRR volumes contain PIC 42 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

August 3, 1986

Historical Summary

The approximate location of this PIC is shown on Figure 26. A report was made of a diesel fuel leak from a tanker truck by Plant Protection personnel. The leak occurred south of Building 460 along the drainage excavation site. An estimated 100 to 150 gallons of diesel fuel leaked from the truck. Fire Department personnel constructed a dike to prevent the spread of the spill, and dirt was used to absorb the standing fuel. An interview was conducted in March 2004 (DOE 2004a) with a Plant employee who was directly involved in the incident. Specifically, the employee stated that the spill was cleaned up, the rock and soil were loaded into a dump truck, and the material was hauled off. He does not know for certain where the material was disposed (DOE 2004a).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

Under the section titled Responses to Operation or Occurrence, the original HRR notes that cleanup operations were necessary (DOE 1992). The employee interviewed in 2004 stated that cleanup was conducted during the day shift (DOE 2004a).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002, that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 42 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action

warranted status for PIC 42 on April 30, 2004 (CDPHE 2004). The NFA decision was made on the basis of an interview (mentioned above) noting specifically, that the spill was cleaned up.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 43

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Drum Spill – 84 Intersection

The Final Update to the HRR for PIC 43 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 43 is summarized in this update. The following HRR volumes contain PIC 43 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

December 31, 1964

Historical Summary

The approximate location of this PIC is shown on Figure 26. A spill occurred from a 30-gallon drum at the "84 intersection." It is assumed that due to the change in the building numbering system, the building the report is referring to is Building 884. This indicates the spill likely occurred at the junction of Eighth Street and Central Avenue. According to the reference, an unknown quantity of oil spilled from the drum. Analytical results indicated 3 cpm while the background was 4.33 cpm. No additional documentation could be found that pertains to the incident (DOE 1992).

The event was designated as a PIC because the exact location (that is, 84 intersection) of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 43 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 43-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 43 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was very likely to asphalt, was below background levels, and was likely cleaned up under Plant procedure. It is unlikely that this spill has had an adverse impact on soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002). The NFA decision was made on the basis that the intersection nearest Building 884 is Eighth St and Central Avenue and is/was asphalt in 1964.

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 44

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Distillate Release – Building 374

The Final Update to the HRR for PIC 44 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 44 is summarized in this update. The following HRR volumes contain PIC 44 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

September 30, 1977

Historical Summary

The approximate location of this PIC is shown on Figure 26. While transferring distillate from Building 374 to Building 774, a contractor broke a flange connected to the sump pump. Liquid was pumped to the ground south of Building 374. No personnel were contaminated. The liquid consisted of distillate that had been transferred to Building 774 on September 29, 1977. It was returned to Building 374 on September 30 because it was contaminated at 6,700 dpm/L (higher than the building could accept). One reference indicated soil samples were collected from the area; however, there is no mention of cleanup (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

The area south of Building 374 is IHSS 188, the site of a leaking drum of acid, thought to be a metal leaching solution. Five surface soil samples were collected in this area and the metal concentrations were found to be well below WRW soil ALs. IHSS 188 was approved for NFA in 1999 (DOE 2004a). In addition, radiological analysis was performed on a surface soil sample collected in this area that indicated americium-241 was detected at an activity of 0.058 pCi/g, uranium-235 at 0.312 pCi/g, and uranium-238 at 3.3 pCi/g. These concentrations are well below the respective WRW soil ALs (DOE 2004a).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002 that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 44 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report

would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 44 on April 30, 2004 (CDPHE 2004).

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 45

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Asphalt Thinner Spill

The Final Update to the HRR for PIC 45 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 45 is summarized in this update. The following HRR volumes contain PIC 45 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

August 22, 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. A 5-gallon can of asphalt thinner fell off a moving construction truck and broke east of the 904 Pad, spilling the contents. The asphalt thinner was not considered hazardous material. Construction Management personnel supervised the cleanup and disposal of the spill using guidance from the RCRA/CERCLA group. The RCRA/CERCLA Program Office determined that the event was not reportable to off-site agencies (DOE 1992). No other documentation was found that detailed the cleanup operation.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 45 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 45-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 45 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up and did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 46

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Honey Wagon (Sewage Transport Truck)

The Final Update to the HRR for PIC 46 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 46 is summarized in this update. The following HRR volumes contain PIC 46 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 1989

Historical Summary

The approximate location of this PIC is shown on Figure 26. A tanker truck used to transport untreated sewage from the Wind Site to the Building 124 sewage drain had several minor leaks. The truck allowed sewage to leak onto the ground wherever it went. The sewage was transported by truck from the sanitary facilities at the Wind Site because it had no direct sewer lines or septic system (DOE 1992). No other documentation was found that provide details of responses to individual leaks or occurrences.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 46 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 46-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 46 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill(s) were not considered a hazardous waste and any spills were likely to asphalt in most cases; and did not adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 47

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Nickel Carbonyl Container Burial

The Final Update to the HRR for PIC 47 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 47 is summarized in this update. The following HRR volumes contain PIC 47 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002a); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

June 17 and 18, 1963

Historical Summary

The approximate location of this PIC is shown on Figure 26. Four 55-gallon drums, one GI can with two cylinders, and six loose cylinders of nickel carbonyl were removed from the burial pit west of Building 771 (PAC 700-1110) and taken to a pit east of the SEP (location unknown). Explosive charges were used to vent the containers and nickel carbonyl was released to the environment. Air samples were collected during the venting of the containers (DOE 1992). Nickel carbonyl is a colorless liquid with extremely toxic vapors and was used in plating and coating applications at Rocky Flats.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

The burial pit (PIC 47) is located within IHSS 900-176, the S&W Contractor Storage Yard. This IHSS was characterized along with other IHSSs as part of IHSS Group 000-1 in accordance with IASAP Addendum #IA-03-02 (DOE 2002b). A Data Summary Report was prepared that indicates nickel concentrations in soil at IHSS 900-176 ranged from 20 to 50 mg/kg (DOE 2003). The WRW soil AL is 20,000 mg/kg. The Data Summary Report was approved by CDPHE on July 29, 2003 (DOE 2004a).

Burning of the nickel carbonyl creates an aerosol of nickel oxide that would have dispersed in the atmosphere. Therefore, nickel carbonyl would not remain in the soil. The sample results do not show a source of nickel contamination in the area (DOE 2004a).

No Further Action Recommendation

It was agreed in an NFA Working Group meeting on April 3, 2002 that additional research/investigation and sampling and analysis, where appropriate, would be performed for PIC 47 and 12 other PICs. Based on the results, an Action/No Action Recommendation Report would be prepared. Upon review of the Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, CDPHE (the LRA) concurred with the No Action warranted status for PIC 47 on April 30, 2004 (CDPHE 2004). The NFA decision was made because the cylinders were documented as being vented of their contents.

Comments

None

References

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002a, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Industrial Area Sampling and Analysis Plan Addendum #IA-03-02, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003, Data Summary Report for IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 48

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Antifreeze Spill – 334 Parking Lot

The Final Update to the HRR for PIC 48 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 48 is summarized in this update. The following HRR volumes contain PIC 48 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

September 27, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. On September 27, 1991, a ruptured hose on a personal vehicle released an antifreeze solution onto the surface of the Building 334 Parking Lot. Seven quarts of antifreeze solution consisting of ethylene glycol and water were released to the environment. In accordance with Plant procedure, and to expedite spill removal and disposal, the material was to be handled as a RCRA-regulated hazardous waste containing lead (D008) and tetrachloroethylene (D039) if confirmed by laboratory analysis. Plant Services and the RFP HAZMAT team contained and cleaned up the spill. Potentially contaminated materials were packaged, marked, and stored in accordance with RCRA requirements. RCRA CPIR No. 91-023 was submitted to CDH (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 48-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 48 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was

justified because the spill was cleaned up by the HAZMAT Response Team and was to an asphalt surface. The spill did not likely have an adverse impact to soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 49

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Diesel Fuel Leak – Building 709

The Final Update to the HRR for PIC 49 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 49 is summarized in this update. The following HRR volumes contain PIC 49 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 17, 1991

Historical Summary

The approximate location of this PIC is shown on Figure 26. On July 17, 1991, diesel fuel was discovered leaking from an aboveground storage tank located near Building 709. A flow rate adjustment in an associated pumping system caused the release of diesel fuel from the tank vent to the surrounding soil. Approximately 1 quart of diesel fuel was released to the environment. Approximately 1 ft^3 of soil was removed and containerized. The average benzene content of most diesel fuel is approximately 4 percent, thus the waste was handled as a RCRA-regulated waste (DOE 1992). The storage tank was isolated, shut down, and repaired.

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 49 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 49-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 49 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was cleaned up and did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

None

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 50

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Process Waste Leak

The Final Update to the HRR for PIC 50 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 50 is summarized in this update. The following HRR volumes contain PIC 50 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

1971

Historical Summary

The approximate location of this PIC is shown on Figure 26. The only identifiable wording in the 1971 reference states, "Leakage from process waste tanks…No action" (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 50 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 50-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 50 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because, even though the exact location is unknown, the process waste lines and tanks are addressed in IHSS Group 000-2 (OPWL) and IHSS Group 000-4 (NPWL). See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 50 because of a lack of information. PIC 50 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 51

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Contaminated Tank

The Final Update to the HRR for PIC 51 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 51 is summarized in this update. The following HRR volumes contain PIC 51 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

January 3, 1968

Historical Summary

The approximate location of this PIC is shown on Figure 26. The outside of a 100-gallon steel tank was found to be contaminated with up to 2,000 cpm alpha activity. The only descriptive location word used was "yard" (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 51 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 51-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 51 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified for PIC 51 because the tank location (that is, yard) was very likely sampled and characterized under an existing IASAP Addendum. The two most likely locations, the PU&D Yard (IHSS 170) or the S&W Yard (IHSS 176), have both been extensively sampled and are approved NFA IHSSs. There is no evidence that the contaminated tank adversely impacted either soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 51 because of a lack of information. PIC 51 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 52

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Storm Drain Dumping

The Final Update to the HRR for PIC 52 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 52 is summarized in this update. The following HRR volumes contain PIC 52 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

June 1982

Historical Summary

The approximate location of this PIC is shown on Figure 26. The contents of 12 unidentifiable test drums were dumped in an area where the liquid entered a storm drain. The drums contained water, sand, and ethylene glycol. The generator/responsible party of the drums was told to contact Environmental Analysis prior to the disposal of any liquid to the ground; however, there is no evidence this happened (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 52 was identified detailing the fate of the constituents released or the location.

PIC Investigations

A review of available documentation was conducted in 2004 for a similar release (PIC 11). Using the IRIS reference dose of 2 mg/kg/day and an HQ of 1.0, the calculated WRW AL for ethylene glycol in soil would be 2 million ppm, a concentration that cannot be achieved. This indicates that chronic exposure by a WRW to soil saturated in ethylene glycol would not result in adverse health effects (EPA 2004). The MSDS states that ethylene glycol is nontoxic to aquatic life, has a moderate biodegradation rate, and has a low potential to bioconcentrate (DOE 2004).

No other PIC 52-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 52 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was not a reportable quantity and did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 52 because of a lack of information. PIC 52 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

EPA, 2004, Integrated Risk Information System (IRIS), Online Database, Office of Research and Development, Cincinnati, Ohio.

PIC REFERENCE NUMBER: 53

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Oil Storage Tank Overflow

The Final Update to the HRR for PIC 53 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 53 is summarized in this update. The following HRR volumes contain PIC 53 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 1972

Historical Summary

The approximate location of this PIC is shown on Figure 26. A 450-gallon oil storage tank overflowed while operators were pumping oil from another building to the storage tank (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 53 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 53-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 53 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because there is no way to determine where the spilled oil occurred. Further, it is unlikely that the spilled oil adversely impacted the soil or water in the area. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 53 because of a lack of information. PIC 53 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 54

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Steam Line Rupture

The Final Update to the HRR for PIC 54 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 54 is summarized in this update. The following HRR volumes contain PIC 54 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 1975

Historical Summary

The approximate location of this PIC is shown on Figure 26. An underground steam line ruptured spraying asphalt-based insulation on two workers (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 54 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 54-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 54 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the asphalt-based insulation was not determined to be a release of hazardous waste and did not likely adversely impact soil or water. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 54 because of a lack of information. PIC 54 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 55

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Leaking Drum Shipment

The Final Update to the HRR for PIC 55 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 55 is summarized in this update. The following HRR volumes contain PIC 55 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

March 1971

Historical Summary

The approximate location of this PIC is shown on Figure 26. The shipment of drums of waste was halted the week of March 1, 1971, because of leaking sludge drums from Building 774. Due to the repeated occurrence of leaking drums, all drums were required to be inspected prior to shipment for proper packaging, damage to liners, and free liquids. Drums that were inspected were stored under cover and away from direct sunlight (DOE 1992).

The area where the drums had leaked could not be determined during the HRR investigation in 1992; therefore, the incident(s) were designated as a PIC. No additional documentation for PIC 55 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 55-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 55 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the referenced spills most likely occurred within IHSS Group 700-4. Additionally, this area is predominantly an asphalted surface and was not likely a direct source of contamination to surface soil. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 55 due to lack of information. PIC 55 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 56

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Rio Grande Motorways Trailer Leak

The Final Update to the HRR for PIC 56 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 56 is summarized in this update. The following HRR volumes contain PIC 56 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

November 9, 1955

Historical Summary

The approximate location of this PIC is shown on Figure 26. A sample from a saturated piece of paper was collected from the floor of a Rio Grande Motorways trailer (Trailer No. 1715). The paper was suspected to be contaminated with liquid draining from Rocky Flats waste barrels associated with an accident near Dillon, Colorado, on November 3, 1955 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. Additional information regarding the accident was, however, available at the time of this writing indicating the location of the accident was approximately 3.5 miles east of the town of Dillon, Colorado.

PIC Investigations

No other PIC 56-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 56 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the spill was confined to the bed of a truck (or trailer) and not believed to be a release to the environment. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 56 due to lack of information. PIC 56 has only been identified on Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 57

IHSS Reference Number: Not Applicable

Current Operable Unit: IA

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Oil from Spill in Cobalt-60 Pit

The Final Update to the HRR for PIC 57 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 57 is summarized in this update. The following HRR volumes contain PIC 57 information:

Original Report – 1992 (DOE 1992);
Update Report – 2002 Annual (DOE 2002); and
Update Report – 2004 Annual (DOE 2004a).

Date(s) of Operation or Occurrence

September 7, 1979

Historical Summary

The approximate location of this PIC is shown on Figure 26. On September 7, 1979, analytical results indicated 238 pCi/L (gross beta) in a sample of oil collected from a spill in the Cobalt-60 pit (believed to be in Building 444). The oil was said to be "ok" for disposal through the waste oil process in Building 774 (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992.

PIC Investigations

Building 444 manufacturing activities included welding and the use of radiography to detect flaws in depleted uranium and beryllium parts. Based on the Building 444 WSRIC Book (DOE 2004b), radiography took place in Rooms 139 and 143. Parts were x-rayed in the x-ray cell, which appears to be Room 139. Cobalt-60 is the radioisotope source of x-rays used in radiography. It is likely the floor of the x-ray cell had what is referred to as the cobalt-60 pit where the cobalt-60 source was stored until needed. Such a depression would catch oil or other liquids that might be spilled (DOE 2004b). The spilled oil was surveyed using field instruments for gross beta contamination, which further indicates the radionuclide of interest was depleted uranium. Gross beta was previously the only survey used to detect uranium-238 contamination, because the daughter products are strong beta emitters (DOE 2004a).

Because the oil release was a spill in a room, the oil was never released to subsurface soil beneath the building. Also, the reference implies that the spill was cleaned up (that is, it was "OK to dispose of the oil at Building 774") (DOE 2004a). The sample collection and analysis performed as part of the IHSS Group 400-3 includes potential spill areas and demonstrates that there is no need for additional action. The Data Summary Report for IHSS Group 400-3, which

includes UBC 444, indicates the IHSS Group is an NFA Site (DOE 2003). The Data Summary Report was approved by CDPHE on December 18, 2003 (CDPHE 2003).

No Further Action Recommendation

Based on the above information, after review of the PICs Action/No Action Recommendations Report (DOE 2004b) by the regulatory agencies, DOE received concurrence from CDPHE (the LRA) of the No Action warranted status for PIC 57 on April 30, 2004 (CDPHE 2004).

Comments

The 1992 HRR did not include a narrative for PIC 56 due to lack of information. Until this reporting period, PIC 56 had only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE, 2003, Approval Letter of the Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December 18.

CDPHE, 2004, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PICs), 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, April 30.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, Data Summary Report for IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Historical Release Report Annual Update, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2004b, Potential Incidents of Concern 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, and 57 Action/No Action Recommendations, Rocky Flats Environmental Technology Site, Golden, Colorado, April 15.

PIC REFERENCE NUMBER: 58

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Contaminated Soil

The Final Update to the HRR for PIC 58 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 58 is summarized in this update. The following HRR volumes contain PIC 58 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

June 1973

Historical Summary

The approximate location of this PIC is shown on Figure 26. Contaminated soil was identified in an unidentified barrel storage area. Once identified, the soil was packaged for off-site shipment (DOE 1992).

The event was designated as a PIC because the exact location (barrel storage area) of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 58 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 58-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 58 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because the contaminated soil was remediated and packaged for off-site disposal. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 58 due to lack of information. PIC 58 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 59

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Holes by Sump Pit

The Final Update to the HRR for PIC 59 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 59 is summarized in this update. The following HRR volumes contain PIC 59 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 8, 1971

Historical Summary

The approximate location of this PIC is shown on Figure 26. On July 8, 1971, two "check holes" were drilled in the ground next to Sump Pit 2. Both holes encountered water flow rates of 40 gpm. No other information is available (DOE 1992).

The event was designated as a PIC because the exact location (Sump Pit 2) could not be determined during the HRR investigation in 1992. No additional documentation for PIC 59 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 59-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 59 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because there was no contamination identified or mentioned in the reference. Further, it is likely that the water pressure noted during the drilling operation was from a ruptured water line. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 59 due to lack of information. PIC 59 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 60

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Trailer Tank 201

The Final Update to the HRR for PIC 60 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 60 is summarized in this update. The following HRR volumes contain PIC 60 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

Unknown

Historical Summary

The approximate location of this PIC is shown on Figure 26. A document was identified that describes a "Trailer Tank 201" overflowing between 5 and 10 gallons of process waste. The activity of the wastes measured approximately 30,000 dpm. No other information is available (DOE 1992).

The event was designated as a PIC because the exact location of the release could not be determined during the HRR investigation in 1992. No additional documentation for PIC 60 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 60-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 60 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because potential contamination from the release (area unknown) would very likely be within the boundary of IHSS Group 000-2 (OPWLs) or IHSS Group 000-4 (NPWLs). See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 60 due to lack of information. PIC 60 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

PIC REFERENCE NUMBER: 61

IHSS Reference Number: Not Applicable

Current Operable Unit: Unknown

Former Operable Unit: Not Applicable

IHSS Group: Not Applicable

Unit Name: Tank Photographs

The Final Update to the HRR for PIC 61 consolidates the information in the initial 1992 HRR and subsequent updates with information gained through the disposition of this PIC in accordance with the RFCA accelerated action process. The disposition of PIC 61 is summarized in this update. The following HRR volumes contain PIC 61 information:

Original Report – 1992 (DOE 1992); and
Update Report – 2002 Annual (DOE 2002).

Date(s) of Operation or Occurrence

July 8, 1975

Historical Summary

The approximate location of this PIC is shown on Figure 26. On July 8, 1975, photographs depicting the removal of a UST show that the tank had holes in it indicating a potential release. The origin of the tank and constituents released is unknown (DOE 1992).

The event was designated as a PIC because the exact location of the release (if any) could not be determined during the HRR investigation in 1992. No additional documentation for PIC 61 was identified detailing the fate of the constituents released or the location.

PIC Investigations

No other PIC 61-specific investigation was deemed necessary.

No Further Action Recommendation

PIC 61 was addressed using the consultative process in an NFA Working Group meeting on April 3, 2002, at CDPHE. Based on these discussions, agreement was reached that an NFA was justified because a spill or release to the environment could not be confirmed. See NFA approval letter dated September 26, 2002 (CDPHE and EPA 2002).

Comments

The 1992 HRR did not include a narrative for PIC 61 due to lack of information. PIC 61 has only been identified in Table PIC-2 of the 1992 HRR (DOE 1992).

References

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, and, RE: Approval of NFA Designation for IHSSs, PACs, and PICs, September 26.

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 2002, Annual Update to the Historical Release Report, August 1, 2001, through August 1, 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

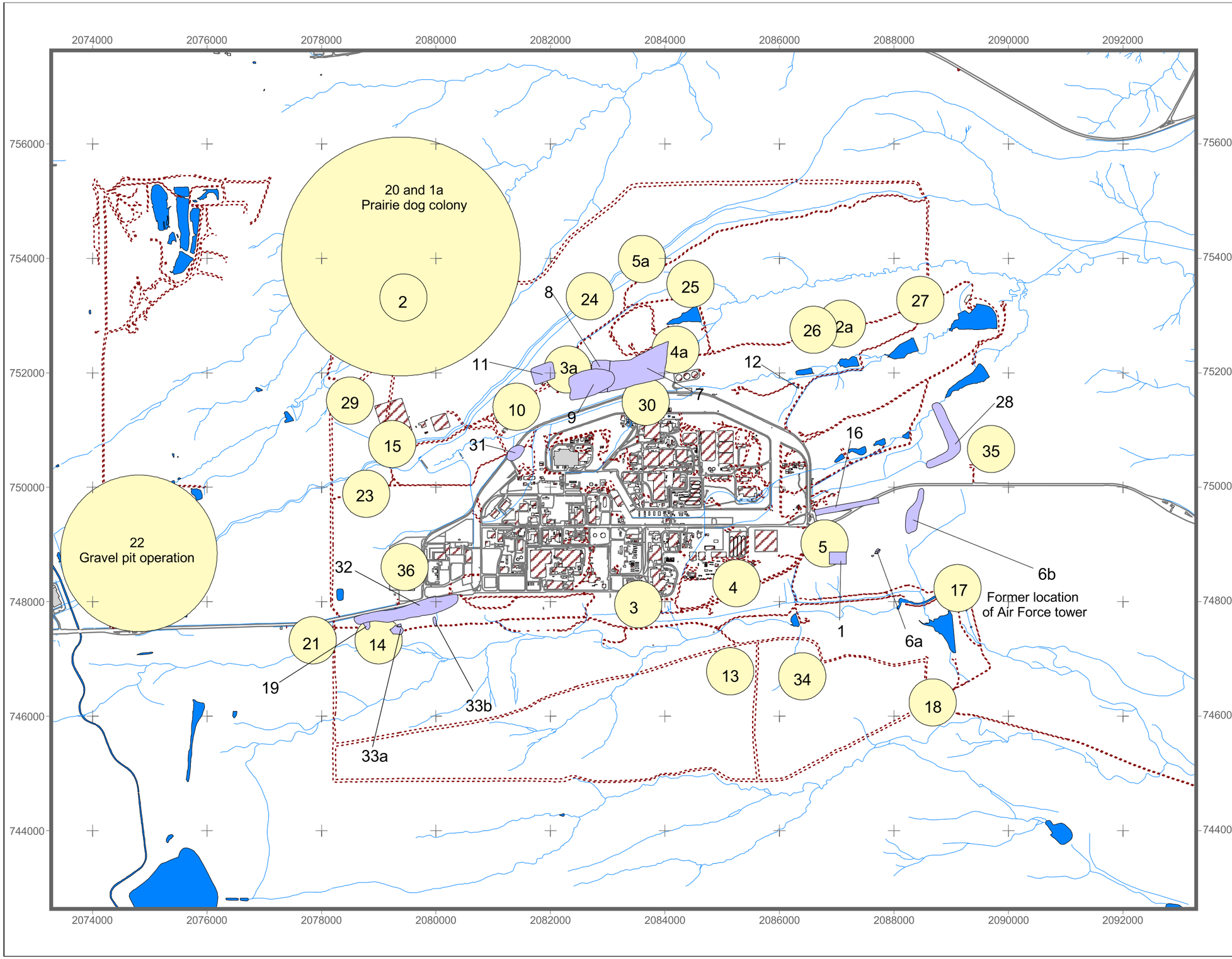

Figure 27
Buffer Zone Contamination Report Site Locations

KEY

- 3 — Agreed to BZ Contamination Report Site Approximate Boundary
- Sites Sampled
- Paved road
- Dirt road
- Stream
- Pond
- Demolished building
- Standing building

N W E S

1000 0 1000 Feet

Scale = 1: 20,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Date: 09.28.05

File: W:\Projects\FY2005\HRR Update\Figures\hrr_fig_27.apr

CDPHE BUFFER ZONE CONTAMINATION REPORTS

This section documents the actions taken and disposition of 36 potential Buffer Zone Contamination Report (BZCR) sites submitted to DOE by CDPHE in a report dated August 1999 (CDPHE 1999), and five additional sites submitted to DOE by CDPHE on April 23, 2003 (CDPHE 2003). The sites (in most cases) are areas of disturbed soil that were identified by CDPHE upon review of aerial photographs. The location of the BZCR sites is shown on Figure 27. A complete discussion of the 1999 sites (with DOE's responses) is located in Section 3.0 of the 2001 Annual Update to the HRR (DOE 2001) and is not repeated in this section. Response to concerns regarding the additional five 2003 BZCR locations was approved by the regulatory agencies on May 11, 2004 (CDPHE and EPA 1994).

Disposition of BZCR Sites

The potential contamination sites in the order they were listed in the 1999 report are identified below. The additional sites identified in 2003 are numbered 1(a) through 5(a) and are at the end of this list. The BZCR site ID, a description, investigative actions taken, and the disposition decision and date for each site is listed below. Approval letters and other pertinent documents are referenced in footnotes in the table. All referenced documents are available in the AR File.

Buffer Zone Contamination Report Sites (CDPHE 1999, 2003)

BZCR ID	Description	Action Taken	Final Disposition and Date
BZCR Site 1 1999	Disturbed Ground SE of IA (CDPHE 1999)	Site identified as the East Firing Range. Designated as new PAC SE-1602. Characterized and remediated under IHSS Group 900-11.	Approved NFAA February 8, 2005 (EPA 2005a)
BZCR Site 2 1999	Disturbed Ground NW of IA (Lindsay Ranch) (CDPHE 1999)	Performed "survey/sweep" for unexploded ordinance. Spent ammunition picked up in 2002 (DOE 2001).	Debris was cleaned up on 8/20/02 and documented in 2002 HRR (DOE 2002). No further investigation is warranted.
BZCR Site 3 1999	Disturbed Areas SW of Building 881 (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss findings. The areas in question were agreed to be engineered drainage structures for the B850 Parking Lot.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 4 1999	Disturbed Ground N of IHSS 119.1 (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss findings. There are no RFCA soil AL exceedances from the 56 samples collected in this area.	No further investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 5 1999	Disturbed Area Identified as Concrete Spoils within the 903 Lip Area (IHSS 900-155) (CDPHE 1999)	Agreed to investigate/remediate with IHSS 155 (903 Lip Area) (RCR, 1/10/2001, CDPHE 2001). Concrete removal and sampling performed in 2004. All results less than RFCA soil ALs.	Documented completion of work with CDPHE September 20, 2004 (DOE 2004a).
BZCR Site 6 1999	Disturbed Area(s) Identified E of IHSS 111.3 (CDPHE 1999)	Samples collected in accordance with BZCR SAP (March 25, 2002) (K-H 2002). All results less than RFCA soil ALs. *Note: the May 3, 2001 responses (CDPHE 2001) indicate characterization will be with IHSS 216.3.*	Documented completion of sampling with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 7 1999	Disturbed Area Identified NW of IA (CDPHE 1999)	Samples collected in accordance with BZCR SAP (March 25, 2002) (K-H 2002). All results less than RFCA soil ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 8 1999	Disturbed Area Identified S of Present Landfill (IHSS 114) (CDPHE 1999)	Samples collected in accordance with BZCR SAP (March 25, 2002) (K-H 2002). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 9 1999	Disturbed Area Identified SW of Present Landfill (IHSS 114) and E of IHSS 170 (PU&D Yard) (CDPHE 1999)	Samples collected in accordance with BZCR SAP (March 25, 2002) (K-H 2002). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).

BZCR ID	Description	Action Taken	Final Disposition and Date
BZCR Site 10 1999	Disturbed Area W of IA and IHSS 170 (PU&D Yard). The Site is the Location of the Concrete Batching Plant (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings. The site has been reconfigured as part of the final grading plan.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 11 1999	Small Arms Range Located N of the IA (CDPHE 1999)	This site was designated as a new PAC NW-1505 on January 10, 2001 (RCR, 1/10/2001, CDPHE 2001). Characterization samples were collected in 2005 in accordance with the IHSS Group NE-1, SAP (DOE 2004 c) and soil was remediated at several locations to below WRW soil ALs.	A Closeout Report was submitted and approved (EPA 2005a), which addresses this site (IHSS Group NE-1) (DOE 2005b).
BZCR Site 12 1999	Small Pond Identified on Aerial Photograph NE of IA (CDPHE 1999)	Samples collected in accordance with BZCR SAP (March 25, 2002) (K-H 2002). All results less than RFCA ALs.	Documented with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 13 1999	Disturbed Area(s) S-SE of IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings. This Site was intended to be used as a radio tower location but not utilized.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 14 1999	Disturbed Area(s) W of IA and N of IHSS 133.5 (CDPHE 1999)	Inspected North Side area and used RFCA consultative process to discuss and assess findings. Agreed to No Further Investigation for North Side (January 10, 2001) (RCR, 1/10/2001, CDPHE 2001). Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). All results less than RFCA soil ALs.	No other investigation required for North Side agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001). Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b). Additional samples were collected in this area and referenced in the Closeout report for the Incinerator Facility (IHSS Group SW-1) (DOE 2003b).
BZCR Site 15 1999	Disturbed Area W of IA, N of Walnut Creek (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 16 1999	Elongated Disturbed Area E of the IA (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).

BZCR ID	Description	Action Taken	Final Disposition and Date
BZCR Site 17 1999	A Structure Identified SE of the IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 18 1999	A Structure Identified SE of the IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 19 1999	Possible Ash Disposal Area or Concrete Spoil area W of IHSSs 133.5 and 133.6 (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b). An NFA Decision for the Ash Pits was approved on June 12, 2003 (EPA 2003a).
BZCR Site 20 1999	Numerous (hundreds) of Disturbed Areas in W BZ (on and off DOE Property). Possibly Prairie Dog Colony (CDPHE 1999)	Performed research and documented ecological explanation.	Explanation provided in 2001 Historical Release Report (DOE 2001, DOE 2004d). Refer also to Site 1a for additional information.
BZCR Site 21 1999	Two Areas of Disturbed Ground SW of IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 22 1999	Large Excavation W of the IA (CDPHE 1999)	Investigation determined site to be operational gravel pit not related to RFETS.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 23 1999	Possible Waste Disposal Area W of the IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 24 1999	Areas of Possible Fill Material N-NW of the IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 25 1999	Disturbed Area N of the IA and N of the Landfill Pond (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 10, 2001 (RCR, 1/10/2001, CDPHE 2001).

BZCR ID	Description	Action Taken	Final Disposition and Date
BZCR Site 26 1999	Disturbed ground NE of the IA and N of Walnut Creek (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 27 1999	Disturbed Ground NE of the IA and N of Walnut Creek (IHSS 142.3) (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 28 1999	Change in Surface Features/Outfall Locations to bypass South Walnut Creek Ponds (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). All results less than RFCA soil ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 29 1999	Disturbed Ground NW of the IA (determined to be "Met Tower" (Identified in Operable Unit 11 RI Report) (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 30 1999	Disturbed Ground N of Parking Lot on North Side of the IA (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 31 1999	Disturbed Ground NW of the IA (near or within PAC 300-700) (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). All results less than RFCA soil ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b).
BZCR Site 32 1999	Possible Waste Disposal Area SW of the IA (near the Ash Pits) (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002 (K-H 2002). *Note: the May 3, 2001 responses indicate characterization would be with IHSS 133 (Ash Pits)* (CDPHE 2001) (EPA 2003a). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b). NFAA approved for Ash Pits, June 12, 2003 (EPA 2003a).
BZCR Site 33 1999	Possible Waste Disposal Area(s) SW of the IA (near the Ash Pits) (CDPHE 1999)	Samples collected in accordance with BZCR SAP for South Side (March 25, 2002) (K-H 2002). *Note: the May 3, 2001 responses indicate characterization will be with IHSS 133 (Ash Pits)* (CDPHE 2001) (EPA 2003a). All results less than RFCA ALs.	Documented completion of sampling and analysis with CDPHE September 16, 2004 (DOE 2004b). NFAA approved for Ash Pits, June 12, 2003 (EPA 2003a).

BZCR ID	Description	Action Taken	Final Disposition and Date
BZCR Site 34 1999	Disturbed Ground SE of the IA and S of Woman Creek (CDPHE 1999)	Inspected area and used RFCA consultative process to discuss and assess findings.	No other investigation required, agreed January 10, 2001 (RCR, 1/10/2001, CDPHE 2001).
BZCR Site 35 1999	Disturbed Ground and Debris E of the IA (CDPHE 1999)	Sampling was performed under an Integrated Work Control Program (IWCP) for Routine BZ Cleanup Activities. Maps given to D. Kruchek (CDPHE) 9/22/04. *Note: the May 3, 2001 responses indicate characterization will be with IHSS 216.2 (EPA 2003b).* Site sampled and all results less than RFCA ALs (DOE 2001, DOE 2004e).	Documented completion of sampling and analysis with CDPHE September 22, 2004. NFAA approved for IHSS 216.2, October 7, 2003 (EPA 2003b).[20]
BZCR Site 36 1999	Disturbed Ground W of the IA. Appears to be Fill Material (CDPHE 1999)	The Site is within PAC 100-604 and was addressed in the NFAA for PAC 100-604.	NFAA approved by CDPHE and EPA February 14, 2002 (CDPHE and EPA 2002).
BZCR Site 1(a) 2003	Additional Investigation Required in the Area W of the IA. Disturbance Identified on Aerial Photographs (CDPHE 2003b)	Borehole samples were collected at three locations on February 3, 2004 and results provided to the Regulatory Agencies on April 8, 2004 (DOE 2004d).	No other investigation required. Approval Letter from CDPHE and EPA dated May 11, 2004 (CDPHE and EPA 2004).
BZCR Site 2(a) 2003	Additional Investigation Required in the Area N of the IA. Aerial Photograph Dated September 25, 1975 shows Unknown Cylindrical Objects (CDPHE 2003b)	Research was conducted and explanations provided in response titled "Additional Assessment to BZCR" April 8, 2004 (DOE 2004d).	No other investigation required. Approval Letter from CDPHE and EPA dated May 11, 2004 (CDPHE and EPA 2004).
BZCR Site 3(a) 2003	Additional Investigation Required in the Area Immediately W of the Present Landfill. Aerial Photograph Dated July 29, 1983 shows Dam-like Feature (CDPHE 2003b)	Research was conducted and explanations provided in response titled "Additional Assessment to BZCR" April 8, 2004 (DOE 2004d).	No other investigation required. Approval Letter from CDPHE and EPA dated May 11, 2004. (CDPHE and EPA 2004).
BZCR Site 4(a) 2003	Additional Investigation Required in the Area Near IHSSs 166.1, 166.2 and 166.3 Immediately S of the Present Landfill (CDPHE 2003b)	Research was conducted and explanations provided in response titled "Additional Assessment to BZCR" April 8, 2004 (DOE 2004d).	No other investigation required. Approval Letter from CDPHE and EPA dated May 11, 2004 (CDPHE and EPA 2004).
BZCR Site 5(a) 2003	Additional Investigation Required in the Area N of the Present Landfill as shown in Aerial Photograph dated June 26, 1991 (CDPHE 2003b)	Research was conducted and explanations provided in response titled "Additional Assessment to BZCR" April 8, 2004 (DOE 2004d).	No other investigation required. Approval Letter from CDPHE and EPA dated May 11, 2004. (CDPHE and EPA 2004).

References

CDPHE, 1999, Buffer Zone Contamination Review, Technical Report, August.

CDPHE, 2001, Buffer Zone Contamination Review, Rocky Flats Response to Concerns, May 3.

CDPHE, 2003, Buffer Zone Contamination Review, Update, Additional Assessment, April.

CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and T. Rehder, EPA, RE: Approval of NFA Designation for IHSSs & PACs, February 14.

CDPHE and EPA 2004. Correspondence to J. Legare, DOE RFFO, from S. Gunderson, CDPHE and M. Aguilar, EPA, RE: Approval of Buffer Zone Contamination Report - Additional Assessment, Site Response to Concerns, May 11.

DOE, 2001, Historical Release Report (Annual Update) for 200, September.

DOE, 2002, Historical Release Report (Annual Update) for 2002 September.

DOE, 2003, Final Closeout Report for IHSS Group SW-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2004a, Map Prepared by the 903 Pad Project Manager verifying Cleanup of Concrete Debris and Sampling Data, September 20, 2004.

DOE, 2004b, Maps and Data Prepared of BZCR Sites Sampled, May 5, 2004 (Given to D. Kruchek 9/16/04).

DOE, 2004c, Buffer Zone Contamination Report-Additional Assessment, Response to Concerns, RFETS, April 15, 2004.

DOE, 2004d, Map Showing Analytical Results for BZCR Site #35, September 22, 2004.

DOE, 2004e, IABZSAP Addendum IABZ-05-01, IHSS Group NE-1, PAC NW-1505 (North Firing Range), Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2005, Closeout Report for IHSS Group NE-1, North Firing Range, PAC NW-1505, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 2003a, Correspondence to R.J. DiSalvo, DOE RFFO, from T. Rehder, EPA Region VIII, Re: No Further Action (NFAA) Justification for Ash Pits PAC Reference Number(s) SW-133.1, SW-133.2, SW-133.4 and 1702 (dated June 11, 2003), NFAA Justification for Trench T-7 PAC Reference Number: NE 11.4 9 dated May 21, 2003, NFAA Justification Trenches T-3 and T-4 PAC Reference Number: 111.1 (dated May 21, 2003), Rocky Flats Environmental Technology Site, Golden, Colorado, June 12.

EPA, 2003b, G. Kleeman, letter to J. Legare, RE: Characterization Data Summary IHSS Group NE/NW, October 7.

EPA, 2005a, Correspondence to J. Legare, DOE RFO, from M. Aguilar, EPA, RE: Approval of IHSS Group 900-11 Closeout Report, February 8, 2005.

EPA, 2005b, Approval Letter from EPA to DOE, Re: Closeout Report for IHSS Group NE-1, North Firing Range, PAC NW-1505, June 13.

K-H, 2002, Sampling and Analysis Approach for Investigation of CDPHE Buffer Zone Contamination Sites (Sites # 2, 6a, 6b, 7, 8,9,12,14,16,19,28,31,32,33a, & 33b), 2002.

RCR, 2001, Regulatory Contact Record for meeting held on January 10, 2001.

INDEX

881 Hillside..... 666, 669, 670, 941
903 Pad... 140, 143, 214, 379, 571, 739, 744, 771, 793, 938, 941
904 Pad..... 601, 1008, 1034
acid. 143, 183, 219, 237, 266, 292, 301, 330, 339, 357, 365, 366, 368, 414, 417, 483, 487, 490, 513, 542, 550, 559, 562, 702, 850, 871, 885, 916, 927, 950, 976, 984
aluminum . 38, 169, 175, 205, 414, 417, 430, 477, 676, 809, 865, 913, 920
americium 20, 25, 26, 32, 33, 34, 39, 43, 50, 60, 63, 66, 68, 69, 72, 103, 140, 141, 163, 169, 185, 191, 197, 199, 219, 220, 228, 273, 274, 278, 288, 290, 340, 368, 415, 418, 421, 424, 425, 432, 464, 467, 476, 483, 508, 525, 531, 557, 560, 567, 571, 590, 594, 603, 606, 737, 754, 842, 848, 851, 853, 858, 872, 875, 876, 879, 885, 888, 890, 895, 898, 899, 907, 910, 914, 921, 938, 940, 1032
arsenic 10, 20, 32, 33, 38, 113, 154, 164, 186, 191, 212, 232, 353, 368, 418, 428, 473, 477, 528, 536, 537, 565, 567, 568, 572, 609, 632, 709, 769, 793, 839, 853, 858, 882, 910, 914, 933
asbestos .. 107, 108, 128, 170, 211, 260, 343, 664
A-Series Drainage..... 43, 59, 184
A-Series Ponds..... 42, 939
beryllium.. 69, 157, 164, 186, 219, 232, 333, 336, 352, 372, 396, 417, 421, 464, 467, 510, 562, 674, 676, 687, 690, 727, 842, 863, 865, 913, 914, 920, 932, 939, 940
Bowman's Pond..... 43, 564, 631, 632, 633
B-Series Drainage..... 48, 49, 59, 85
B-Series Ponds..... 48, 510, 792, 939, 940
Buffer Zone.... 18, 24, 30, 37, 42, 48, 55, 59, 62, 65, 68, 71, 74, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 98, 100, 102, 107, 113, 116, 119, 121, 123, 126, 128, 130, 132, 134, 136, 139, 147, 149, 151, 153, 167, 179, 214, 731, 735, 739, 760, 766, 769, 771, 786, 813, 831
Building 111..... 251
Building 115..... 247
Building 116..... 209
Building 119..... 264
Building 121..... 257
Building 122..... 838
Building 123... 189, 220, 231, 237, 239, 242, 260, 262, 269, 339, 841
Building 124..... 139, 175, 235
Building 125..... 249, 845
Building 130..... 266
Building 131..... 255
Building 219..... 167
Building 223..... 456
Building 228A..... 795
Building 228B..... 795
Building 231..... 454
Building 331... 272, 274, 305, 320, 326, 847, 982
Building 334.... 281, 286, 318, 487, 560, 990
Building 335..... 283, 284
Building 367..... 303, 501
Building 371... 214, 227, 281, 296, 301, 315, 456, 501, 849, 850
Building 373..... 277, 322, 324
Building 374... 205, 217, 219, 242, 301, 309, 311, 328, 562, 601, 602, 611, 645, 852, 1032
Building 381..... 307
Building 439..... 351, 855
Building 440..... 388, 857
Building 441..... 339, 860
Building 442..... 348, 392, 863
Building 443..... 205, 399, 966
Building 444. 19, 21, 25, 31, 37, 71, 75, 168, 269, 273, 274, 298, 336, 345, 351, 352, 355, 396, 407, 462, 472, 487, 562, 732, 744, 865, 939, 1058
Building 446..... 382
Building 447... 168, 333, 351, 352, 363, 376, 377, 868, 972
Building 452..... 469
Building 453..... 333, 355
Building 460..... 365, 401, 404, 409
Building 528..... 423, 425, 871
Building 551..... 414, 420, 430, 458, 962
Building 552..... 430
Building 553..... 420
Building 554..... 326
Building 559.... 414, 423, 440, 451, 871, 874

Building 561..... 451
Building 566..... 434
Building 569..... 197, 415
Building 662..... 484, 487
Building 663..... 487, 490
Building 664..... 467, 476
Building 666..... 492
Building 667..... 501
Building 668..... 464
Building 701..... 557, 654, 878
Building 702..... 535
Building 703..... 535
Building 707..... 49, 281, 508, 513, 597, 599, 618, 881, 883, 958
Building 708..... 207, 621, 649
Building 712..... 535
Building 713..... 535
Building 714..... 550
Building 728..... 521, 522
Building 729..... 954
Building 730..... 530, 556
Building 731..... 885
Building 732..... 611
Building 750..... 639, 950
Building 762A..... 627
Building 765..... 647
Building 770..... 570, 572, 632, 887
Building 771. 42, 43, 65, 184, 191, 196, 209, 228, 479, 482, 550, 552, 554, 561, 570, 574, 606, 637, 744, 890, 891, 938, 978
Building 774..... 42, 65, 140, 149, 184, 201, 202, 281, 516, 517, 524, 545, 547, 559, 564, 571, 606, 631, 647, 739, 745, 757, 891, 894, 1058
Building 776... 298, 461, 472, 479, 504, 527, 530, 577, 583, 590, 608, 629, 635, 651, 654, 744, 891, 897, 898, 902, 904, 938, 952, 956, 980
Building 777... 461, 472, 562, 590, 897, 898, 904, 932, 952
Building 778..... 530, 611, 635, 906
Building 779.... 539, 587, 624, 635, 909, 911
Building 781..... 952
Building 785..... 539
Building 788..... 184, 602
Building 850..... 501
Building 865..... 687, 700, 913
Building 866..... 706, 707, 727
Building 869..... 744
Building 881... 139, 140, 147, 149, 151, 196, 209, 269, 273, 274, 298, 462, 479, 501, 560, 562, 660, 662, 664, 666, 669, 672, 674, 685, 693, 695, 709, 716, 757, 916, 917
Building 883... 298, 482, 690, 700, 702, 711, 725, 744, 920, 921
Building 884..... 679
Building 885..... 682
Building 886..... 676, 924, 970
Building 887..... 672, 927
Building 889..... 679, 700, 706, 929, 984
Building 891..... 506
Building 910..... 95, 795
Building 920..... 83
Building 952..... 786
Building 964..... 784
Building 980..... 782, 790
Building 990..... 210
Building 991... 163, 510, 780, 788, 797, 932, 972
Building 995..... 49, 62, 108, 204, 209, 210, 524, 795
BZ ..... *See* Buffer Zone
carbon tetrachloride ... 19, 20, 26, 39, 91, 93, 157, 201, 415, 424, 451, 504, 506, 508, 530, 532, 554, 557, 736, 739, 740, 813, 823, 835, 962, 980
caustic 49, 158, 204, 205, 336, 542, 547, 550, 559, 850, 894, 895
Central Avenue 196, 201, 202, 214, 217, 359, 427, 437, 448, 461, 562, 841, 974, 1030
Central Avenue Ditch 204, 412, 498, 704, 745, 972
chlorine 75, 175, 655
chromate..... 277, 345, 536, 972, 973
chromic acid..... 49, 71, 75, 803, 939
chromium 33, 49, 60, 63, 71, 75, 89, 91, 157, 164, 212, 311, 345, 352, 368, 371, 401, 417, 420, 467, 482, 522, 528, 536, 539, 557, 560, 609, 677, 764, 831, 963, 1000, 1002
closure.. 46, 53, 57, 110, 114, 145, 159, 176, 185, 186, 210, 211, 212, 220, 227, 333, 371,

410, 444, 517, 522, 539, 548, 550, 602, 693, 696, 842, 885, 891
condensate.. 42, 49, 139, 140, 149, 151, 361, 514, 545, 547, 599, 631, 632, 647, 709
container... 21, 108, 116, 119, 123, 132, 237, 286, 352, 371, 571, 602, 711, 777, 778, 790, 792, 803, 887, 894, 913, 916, 932
contaminated soil . 26, 32, 33, 49, 68, 85, 87, 123, 130, 169, 202, 220, 337, 340, 343, 348, 357, 394, 422, 423, 438, 441, 454, 458, 485, 488, 505, 508, 525, 527, 531, 532, 542, 552, 557, 560, 562, 568, 571, 577, 580, 587, 590, 609, 615, 619, 621, 625, 640, 647, 669, 679, 714, 736, 740, 745, 746, 754, 757, 766, 771, 774, 778, 863, 871, 879, 898, 900, 903, 904, 910, 911, 1002, 1024, 1060
Contingency Plan Implementation Report49, 71, 83, 96, 130, 132, 133, 134, 143, 236, 242, 262, 289, 301, 311, 320, 322, 324, 325, 327, 329, 394, 443, 451, 455, 456, 458, 697, 814, 835, 850, 927
cooling tower ... 42, 151, 209, 277, 345, 535, 536, 539
corrosion 355, 504, 777, 801
CPIR. *See* Contingency Plan Implementation Report
criticality 897, 902, 924
C-Series Drainage 140, 143
cyanide 183, 368, 371, 603, 695, 731, 732
dock 151, 249, 252, 301, 333, 336, 348, 351, 401, 420, 570, 571, 577, 587, 597, 624, 709, 780, 850, 874, 897, 933
east gate..... 81, 292, 731
East Spray Field 49, 71, 74, 75, 143
effluent . 71, 74, 75, 140, 175, 183, 184, 189, 204, 210, 277, 536, 539, 564, 567, 606, 608, 666, 672, 788, 819, 894
ethylene glycol . 49, 207, 240, 324, 339, 513, 954, 966, 986, 1016, 1040, 1048
explosion 527, 574, 608, 809, 897
FIDLER..... 60, 147, 564, 706
fire .. 305, 307, 336, 352, 363, 396, 397, 527, 570, 574, 577, 583, 590, 608, 637, 654, 679, 700, 711, 891, 897, 902
Firing Range..... 136, 153, 154
Flume Pond 55
footing drain. 42, 49, 65, 143, 151, 158, 184, 214, 226, 228, 252, 451, 559, 561, 564, 631, 669
Freon 114, 119, 407, 845
glovebox. 637, 850, 852, 881, 891, 897, 898, 902, 913
graphite 158, 487, 865, 890, 916
Great Western Reservoir..... 937, 939, 940
groundwater . 20, 26, 39, 43, 56, 91, 93, 108, 120, 126, 159, 163, 169, 184, 333, 423, 506, 521, 532, 539, 554, 562, 599, 603, 615, 669, 670, 727, 736, 737, 740, 745, 746, 747, 749, 750, 766, 816, 838, 842, 845, 847, 850, 852, 855, 857, 866, 868, 871, 875, 878, 882, 885, 887, 891, 895, 900, 909, 914, 917, 920, 921, 925, 927, 929, 933, 938, 940
HEPA filter 570, 863, 891
hydrofluoric acid..... 143, 220, 365, 371, 550
hydrogen peroxide .. 359, 427, 428, 838, 839
IA .....*See* Industrial Area
IHSS 199 ..... 937, 938, 939
IHSS 200 ..... 937, 938, 939, 940
IHSS 201 ..... 937, 941
IHSS 202 ..... 937, 942
incinerator 107, 167, 168, 170, 173, 849, 897, 902
Indiana Street 140, 938
Industrial Area 157, 175, 183, 189, 196, 201, 204, 207, 209, 216, 217, 219, 226, 231, 235, 237, 239, 242, 245, 247, 249, 251, 255, 257, 260, 262, 264, 266, 269, 272, 283, 288, 292, 294, 298, 301, 303, 305, 307, 309, 311, 313, 315, 318, 320, 322, 324, 326, 328, 330, 333, 336, 339, 342, 345, 348, 351, 355, 357, 359, 361, 363, 365, 368, 371, 374, 376, 379, 382, 384, 386, 388, 390, 392, 394, 396, 399, 401, 404, 407, 409, 412, 414, 417, 420, 423, 427, 430, 434, 437, 440, 443, 445, 448, 451
ion exchange 887, 891
irrigation..... 74, 79, 939, 941, 942
landfill 65, 107, 109, 130, 158, 159, 183
landfill pond 65, 66, 68
lathe coolant 19, 21, 25, 31, 37, 103, 114, 119
lead... 20, 33, 38, 60, 69, 132, 136, 153, 154, 164, 169, 266, 330, 340, 368, 407, 415, 417,

420, 462, 470, 473, 505, 522, 532, 557, 677, 764, 842, 860, 866, 917, 1000, 1002, 1022
lithium 272, 274, 322, 345, 352, 465, 531, 677, 760, 917
McKay Ditch 55, 56, 939
mercury 33, 60, 147, 169, 235, 482, 764, 846
mound 744, 745, 747, 797, 941
Mower Reservoir 937, 942
nickel carbonyl 121, 637, 760, 1038
nitrate ... 43, 66, 68, 140, 183, 184, 185, 199, 219, 227, 232, 240, 311, 417, 513, 517, 524, 562, 571, 580, 594, 631, 749, 852, 940
nitric acid 143, 220, 239, 292, 336, 365, 366, 371, 482, 510, 697, 850, 871, 891, 920
North Walnut Creek 42, 43, 68, 184, 536, 545, 552, 559, 560, 631
North Walnut Creek Drainage 42, 228
NPDES 49, 74, 452, 939, 941
NPWL 219, 220, 221, 343, 697, 698, 839, 841, 853, 922, 1044, 1064
oil 19, 25, 31, 37, 81, 108, 116, 119, 123, 132, 157, 179, 201, 214, 219, 247, 251, 255, 269, 279, 283, 286, 305, 318, 333, 342, 352, 355, 363, 379, 392, 394, 399, 407, 417, 434, 437, 440, 445, 456, 461, 469, 476, 484, 487, 490, 492, 498, 510, 513, 530, 587, 609, 614, 618, 621, 629, 647, 651, 658, 669, 682, 690, 713, 719, 725, 739, 749, 754, 766, 769, 782, 790, 807, 833, 879, 894, 946, 956, 958, 960, 968, 970, 988, 996, 1000, 1004, 1006, 1008, 1020, 1022, 1024, 1026, 1030, 1050, 1058
Operable Unit 1 ..... 658, 660, 662, 664, 666, 669, 672, 749, 754, 757, 941
Operable Unit 10 .... 113, 116, 119, 286, 294, 342, 355, 365, 368, 371, 601, 682, 782, 790, 792
Operable Unit 11 199
Operable Unit 12 .... 333, 336, 345, 351, 357, 464, 467, 482, 674
Operable Unit 13 .... 204, 231, 269, 272, 273, 275, 283, 288, 348, 359, 414, 417, 420, 427, 430, 461, 469
Operable Unit 14 .... 196, 281, 282, 472, 476, 479, 527, 679
Operable Unit 15 .... 296, 363, 685, 687, 690, 693, 695
Operable Unit 16 .... 121, 207, 361, 431, 597, 599
Operable Unit 2 .... 18, 24, 30, 37, 74, 87, 91, 93, 98, 100, 102, 731, 735, 739, 744, 760, 766, 769, 771, 786, 813, 822, 825, 941
Operable Unit 3 ..... 937, 943
Operable Unit 4 183
Operable Unit 5 ..... 139, 143, 147, 157, 162, 163, 167, 173, 175
Operable Unit 6 .... 42, 48, 55, 59, 62, 65, 71, 85, 552, 763, 777, 940
Operable Unit 7 ..... 68, 107, 123
Operable Unit 8 ..... 201, 277, 279, 280, 292, 504, 508, 510, 511, 531, 535, 539, 542, 545, 547, 550, 556, 557, 570, 574, 577, 580, 583, 585, 587, 590, 592, 594, 780, 788
Operable Unit 9 ..... 189, 339, 423, 504, 513, 516, 520, 521, 524, 530, 562, 564, 567
OPWL 43, 50, 189, 190, 219, 228, 339, 513, 516, 524, 556, 560, 562, 567, 568, 677, 679, 839, 841, 860, 868, 871, 875, 882, 883, 885, 895, 909, 911, 917, 921, 922, 927, 930, 1044, 1064
Original Landfill 157, 158, 159, 175, 176
OU ..... *See* Operable Unit
outfall . 49, 65, 158, 552, 554, 561, 631, 632, 666
PAC 000-101 183
PAC 000-121 189
PAC 000-162 196
PAC 000-168 199
PAC 000-172 201
PAC 000-190 204
PAC 000-192 207
PAC 000-500 209
PAC 000-501 214
PAC 000-503 217
PAC 000-504 219
PAC 000-505 226
PAC 100-148 231
PAC 100-600 235
PAC 100-601 237
PAC 100-602 239
PAC 100-603 242
PAC 100-604 245
PAC 100-605 247

PAC 100-606 249
PAC 100-607 251
PAC 100-608 255
PAC 100-609 257
PAC 100-610 260
PAC 100-611 262
PAC 100-612 264
PAC 100-613 266
PAC 1601.1 151
PAC 1601.2 151
PAC 300-128 269
PAC 300-134N 272
PAC 300-134S 272
PAC 300-135 277
PAC 300-151 279
PAC 300-156.1 281
PAC 300-171 283
PAC 300-181 286
PAC 300-186 288
PAC 300-188 292
PAC 300-206 294
PAC 300-212 296
PAC 300-700 298
PAC 300-701 301
PAC 300-702 303
PAC 300-703 305
PAC 300-704 307
PAC 300-705 309
PAC 300-706 311
PAC 300-707 313
PAC 300-708 315
PAC 300-709 318
PAC 300-710 320
PAC 300-711 322
PAC 300-712 324
PAC 300-713 326
PAC 300-714 328
PAC 300-715 330
PAC 400-116.1 333
PAC 400-116.2 336
PAC 400-122 339
PAC 400-136.1 345
PAC 400-136.2 345
PAC 400-157.2 351
PAC 400-182 355
PAC 400-187 357
PAC 400-191 359
PAC 400-193 361
PAC 400-204 363
PAC 400-205 365
PAC 400-207 368
PAC 400-208 371
PAC 400-800 374
PAC 400-801 376
PAC 400-802 379
PAC 400-803 382
PAC 400-804 384
PAC 400-805 386
PAC 400-806 388
PAC 400-807 390
PAC 400-808 392
PAC 400-809 394
PAC 400-810 396
PAC 400-811 399
PAC 400-812 401
PAC 400-813 404
PAC 400-814 407
PAC 400-815 409
PAC 400-820 412
PAC 500-117.1 414
PAC 500-117.2 417
PAC 500-158 420
PAC 500-159 423
PAC 500-169 427
PAC 500-197 430
PAC 500-900 434
PAC 500-901 437
PAC 500-902 440
PAC 500-903 443
PAC 500-904 445
PAC 500-905 448
PAC 500-906 451
PAC 500-907 454
PAC 500-908 456
PAC 500-909 458
PAC 600-1000 484
PAC 600-1001 487
PAC 600-1001(A) 490
PAC 600-1002 492
PAC 600-1003 495
PAC 600-1004 498
PAC 600-1005 501

PAC 600-117.3 461
PAC 600-120.1 464
PAC 600-120.2 467
PAC 600-152 469
PAC 600-160 472
PAC 600-161 476
PAC 600-164.1 479
PAC 600-189 482
PAC 700-1100 608
PAC 700-1101 611
PAC 700-1102 614
PAC 700-1103 618
PAC 700-1104 621
PAC 700-1105 624
PAC 700-1106 627
PAC 700-1107 629
PAC 700-1108 631
PAC 700-1109 635
PAC 700-1110 637
PAC 700-1111 639
PAC 700-1112 642
PAC 700-1113 645
PAC 700-1114a..... 647
PAC 700-1114b 647
PAC 700-1115 649
PAC 700-1116 651
PAC 700-1117 654
PAC 700-118.1 504
PAC 700-118.2 508
PAC 700-123.1 510
PAC 700-123.2 513
PAC 700-124.1 516
PAC 700-124.2 516
PAC 700-124.3 516
PAC 700-125 520
PAC 700-126.1 521
PAC 700-126.2 521
PAC 700-127 524
PAC 700-131 527
PAC 700-132 530
PAC 700-137 535
PAC 700-138 539
PAC 700-139.1(S)..... 542
PAC 700-143 552
PAC 700-144(N)..... 556
PAC 700-144(S)..... 556
PAC 700-146.1 559
PAC 700-146.2 559
PAC 700-146.3 559
PAC 700-146.4 559
PAC 700-146.5 559
PAC 700-146.6 559
PAC 700-147.1 562
PAC 700-149.1 564
PAC 700-149.2 567
PAC 700-150.1 570
PAC 700-150.2(N)..... 574
PAC 700-150.2(S)..... 577
PAC 700-150.3 580
PAC 700-150.4 583
PAC 700-150.5 585
PAC 700-150.6 587
PAC 700-150.7 590
PAC 700-150.8 587
PAC 700-163.1 592
PAC 700-163.2 594
PAC 700-185 597
PAC 700-194 599
PAC 700-214 601
PAC 700-215 606
PAC 800-102 658
PAC 800-103 660
PAC 800-104 662
PAC 800-105.1 664
PAC 800-105.2 664
PAC 800-106 666
PAC 800-107 669
PAC 800-1200 ..... 697, 698
PAC 800-1201 700
PAC 800-1202 702
PAC 800-1203 704
PAC 800-1204 706
PAC 800-1205 709
PAC 800-1206 711
PAC 800-1207 713
PAC 800-1208 716
PAC 800-1209 719
PAC 800-1210 722
PAC 800-1211 725
PAC 800-1212 727
PAC 800-145 672
PAC 800-147.2 674

PAC 800-164.2 676
PAC 800-164.3 679
PAC 800-177 682
PAC 800-178 685
PAC 800-179 687
PAC 800-180 690
PAC 800-211 693
PAC 800-217 695
PAC 900-108 731
PAC 900-109 735
PAC 900-112 739
PAC 900-113 744
PAC 900-119.1 749
PAC 900-119.2 754
PAC 900-130 757
PAC 900-1301 797
PAC 900-1302 799
PAC 900-1303 801
PAC 900-1304 803
PAC 900-1305 805
PAC 900-1306 807
PAC 900-1307 809
PAC 900-1308 811
PAC 900-1309 813
PAC 900-1310 816
PAC 900-1311 819
PAC 900-1312 822
PAC 900-1313 825
PAC 900-1314 827
PAC 900-1315 829
PAC 900-1316 831
PAC 900-1317 833
PAC 900-1318 835
PAC 900-140 760
PAC 900-141 763
PAC 900-153 766
PAC 900-154 769
PAC 900-155 771
PAC 900-165 777
PAC 900-173 780
PAC 900-175 782
PAC 900-176 784
PAC 900-183 786
PAC 900-184 788
PAC 900-210 790
PAC 900-213 792
PAC NE-110 ..... 18, 22
PAC NE-111.1 24
PAC NE-111.2 30
PAC NE-111.3 30
PAC NE-111.4 37
PAC NE-111.5 30
PAC NE-111.6a 30
PAC NE-111.6b 30
PAC NE-111.7 30
PAC NE-111.8 30
PAC NE-1400 77
PAC NE-1401 79
PAC NE-1402 81
PAC NE-1403 83
PAC NE-1404 85
PAC NE-1405 87
PAC NE-1406 89
PAC NE-1407 91
PAC NE-1408 93
PAC NE-1409 95
PAC NE-1410 98
PAC NE-1411 100
PAC NE-1412 102
PAC NE-1413 102
PAC NE-142.1 42
PAC NE-142.12 55
PAC NE-142.2 42
PAC NE-142.3 42
PAC NE-142.4 42
PAC NE-142.5 ..... 48, 552
PAC NE-142.7 48
PAC NE-142.8 48
PAC NE-142.9 48
PAC NE-156.2 59
PAC NE-166.1 62
PAC NE-166.2 62
PAC NE-166.3 62
PAC NE-167.1 65
PAC NE-167.2 68
PAC NE-167.3 68
PAC NE-216.1 71
PAC NE-216.2 74
PAC NE-216.3 74
PAC NW-114 107
PAC NW-1500 126
PAC NW-1501 128

PAC NW-1502 130
PAC NW-1503 132
PAC NW-1504 134
PAC NW-1505 136
PAC NW-170 113
PAC NW-174a 116
PAC NW-174b 119
PAC NW-195 121
PAC NW-203 123
PAC Off-Site Area 1 937
PAC Off-Site Area 2 937
PAC Off-Site Area 3 937
PAC Off-Site Area 4 937
PAC SE-142.10 139
PAC SE-142.11 143
PAC SE-1600 ..... 149, 150
PAC SE-1601 151
PAC SE-1601.1 151
PAC SE-1602 153
PAC SE-209 147
PAC SW-115 157
PAC SW-133.1 162
PAC SW-133.2 162
PAC SW-133.3 162
PAC SW-133.4 162
PAC SW-133.5 167
PAC SW-133.6 173
PAC SW-1700 ..... 140, 179
PAC SW-1701 162
PAC SW-1702 162
PAC SW-196 175
paint thinner 116, 157, 508, 790
PCB ..... *See* polychlorinated biphenyl (PCB)
PCE ..... *See* perchloroethylene (PCE)
perchloroethylene (PCE) 120, 530, 739, 745, 746, 750, 766
perclene 201, 336, 487, 490
pesticide 157, 303, 340, 501, 871
plenum.... 283, 352, 396, 397, 521, 570, 574, 637, 891, 922
plutonium . 18, 20, 21, 24, 25, 26, 30, 32, 33, 34, 37, 39, 49, 50, 51, 60, 63, 66, 68, 69, 72, 103, 108, 140, 169, 185, 191, 197, 199, 201, 219, 220, 273, 274, 278, 288, 289, 333, 340, 417, 421, 424, 425, 431, 462, 464, 467, 470, 472, 473, 476, 479, 483, 488, 492, 495, 513, 517, 522, 524, 525, 527, 531, 552, 557, 559, 562, 568, 571, 574, 577, 578, 580, 594, 603, 606, 608, 631, 669, 677, 700, 737, 739, 754, 757, 764, 771, 774, 778, 793, 843, 848, 849, 850, 851, 853, 858, 872, 874, 875, 876, 879, 881, 885, 890, 891, 895, 897, 898, 899, 902, 903, 906, 907, 909, 910, 914, 921, 924, 932, 938, 940, 942
polychlorinated biphenyl (PCB) 81, 107, 108, 123, 219, 251, 257, 315, 339, 340, 374, 376, 399, 434, 440, 446, 448, 484, 495, 614, 618, 621, 624, 625, 632, 639, 640, 642, 647, 713, 714, 716, 719, 767, 869, 871, 911, 1026
pond.... 49, 56, 175, 199, 272, 277, 345, 631, 645, 666, 819, 900, 904
Pond 2 ..... 183, 911
Pond 207-A 627
Pond 207-C 524
Pond 2C 183
Pond 2D 183
Pond 6 ..... 139, 151, 175
Pond 7 ..... 139, 149, 150, 151
Pond 8 ..... 139, 151
Pond 9 139
Pond A 602
Pond A-1 ..... 42, 43, 44
Pond A-2 ..... 42, 44, 49, 204
Pond A-3 ..... 42, 45, 228, 396, 560
Pond A-4 ..... 42, 43, 45, 144, 227, 228, 560
Pond A-5 ..... 42, 55
Pond B 602
Pond B-1 ..... 48, 49, 50, 204, 205, 207, 510, 552, 599
Pond B-2 ..... 48, 49, 50, 85, 204, 205
Pond B-3 ... 48, 51, 71, 74, 75, 204, 210, 396
Pond B-4 ..... 48, 49, 51, 599
Pond B-5 ..... 48, 49, 52, 144
Pond C 602
Pond C-1 ..... 139, 140, 143, 214, 396
Pond C-2 ..... 139, 143, 144, 169, 366, 666
pondcrete 184, 601, 603, 792
Present Landfill .. 62, 65, 102, 107, 108, 109, 121, 123, 130, 132, 134, 157, 168, 173, 257, 298, 414, 431, 469, 484, 629, 669, 702, 745, 784, 786

process waste . 189, 205, 209, 210, 220, 231, 239, 240, 288, 289, 339, 368, 401, 409, 423, 424, 513, 521, 522, 524, 530, 556, 559, 562, 564, 580, 601, 627, 631, 645, 695, 697, 706, 707, 786, 829, 852, 871, 875, 878, 885, 894, 927
radiological survey. 169, 218, 333, 476, 527, 539, 557, 574, 578, 587, 592, 685, 693, 695, 700, 749, 788, 855, 897, 921, 922
radionuclides..... 20, 26, 32, 34, 60, 63, 103, 140, 163, 167, 199, 219, 231, 232, 270, 273, 282, 290, 334, 337, 339, 346, 351, 355, 371, 384, 397, 415, 476, 479, 487, 490, 492, 513, 525, 527, 530, 553, 580, 587, 592, 603, 609, 624, 633, 670, 676, 682, 736, 741, 746, 757, 767, 793, 819, 842, 852, 871, 938, 939, 941, 953, 982
reverse osmosis (RO)..... 795
roof drain..... 42, 209, 922
salt..... 215, 311, 697, 852, 881, 890, 920
saltcrete 601, 602, 603, 792
sanitary sewer. 140, 209, 210, 211, 228, 245, 556, 557, 561, 704, 763, 855, 871, 875, 978
sediment..... 43, 48, 49, 50, 51, 55, 141, 163, 164, 556, 601, 633, 869, 900, 904, 921, 938, 939, 940, 942
SEP..... *See* Solar Evaporation Ponds (SEP)
SID.....*See* South Interceptor Ditch (SID)
sludge. 18, 24, 30, 37, 62, 89, 102, 107, 108, 175, 183, 184, 185, 252, 340, 343, 454, 601, 602, 606, 645, 658, 669, 682, 727, 731, 763, 764, 792, 795, 827, 878, 890, 894, 1054
soil..... 19, 20, 25, 31, 43, 50, 51, 55, 74, 75, 100, 119, 126, 136, 157, 159, 162, 163, 164, 167, 333, 348, 349, 351, 353, 386, 399, 401, 404, 409, 473, 476, 479, 488, 496, 498, 501, 504, 506, 513, 531, 536, 542, 550, 552, 564, 568, 571, 577, 578, 608, 614, 618, 624, 631, 632, 633, 640, 645, 647, 649, 679, 714, 793, 811, 816, 827, 830, 833, 835, 838, 842, 845, 847, 850, 852, 855, 857, 866, 868, 871, 875, 878, 882, 885, 887, 891, 895, 897, 900, 904, 910, 914, 917, 920, 925, 927, 929, 933, 938, 948, 1058
Solar Evaporation Ponds (SEP)..... 183, 185, 217, 289, 414, 564, 567, 602, 627, 645, 777, 827, 939, 940
solar pond.....*See* Solar Evaporation Ponds (SEP)
solvent..... 20, 108, 201, 219, 283, 286, 289, 333, 336, 339, 348, 351, 352, 363, 365, 415, 417, 421, 464, 467, 473, 504, 505, 508, 510, 513, 530, 532, 562, 571, 597, 609, 645, 669, 682, 685, 687, 690, 693, 731, 735, 736, 749, 754, 760, 780, 790, 875, 916
South Interceptor Ditch (SID)..... 139, 158
South Walnut Creek... 48, 49, 204, 207, 510, 746, 764, 792, 819, 911
spray field..... 68, 74
Standley Lake..... 937, 940, 941, 942
strontium 20, 38, 60, 63, 66, 68, 72, 110, 514, 522, 531, 553, 560, 677, 764, 797, 810
tank..... 49, 95, 100, 185, 191, 204, 205, 209, 210, 217, 219, 277, 279, 283, 294, 309, 311, 328, 339, 340, 342, 357, 365, 368, 386, 388, 401, 404, 409, 424, 454, 461, 462, 469, 482, 483, 498, 504, 505, 506, 508, 516, 520, 521, 522, 524, 525, 530, 532, 542, 545, 547, 552, 556, 559, 571, 583, 594, 602, 606, 611, 631, 632, 658, 664, 676, 679, 697, 706, 707, 727, 757, 778, 819, 839, 850, 852, 860, 871, 885, 895, 909, 921, 927, 929, 972, 1042, 1044, 1046, 1050, 1064, 1066
TCE..... *See* trichloroethene (TCE)
tear gas 77
transformer81, 123, 251, 255, 315, 318, 374, 376, 399, 430, 434, 437, 440, 445, 448, 449, 484, 492, 495, 614, 615, 618, 619, 621, 624, 632, 639, 642, 651, 713, 716, 719, 722, 807, 1026
trench.. 18, 20, 21, 24, 26, 30, 31, 33, 34, 37, 62, 63, 102, 162, 163, 210, 243, 298, 430, 462, 539, 540, 649, 669, 731, 735, 761, 900, 904, 909, 938, 942
Triangle Area 560, 571, 777, 784
trichloroethane . 34, 126, 157, 296, 392, 647, 736
trichloroethene .... *See* trichloroethene (TCE)

trichloroethene (TCE) 20, 26, 39, 91, 93, 109, 249, 273, 415, 451, 647, 670, 739, 745, 746, 766, 813, 823, 835, 1014
tritium... 20, 66, 68, 108, 109, 141, 199, 277, 294, 368, 599, 603, 707, 874, 940
UBC 122 838
UBC 123 841
UBC 125 845
UBC 331 847
UBC 371 849
UBC 374 852
UBC 439 855
UBC 440 857
UBC 441 ..... 860, 863
UBC 442 863
UBC 444 865
UBC 447 868
UBC 528 871
UBC 559 874
UBC 701 878
UBC 707 881
UBC 731 885
UBC 770 887
UBC 771 890
UBC 774 894
UBC 776 897
UBC 777 902
UBC 778 906
UBC 779 909
UBC 865 913
UBC 881 916
UBC 883 920
UBC 886 924
UBC 887 927
UBC 889 929
UBC 991 932
uranium 18, 19, 20, 21, 24, 26, 30, 32, 34, 37, 38, 63, 103, 108, 109, 140, 141, 153, 158, 163, 167, 168, 169, 176, 185, 197, 201, 202, 212, 219, 220, 274, 288, 290, 333, 334, 336, 337, 345, 351, 352, 355, 363, 368, 372, 379, 384, 397, 414, 420, 421, 464, 465, 467, 470, 476, 477, 483, 510, 513, 517, 522, 559, 560, 562, 583, 603, 609, 612, 627, 635, 674, 677, 679, 680, 683, 690, 697, 700, 706, 707, 731, 732, 737, 739, 749, 754, 797, 810, 843, 847, 848, 849, 851, 853, 856, 857, 858, 860, 863, 865, 866, 868, 869, 872, 874, 876, 879, 885, 888, 892, 895, 907, 913, 914, 916, 917, 920, 921, 924, 927, 932, 933, 940
Valve Vault 1 ..... 222, 698, 922, 974
Valve Vault 11 ..... 220, 288
Valve Vault 12 ..... 220, 288, 289, 627
Valve Vault 124-B 235
Valve Vault 13 ..... 220, 288, 289
Valve Vault 14 290
Valve Vault 17 ..... 239, 240
Valve Vault 18 ..... 233, 239, 240, 842
Valve Vault 19 289
Valve Vault 2 .. 221, 222, 697, 698, 922, 974
Valve Vault 3 ..... 222, 698, 922
Valve Vault 4 930
Valve Vault 6 222
Valve Vault 7 510
Valve Vault 8 221
Valve Vault 9 ..... 221, 611
violation 74, 434
Walnut Creek . 42, 48, 55, 56, 277, 599, 939, 940, 941
West Spray Field..... 184, 199
Wind Site 1036
Windblown..... 772
Woman Creek 74, 91, 139, 140, 143, 157, 158, 167, 175, 179, 666, 669, 737, 941

Appendix 1

Appendix 1 to the HRR is a listing of all IHSSs, PACs, UBC sites, and PICs and their HRR history. All references are footnoted in the table and listed at the end of the table. The column "Proposed for NFA/NFAA" includes the annual update, closeout report (CR), data summary report (DSR), CAD/ROD, or NFAA justification where the proposal was included. An NA in this column indicates that the site was granted NFA/NFAA based on the original report.

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NORTHEAST BUFFER ZONE							
110	BZ	NE-110	Trench T-3	HRR[1]	Annual 1996[2] Annual 1997[3] Annual 2000[26] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26] NFAA Addendum 2005[176]	2002[32,] 2003[42] 2005[101]
111.1	BZ	NE-111.1	Trench T-4	HRR[1]	Annual 1996[2] Annual 1997[3] Annual 1999[23] Annual 2003[55] Final 2005	Annual 1997[3] NFAA Addendum 2005[176]	1999[27] 2003[42] 2005[101]
111.2	BZ	NE-111.2	Trench T-5	HRR[1]	Final 2005	CR 2005[174]	2005[100]
111.3	BZ	NE-111.3	Trench T-6	HRR[1]	Final 2005	CR 2005[174]	2005[100]
111.4	BZ	NE-111.4	Trench T-7	HRR[1]	Annual 2003[55] Final 2005	NFAA Justification 2003[194] NFAA Addendum 2005[175]	2003[42] 2005[99]
111.5	BZ	NE-111.5	Trench T-8	HRR[1]	Final 2005	CR 2005[174]	2005[100]
111.6	BZ	NE-111.6	Trench T-9	HRR[1]	Final 2005	CR 2005[174]	2005[100]
111.7	BZ	NE-111.7	Trench T-10	HRR[1]	Final 2005	CR 2005[174]	2005[100]
111.8	BZ	NE-111.8	Trench T-11	HRR[1]	Final 2005	CR 2005[174]	2005[100]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
142.1	6	NE-142.1	Pond A-1	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.2	6	NE-142.2	Pond A-2	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.3	6	NE-142.3	Pond A-3	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.4	6	NE-142.4	Pond A-4	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.5	6	NE-142.5	Pond B-1	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] CR[181]	2005[105]
142.6	6	NE-142.6	Pond B-2	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] CR[181]	2005[105]
142.7	6	NE-142.7	Pond B-3	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] CR[181]	2005[105]
142.8	6	NE-142.8	Pond B-4	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.9	6	NE-142.9	Pond B-5	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
142.12	6	NE-142.12	Flume Pond (IAG Name: Newly Identified Pond A-5)	HRR[1]	Annual 1996[2] Final 2005	Annual 1996[2] DSR 2005[189]	2005[114]
156.2	6	NE-156.2	Soil Dump Area Between the A and B Series Drainages	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
166.1	6	NE-166.1	Trench A	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
166.2	6	NE-166.2	Trench B	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
166.3	6	NE-166.3	Trench C	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
167.1	6	NE-167.1	Landfill North Area Spray Field	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
167.2	7	NE-167.2	Pond Area Spray Field (Center Area)	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
167.3	7	NE-167.3	South Area Spray Field	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
216.1	6	NE-216.1	East Spray Fields - North Area	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
216.2	BZ	NE-216.2	East Spray Field	HRR[1]	Annual 1997[3] Annual 2003[55] Final 2005	Annual 1997[3] DSR 2003[136]	2003[57]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
216.3	BZ	NE-216.3	East Spray Field	HRR[1]	Annual 1997[3] Annual 2003[55] Final 2005	Annual 1997[3] DSR 2003[136]	2003[57]
NA	BZ	NE-1400	Tear Gas Powder Release	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	BZ	NE-1401	NE Buffer Zone Gas Line Break	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	BZ	NE-1402	East Inner Gate PCB Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	BZ	NE-1403	Gasoline Spill - Building 920 Guard Post	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
142.6	BZ	NE-1404	Diesel Spill at Pond B-2 Spillway	Quarterly 2[5]	Quarterly 3[6] Annual 1998[7] Annual 2002[35] Final 2005	Annual 1998[7]	2002[34]
NA	BZ	NE-1405	Diesel Fuel Spill at Field Treatability Unit (identified as NE-1404; reassigned NE-1405 in Quarterly 7[9])	Quarterly 3[6]	Quarterly 4[8] Quarterly 7[9] Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
NA	BZ	NE-1406	771 Hillside Sludge Release	Quarterly 4[8]	Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	BZ	NE-1407	OU 2 Treatment Facility	Quarterly 4[8]	Quarterly 7[9] (900-1312) Quarterly 8[15] (900-1309) Annual 2002[35] Annual 2003[55] Final 2005	Annual 2002[35] DSR 2003[136]	2003[57]
NA	BZ	NE-1408	OU 2 Test Well (formerly NE-1406)	Quarterly 4[8]	Quarterly 7[9] Annual 1999[23] Annual 2000[26] Final 2005	Annual 1999[23]	2000[29]
NA	BZ	NE-1409	Modular Tanks and 910 Treatment System Spill (misidentified as 000-503 in Quarterly 5; correctly identified as NE-1409 in Quarterly 7)	Quarterly 5[10]	Quarterly 7[9] Annual 1999[23] Interim 2000[25] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1999[23] Annual 2000[26]	2001[31] 2002[32]
NA	BZ	NE-1410	Diesel Fuel Spill at Field Treatability Unit	Quarterly 7[9]	Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	BZ	NE-1411	Diesel Fuel Overflowed from Tanker at OU 2 Field Treatability Unit	Quarterly 7[9]	Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	BZ	NE-1412	Trench T-12 Located in OU 2 East Trenches	Quarterly 10[11]	Annual 2003[55] Final 2005	DSR 2003[136]	2003[57]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	BZ	NE-1413	Trench T-13 Located in OU 2 East Trenches	Quarterly 10[11]	Annual 2003[55] Final 2005	DSR 2003[136]	2003[57]
NORTHWEST BUFFER ZONE							
114	7	NW-114	Present Landfill	HRR[1]	Final 2005	CR 2006[191]	2006[115]
170	BZ	NW-170	PU&D Storage Yard - Waste Spills	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 1999[23] Annual 2002[35] Final 2005	Annual 1998[7] Annual 1999[23]	2002[34]
174A	BZ	NW-174A	PU&D Yard Container Storage Area	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 2003[55] Final 2005	DSR 2003[136]	2003[57]
174B	BZ	NW-174B	PU&D Container Storage Facilities	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7] Annual 1999[23]	1999[28]
195	16	NW-195	Nickel Carbonyl Disposal	HRR[1]	Annual 1996[2] Final 2005	OU 16 CAD/ROD 1994[12]	1994[12]
203	7	NW-203	Inactive Hazardous Waste Storage Area	HRR[1]	Annual 1996[2] Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	BZ	NW-1500	Diesel Spill at PU&D Yard (formerly NW-175)	Quarterly 3[6]	Quarterly 7[9] Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
NA	BZ	NW-1501	Asbestos Release at PU&D Yard (formerly NW-176)	Quarterly 3[6]	Quarterly 7[9] Annual 1999[23] Annual 2000[26] Final 2005	Annual 1999[23]	2000[29]
114	7	NW-1502	Improper Disposal of Diesel-Contaminated Material at Landfill (formerly NW-177)	Quarterly 2[5]	Quarterly 3[6] Quarterly 7[9] Annual 2002[35] Final 2005	Quarterly 7[9]	2002[32]
114	7	NW-1503	Improper Disposal of Fuel-Contaminated Material at Landfill	Quarterly 1[24]	Quarterly 7[9] Annual 2002[35] Final 2005	Quarterly 7[9]	2002[32]
114	7	NW-1504	Improper Disposal of Thorosilane-Contaminated Material at Landfill	Quarterly 7[9]	Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	BZ	NW-1505	North Firing Range	Annual 2001[75]	Final 2005	CR 2005[184]	2005[107]
SOUTHEAST BUFFER ZONE							
142.10	5	SE-142.10	Pond C-1	HRR[1]	Annual 1997[3] Annual 2004[56] Final 2005	Annual 1997[3] NFAA Justification, 2004[146]	2004[79]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
142.11	5	SE-142.11	Pond C-2	HRR[1]	Annual 1997[3] Final 2005	Annual 1997[3] DSR 2005[189]	2005[114]
209	5	SE-209	Surface Disturbance Southeast of Bldg. 881	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
NA	BZ	SE-1600	Pond 7-Steam Condensate Releases	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[34]
NA	BZ	SE-1601	Pond 8 - Cooling Tower Discharge Releases	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[34]
155	BZ	SE-1602	East Firing Range	Annual 1999[23]	Annual 1999[23] Final 2005	CR 2005[179]	2005[98]
SOUTHWEST BUFFER ZONE							
115	IA	SW-115	Original Landfill	HRR[1]	Final 2005	CR 2006[192]	2006[116]
133.1	5	SW-133.1	Ash Pit 1	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2003[55] Final 2005	Annual 2001[75]	2003[42]
133.2	5	SW-133.2	Ash Pit 2	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2002[35] Annual 2003[55] Final 2005	Annual 2001[75]	2003[42]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
133.3	5	SW-133.3	Ash Pit 3	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2002[35] Final 2005	Annual 2001[75]	2002[32]
133.4	5	SW-133.4	Ash Pit 4	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2002[35] Annual 2003[55] Final 2005	Annual 2001[75]	2003[42]
133.5	5	SW-133.5	Incinerator Facility	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2004[56] Final 2005	Annual 1997[3] Annual 2001[75] CR 2003[137]	2003[60]
133.6	5	SW-133.6	Concrete Wash Pad	HRR[1]	Annual 1997[3] Annual 2001[75] Annual 2004[56] Final 2005	Annual 1997[3] Annual 2001[75] CR 2003[137]	2003[60]
196	IA	SW-196	Water Treatment Plant Backwash Pond	HRR[1]	Final 2005	CR 2006[192]	2006[116]
NA	BZ	SW-1700	Fuel Spill into Woman Creek Drainage	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	5	SW-1701	Recently Identified Ash Pit (also referred to as TDEM-1)	Quarterly 9[13]	Annual 1997[3] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2001[75]	2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	5	SW-1702	Recently Identified Ash Pit (also referred to as TDEM-2)	Quarterly 9[13]	Annual 1997[3] Annual 2001[75] Annual 2003[55] Final 2005	Annual 2001[75]	2003[42]
000 AREA							
101	IA	000-101	207 Solar Evaporation Ponds	HRR[1]	Annual 1998[7] Annual 2003[55] Final 2005	CR 2003[129]	2003[50]
121	IA	000-121	Original Process Waste Lines	HRR[1]	Annual 1996[2] Annual 1998[7] Annual 2005	CR 2005[186]	2005[110]
162	IA	000-162	Radioactive Site - 700 Area Site # 2	HRR[1]	Final 2005	CR 2005[186]	2005[110]
168	11	000-168	West Spray Field	HRR[1]	Annual 1996[2] Final 2005	OU 11 CAD/ROD 1995[14]	1995[14]
172	IA	000-172	Central Avenue Waste Spill	HRR[1]	Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
190	IA	000-190	Caustic Leak (also referred to as Central Avenue Ditch)	HRR[1]	Annual 2004[56] Final 2005	NFAA Justification 2004[153]	2004[73]
192	16	000-192	Antifreeze Discharge	HRR[1]	Annual 1996[2] Final 2005	OU 16 CAD/ROD 1994[12]	1994[12]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	000-500	Sanitary Sewer System	HRR[1]	Final 2005	NFAA Justification 2005[177]	2005[103]
NA	BZ	000-501	Roadway Spraying	HRR[1]	Quarterly 4[8] Quarterly 7[9] Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	000-502 (see 900-1310)	ITS Water Spill (identified in Quarterly 2 as 000-502; reassigned as 900-1310 in Quarterly 7; the number 000-502 is no longer in use.)	Quarterly 2[5]	Quarterly 7[9]	NA	NA
NA	IA	000-503	Solar Pond Water Spill Along Central Avenue	Quarterly 7[9]	Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	IA	000-504	New Process Waste Lines	Annual 1999[23]	Annual 2004[56] Final 2005	CR 2005[188]	2005[112]
NA	IA	000-505	Storm Drains	Annual 1999[23]	Final 2005	CR 2005[187]	2005[111]
100 AREA							
148	IA	100-148	Waste Spills	HRR[1]	Annual 1998[7] Annual 2002[35] Annual 2003[55] Final 2005	CR 2003[118]	2003[39]
NA	IA	100-600	Mercury Spill-Valve Vault 124-B, Building 124	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	100-601	Building 123 Phosphoric Acid Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	100-602	Building 123 Process Waste Line Break	HRR[1]	Final 2005	CR 2005[186]	2005[110]
NA	IA	100-603	Building 123 Bioassay Waste Spill	HRR[1]	Annual 2001[75] Annual 2002[36] Final 2005	Annual 2001[75]	2002[32]
NA	IA	100-604	T130 Complex Sewer Line Leaks	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	100-605	Building 115 Hydraulic Oil Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	100-606	Building 125 TCE Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	100-607	Building 111 Transformer PCB Leak	HRR[1]	Interim 2000[25] Annual 2000[26] Annual 2001[75] Annual 2002[36] Final 2005	Annual 2001[75]	2001[30]
NA	IA	100-608	Building 131 Transformer Leak	HRR[1]	Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
NA	IA	100-609	Building 121 Security Incinerator	HRR[1]	Annual 2002[35] Annual 2003[55] Final 2005	CR 2003[118]	2003[39]
NA	IA	100-610	Asbestos Release – Building 123	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	100-611	Building 123 Scrubber Solution Spill	HRR[1]	Annual 2002[35] Annual 2003[55] Final 2005	Annual 2002 CR 2003[118]	2003[39]
NA	IA	100-612	Battery Solution Spill - Building 119	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	100-613	Asphalt Surface in Lay-down Yard North of Building 130 (identified as 000-501 in Quarterly 4[8]; reassigned as 100-613 in Quarterly 7[9])	Quarterly 4[8]	Quarterly 7[9] Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
300 AREA							
128	IA	300-128	Oil Burn Pit No. 1	HRR[1]	Annual 2003[55] Final 2005	CR 2003[125]	2003[44]
134N	IA	300-134N	Lithium Metal Destruction Site	HRR[1]	Annual 2003[55] Final 2005	CR 2003[125]	2003[44]
134S	IA	300-134S	Lithium Metal Destruction Site	HRR[1]	Final 2005	DSR 2004[168]	2004[91]
135	IA	300-135	Cooling Tower Blowdown	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
151	IA	300-151	Tank 262 Fuel Oil Spills	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
156.1	IA	300-156.1	Building 371 Parking Lot	HRR[1]	Annual 1997[3] Interim 2000[25] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26]	2001[31] 2002[32]
171	IA	300-171	Solvent Burning Ground	HRR[1]	Annual 2003[55] Final 2005	CR 2003[125]	2003[44]
181	IA	300-181	Building 334 Cargo Container Area	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
186	IA	300-186	Valve Vault 12	HRR[1]	Annual 2002[35] Final 2005	DSR 2004[159]	2004[85]
188	IA	300-188	Acid Leak	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
206	IA	300-206	Inactive D-836 Hazardous Waste Tank	HRR[1]	Annual 2001[75] Annual 2002[35] Final 2005	Annual 2001[75]	2002[34]
212	IA	300-212	Building 371 Drum Storage Area, Unit 63 (deferred to Part VIII of the RFETS RCRA Mixed Residues Modification; see Annual 1997)	HRR[1]	Annual 1997[3] Annual 2002[35] Final 2005	Annual 1997[3]	2002[34]
NA	IA	300-700	Scrap Roofing Disposal (see also BZCR Site 31, Section 3)	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	300-701	Sulfuric Acid Spill – Building 371	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-702	Pesticide Shed	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[134]	2003[48]
NA	IA	300-703	Building 331 North Area	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-704	Roof Fire, Building 381	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-705	Potassium Hydroxide Spill North of Building 374	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-706	Evaporator Tanks North of Building 374	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-707	Sanitizer Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	300-708	Transformers North of Building 371	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	300-709	Transformer Leak 334-1	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	300-710	Gasoline Spill North of Building 331	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	300-711	Nickel-Cadmium Battery Acid Spill Outside of Building 373	Quarterly 1[24]	Quarterly 7[9] Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	IA	300-712	0.5-Gallon Antifreeze Spilled by Street Sweeper Outside of Building 373	Quarterly 7[9]	Annual 2002[35] Final 2005	Quarterly 7[9]	2002[34]
NA	IA	300-713	Caustic Spill North of Building 331	Quarterly 8[15]	Annual 2002[35] Final 2005	Quarterly 8[15]	2002[34]
NA	IA	300-714	Laundry Waste Water Spill from Tank T-803, North of Building 374	Quarterly 10[11]	Annual 2002[35] Final 2005	Quarterly 10[11]	2002[34]
NA	IA	300-715	Battery Acid Spill	Annual 1997[3]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
400 AREA							
116.1	IA	400-116.1	West Loading Dock, Building 447 (IAG Name: West Loading Dock Area)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
116.2	IA	400-116.2	South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
122	IA	400-122	Underground Concrete Tank	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	CR 2004[142]	2004[65]
129	IA	400-129	Building 443 Oil Leak	HRR[1]	Annual 1996[2] Annual 1997[3] Final 2005	CR 2004[170]	2005[94]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
136.1	IA	400-136.1	Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
136.2	IA	400-136.2	Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
157.1	IA	400-157.1	Radioactive Site North Area	HRR[1]	Final 2005	CR 2004[170]	2005[94]
157.2	IA	400-157.2	Radioactive Site South Area	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[158]	2004[84]
182	IA	400-182	Building 444/453 Drum Storage Area	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
187	IA	400-187	Sulfuric Acid Spill (IAG Name: Acid Leaks [2]	HRR[1]	Final 2005	CR 2004[170]	2005[94]
191	IA	400-191	Hydrogen Peroxide Spill	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
193	16	400-193	Steam Condensate Leak	HRR[1]	Annual 1996[2] Final 2005	OU 16 CAD/ROD 1994[12]	1994[12]
204	15	400-204	Original Uranium Chip Roaster (deferred to D&D and UBC 447; see OU 15 CAD/ROD)	HRR[1]	Annual 1996[2] Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
205	IA	400-205	Building 460 Sump #3 Acid Side	HRR[1]	Final 2005	DSR 2004[166]	2004[89]
207	IA	400-207	Inactive 444 Acid Dumpster	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
208	IA	400-208	Inactive 444/447 Waste Storage Area	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
NA	IA	400-800	Transformer 443-1	HRR[1]	Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
NA	IA	400-801	Transformer, Roof of Building 447	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
NA	IA	400-802	Storage Area, South of Building 334	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[128]	2003[43]
NA	IA	400-803	Miscellaneous Dumping, Building 460 Storm Drain	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[155]	2004[77]
NA	IA	400-804	Road North of Building 460	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[155]	2004[77]
NA	IA	400-805	Building 443 Tank #9 Leak	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	400-806	Catalyst Spill, Building 440	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	400-807	Sandblasting Area	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[130]	2003[46]
NA	IA	400-808	Vacuum Pump Leak - Building 442	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	400-809	Oil Leak - 446 Guard Post	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	400-810	Beryllium Fire - Building 444	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
NA	IA	400-811	Transformer 443-2, Building 443	Quarterly 2[5]	Quarterly 3[6] Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
NA	IA	400-812	Tank T-2 Spill in Building 460	Quarterly 6[16]	Quarterly 7[9] Quarterly 8[15] Annual 2001[75] Annual 2002[35] Final 2005	Quarterly 8[15] Annual 2001[75]	2002[32]
NA	IA	400-813	RCRA Tank Leak in Building 460	Quarterly 7[9]	Final 2005	DSR 2004[166]	2004[89]
NA	IA	400-814	Air Conditioner Compressor Release, Bldg. 444 Roof	Quarterly 8[15]	Annual 2002[35] Final 2005	Quarterly 8[15]	2002[34]
NA	IA	400-815	RCRA Tank Leak in Building 460	Quarterly 8[15]	Annual 2002[35] Final 2005	DSR 2004[166]	2004[89]
NA	IA	400-820 (see 600-1004)	Central Avenue Ditch Soil Spreading (identified in Quarterly 6 as 400-820, reassigned as 600-1004 in Quarterly 7; the number 400-820 is no longer in use).	Quarterly 6[16]	Quarterly 7[9] Final 2005	NA	NA
500 AREA							
117.1	IA	500-117.1	North Site Chemical Storage	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[159]	2004[85]
117.2	IA	500-117.2	Middle Site Chemical Storage	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[150]	2004[70]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
158	IA	500-158	Radioactive Site – Building 551	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[149]	2004[69]
159	IA	500-159	Radioactive Site – Building 559	HRR[1]	Final 2005	CR 2005[182]	2005[109]
169	IA	500-169	Waste Drum Peroxide Burial	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 2000[26] Annual 2004[56] Final 2005	Annual 1998[7]	2004[63]
197	IA	500-197	Scrap Metal Sites	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[159]	2004[85]
NA	IA	500-900	Transformer Leak – 515/516	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	500-901	Transformer Leak – 555	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	500-902	Transformer Leak – 559	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	500-903	RCRA Storage Unit #1	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	500-904	Transformer Leak – 223-1/223-2	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[148]	2004[68]
NA	IA	500-905	Transformer Leak – 558-1	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] Annual 2004[56] NFAA Justification 2004 [145]	2004[74]
NA	IA	500-906	Asphalt Surface Near Building 559	Quarterly 4[8]	Annual 2002[35] Annual 2003[55] Final 2005	DSR 2003[123]	2003[47]
172	IA	500-907	Tanker Truck Release of Hazardous Waste from Tank 231B	Quarterly 9[13]	Annual 2003[55] Final 2005	DSR 2003[126]	2003[41]
156.1, 186	IA	500-908	Oil Released from Air Compressor	Quarterly 12[17]	Annual 2002[35] Final 2005	Quarterly 12[17]	2002[34]
158	IA	500-909	Release of Spent Photographic Fixer Solution	Annual 1996[2]	Annual 2002[35] Final 2005	Annual 1996[2]	2002[32]
600 AREA							
117.3	IA	600-117.3	Chemical Storage – South Site	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
120.1	IA	600-120.1	Fiberglassing Area North of Building 664	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[147]	2004[67]
120.2	IA	600-120.2	Fiberglassing Area West of Building 664	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[130]	2003[46]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
152	IA	600-152	Fuel Oil Tank 221 Spills	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
160	IA	600-160	Radioactive Site Building 444 Parking Lot	HRR[1]	Final 2005	DSR 2004[169]	2005[93]
161	IA	600-161	Radioactive Site - Building 664	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[130]	2003[46]
164.1	IA	600-164.1	Radioactive Slab from Bldg. 771	HRR[1]	Annual 1997[3] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26]	2001[31] 2002[32]
189	IA	600-189	Nitric Acid Tank	HRR[1]	Annual 1997[3] Annual 2000[26] Annual 2001[75] Final 2005	Annual 1997[3] Annual 2001[75]	2002[34]
NA	IA	600-1000	Transformer Storage Outside Building 662	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	1996[2] 2004[56]
NA	IA	600-1001	Temporary Waste Storage Building 663	HRR[1]	Annual 1997[3] Annual 2003[55] Final 2005	CR 2003[127]	2003[45]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	600-1001(a)	Waste Oil Identified in PAC-1001	Annual 1997[3]	Annual 1997[3] Annual 1999[23] Annual 2000[25] Annual 2000[26] Annual 2002[35] Final 2005	Annual 1997[3]	1999[27] 2002[32]
NA	IA	600-1002	Transformer Storage - West of Building 666	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	600-1003	Transformers North and South of 661/675 Substation	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
152, 157.1, 172	IA	600-1004	Central Avenue Ditch Cleaning Incident (formerly identified as 400-820)	Quarterly 6[16]	Quarterly 7[9] Annual 2004[56] Final 2005	DSR 2004[152]	2004[71]
NA	IA	600-1005	Former Pesticide Storage Area	Quarterly 7[9]	Annual 2002[35] Annual 2003[55] Final 2005	DSR 2003[119]	2003[40]
700 AREA							
118.1	IA	700-118.1	Multiple Solvent Spills West of Building 730	HRR[1]	Annual 1998[7] Final 2005	CR 2005[180]	2005[104]
118.2	IA	700-118.2	Multiple Solvent Spills South End of Building 776	HRR[1]	Final 2005	CR 2005[180]	2005[104]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
123.1	IA	700-123.1	Valve Vault 7	HRR[1]	Annual 1997[3] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26]	2001[31] 2002[32]
123.2	IA	700-123.2	Valve Vault West of Building 707	HRR[1]	Final 2005	CR 2005[186]	2005[110]
124.1	IA	700-124.1	30,000 Gallon Tank (Tank #68)	HRR[1]	Annual 1996[2] (000-121) Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
124.2	IA	700-124.2	14,000 Gallon Tank (Tank #66)	HRR[1]	Annual 1996[2] (000-121) Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
124.3	IA	700-124.3	14,000 Gallon Tank (Tank #67)	HRR[1]	Annual 1996[2] (000-121) Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
125	IA	700-125	Holding Tank (Tank #66)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
126.1	IA	700-126.1	Westernmost Out-of-Service Waste Tank	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
126.2	IA	700-126.2	Easternmost Out-of-Service Waste Tank	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
127	IA	700-127	Low-Level Radioactive Waste Leak	HRR[1]	Final 2005	CR 2005[186]	2005[110]
131	IA	700-131	Radioactive Site - 700 Area Site #1	HRR[1]	Final 2005	CR 2005[180]	2005[104]
132	IA	700-132	Radioactive Site - 700 Area Site #4	HRR[1]	Annual 1996[2] (000-121) Annual 1997[3] Final 2005	CR 2005[180]	2005[104]
137	IA	700-137	Cooling Tower Blowdown Buildings 712 and 713 (IAG Name: Cooling Tower Blowdown Building 774)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[164]	2004[82]
138	IA	700-138	Cooling Tower Blowdown Building 779	HRR[1]	Annual 2004[56] Final 2005	CR 2004[157]	2004[87]
139.1N(a)	IA	700-139.1N(a)	Caustic/Acid Spills Hydroxide Tank Area	HRR[1]	Annual 1999[23] Final 2005	CR 2005[173]	2005[97]
139.1N(b)	IA	700-139.1N(b)	Caustic/Acid Spills Hydroxide Tank Area	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
139.1S	IA	700-139.1S	Caustic/Acid Spills Hydroxide Tank Area	HRR[1]	Annual 2004[56] Final 2005	CR 2004[164]	2004[82]
139.2	IA	700-139.2	Caustic/Acid Spills Hydrofluoric Acid Tanks	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
143	IA	700-143	Bldg. 771 Outfall	HRR[1]	Annual 1997[3] Annual 2004[56] Final 2005	NFAA Justification 2004[156]	2004[80]
144	IA	700-144(N)	Sewer Line Overflow (IAG Name: Sewer Line Break)	HRR[1]	Final 2005	CR 2005[180]	2005[104]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
144	IA	700-144(S)	Sewer Line Overflow (IAG Name: Sewer Line Break)	HRR[1]	Final 2005	CR 2005[180]	2005[104]
146.1	IA	700-146.1	Concrete Process Waste Tanks 7,500 Gallon Tank (31)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
146.2	IA	700-146.2	Concrete Process Waste Tanks 7,500 Gallon Tank (32)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
146.3	IA	700-146.3	Concrete Process Waste Tanks 7,500 Gallon Tank (34W)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
146.4	IA	700-146.4	Concrete Process Waste Tanks 7,500 Gallon Tank (34E)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
146.5	IA	700-146.5	Concrete Process Waste Tanks 3,750 Gallon Tank (30)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
146.6	IA	700-146.6	Concrete Process Waste Tanks 3,750 Gallon Tank (33)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
147.1	IA	700-147.1	Process Waste Line Leaks (IAG Name: Maas Area)	HRR[1]	Final 2005	CR 2005[186]	2005[110]
149.1	IA	700-149.1	Effluent Pipe	HRR[1]	Final 2005	CR 2003[129] CR 2005[186]	2003[50] 2005[110]
149.2	IA	700-149.2	Effluent Pipe	HRR[1]	Annual 2003[55] Final 2005	CR 2003[129] CR 2004[157]	2003[50] 2004[87]
150.1	IA	700-150.1	Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
150.2	IA	700-150.2(N) 700-150.2(S)	Radioactive Site West of Buildings 771 and 776 (IAG Name: Radioactive Leak West of Building 771)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141] CR 2005[180]	2004[62] 2005[104]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
150.3	IA	700-150.3	Radioactive Site Between Buildings 771 & 774 (IAG Name: Radioactive Leak Between Buildings 771 & 774)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
150.4	IA	700-150.4	Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)	HRR[1]	Final 2005	CR 2005[180]	2005[104]
150.5	IA	700-150.5	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)	HRR[1]	Annual 1998[7] Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
150.6	IA	700-150.6	Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)	HRR[1]	Annual 2003[55] Final 2005	CR 2004[157]	2003[87]
150.7	IA	700-150.7	Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)	HRR[1]	Final 2005	CR 2005[180]	2005[104]
150.8	IA	700-150.8	Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)	HRR[1]	Annual 2003[55] Final 2005	CR 2004[157]	2003[87]
163.1	IA	700-163.1	Radioactive Site 700 Area Site No.3 Wash Area	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
163.2	IA	700-163.2	Radioactive Site 700 Area Site No.3 Buried Slab	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
185	16	700-185	Solvent Spill	HRR[1]	Annual 1996[2] Final 2005	OU 16 CAD/ROD 1994[12]	1994[12]
194	16	700-194	Steam Condensate Leak	HRR[1]	Annual 1996[2] Final 2005	OU 16 CAD/ROD 1994[12]	1994[12]
214	IA	700-214	750 Pad Pondcrete & Saltcrete Storage, Unit 25	HRR[1]	Final 2005	DSR 2004[167]	2005[92]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
215	IA	700-215	Process Waste Tank Unit 55.13	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
NA	IA	700-1100	French Drain North of Building 776/777	HRR[1]	Final 2005	CR 2005[180]	2005[104]
NA	IA	700-1101	Laundry Tank Overflow - Building 732	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[162]	2004[86]
NA	IA	700-1102	Transformer Leak – 776-4	HRR[1]	Annual 1996[2] Annual 1997[3] Annual 2000[26] Annual 2001[75] Annual 2004[56]	Annual 1997[3] Annual 2001[75] NFAA Justification 2004[145]	2004[74]
NA	IA	700-1103	Leaking Transformers - Building 707	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	700-1104	Leaking Transformers - Building 708	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	700-1105	Transformer Leak - 779-1/779-2	HRR[1]	Annual 2004[56] Final 2005	CR 2004[157]	2003[58]
NA	IA	700-1106	Process Waste Spill - Portal 1	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[120]	2003[37]
NA	IA	700-1107	Compressor Waste Oil Spill - Building 776	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	700-1108	771/774 Footing Drain Pond	HRR[1]	Annual 1999[23] Final 2005	CR 2005[173]	2005[97]
NA	IA	700-1109	Uranium Incident - Building 778	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	700-1110	Nickel Carbonyl Burial West of Building 771	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[34]
NA	IA	700-1111	Leaking Transformer - Building 750	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	700-1112	Leaking Transformer - 776-5	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
101	IA	700-1113	Water Released from 207C Solar Evaporation Pond	Quarterly 11[18]	Annual 2002[35] Final 2005	Quarterly 11[18]	2002[34]
NA	IA	700-1114a	Release During Liquid Transfer Operations from Bldg. 774	Annual 1997[3]	Annual 2002[35] Final 2005	Annual 1997[3]	2002[34]
NA	IA	700-1114b	Release During Liquid Transfer Operations from Bldg. 774	Annual 1997[3]	Annual 2002[35] Final 2005	Annual 1997[3]	2002[34]
NA	IA	700-1115	Identification of Diesel Fuel in Subsurface Soils	Annual 1997[3]	Annual 2004[56] Final 2005	DSR 2004[161]	2004[81]
150.7	IA	700-1116	Leaking Transformer South of Building 776	Annual 1998[7]	Final 2005	CR 2005[180]	2005[104]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	700-1117	Building 701 Water Line, Soil Put-back	Annual 1998[7]	Annual 1999[23] Final 2005	Annual 1998[7]	1999[28]
800 AREA							
102	1	800-102	Oil Sludge Pit	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
103	1	800-103	Chemical Burial	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
104	1	800-104	Liquid Dumping	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
105.1	1	800-105.1	Bldg. 881 Westernmost Out of Service Fuel Tanks	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
105.2	1	800-105.2	Bldg. 881 Easternmost Out of Service Fuel Tanks	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
106	1	800-106	Bldg. 881, Outfall	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
107	1	800-107	Bldg. 881, Hillside Oil Leak	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
145	1	800-145	Sanitary Waste Line Leak	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
147.2	IA	800-147.2	Bldg. Conversion Activity Contamination Area	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
164.2	IA	800-164.2	Radioactive Site 800 Area Site #2, Building 886 Spills	HRR[1]	Annual 2003[55] Final 2005	CR 2003[121]	2003[52]
164.3	IA	800-164.3	Radioactive Site 800 Area Site #2, Building 889 Storage Pad	HRR[1]	Annual 2003[55] Final 2005	CR 2003[117]	2003[38]
177	IA	800-177	Building 885 Drum Storage and Paint Storage (IAG Name: Building 885 Drum Storage Area)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[151]	2004[72]
178	15	800-178	Building 881 Drum Storage Area	HRR[1]	Annual 1996[2] Final 2005	OU 15 CAD/ROD 1995[21]	1995[21]
179	15	800-179	Building 865 Drum Storage; refer to OU 15 CAD/ROD)	HRR[1]	Annual 1996[2] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1996[2] Annual 2001[75]	2002[32]
180	15	800-180	Building 883 Drum Storage; refer to OU 15 CAD/ROD)	HRR[1]	Annual 1996[2] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1996[2] Annual 2001[75]	2002[32]
211	15	800-211	Building 881 Drum Storage, Unit 26	HRR[1]	Annual 1996[2] Final 2005	OU 15 CAD/ROD 1995[21]	1995[21]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
217	15	800-217	Building 881, CN^- Bench Scale Treatment, Unit 32	HRR[1]	Annual 1996[2] Final 2005	OU 15 CAD/ROD 1995[21]	1995[21]
NA	IA	800-1200	Valve Vault 2	HRR[1]	Final 2005	CR 2005[183]	2005[106]
NA	IA	800-1201	Radioactive Site South of Building 883	HRR[1]	Final 2005	DSR 2005[183]	2005[106]
NA	IA	800-1202	Sulfuric Acid Spill, Building 883	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	800-1203	Sanitary Sewer Line Break Between Buildings 865 and 886	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	800-1204	Building 866 Spills	HRR[1]	Annual 2004[56] Final 2005	CR 2004[143]	2004[64]
NA	IA	800-1205	Building 881, East Dock	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[132]	2003[53]
NA	IA	800-1206	Fire, Building 883	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	800-1207	Transformer 883-4	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	800-1208	Transformer 881-4	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	800-1209	Leaking Transformers, 800 Area	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	800-1210	Transformers 865-1 and 865-2	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] CR2003[143]	2004[64]
NA	IA	800-1211	Capacitor Leak, Building 883	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	800-1212	Building 866 Sump Spill	Quarterly 5[10]	Annual 2004[56] Final 2005	CR 2003[143]	2004[64]
900 AREA							
108	BZ	900-108	Trench T-1	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 1999[23] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1999[23] Annual 2000[26]	2001[31] 2002[32]
109	BZ	900-109	Trench T-2 - Ryan's Pit	HRR[1]	Annual 1996[2] Annual 1997[3] Annual 2002[35] Final 2005	Annual 1997[3]	2002[34]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
112	BZ	900-112	903 Pad (IAG Name: 903 Drum Storage Area)	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 1999[23] Annual 2000[26] Final 2005	CR 2005[171]	2005[95]
113	BZ	900-113	Mound Area	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
119.1	1	900-119.1	West Scrap Metal Storage Area and Solvent Spill (OU 1 CAD/ROD Specifies Continuance of Groundwater Collection from well (see ref. # 20).	HRR[1]	Annual 1996[2] Annual 1997[3] Annual 1998[7] Annual 1999[23] Final 2005	OU 1 CAD/ROD 1997[20]	1999[27]
119.2	1	900-119.2	East Scrap Metal Storage Area and Solvent Spill	HRR[1]	Annual 1996[2] Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
130	1	900-130	Contaminated Soil Disposal Area East of Bldg. 881	HRR[1]	Annual 1997[3] Final 2005	OU 1 CAD/ROD 1997[20]	1997[20]
140	BZ	900-140	Hazardous Disposal Area (IAG Name: Reactive Metal Destruction Site)	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 2000[26] Annual 2003[55] Final 2005	Annual 1998[7] Annual 2003[55] CR 2005[172]	2005[96]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
141	6	900-141	Sludge Disposal	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
153	IA	900-153	Oil Burn Pit No. 2	HRR[1]	Annual 1999[23] Annual 2003[55] Final 2005	DSR 2003[124] CR 2005[185]	2005[108]
154	IA	900-154	Pallet Burn Site	HRR[1]	Annual 1999[23] Annual 2003[55] Final 2005	DSR 2003[124] CR 2005[185]	2005[108]
155	BZ	900-155	903 Lip Area	HRR[1]	Annual 1997[3] Annual 1998[7] Annual 1999[23] Annual 2000[26] Final 2005	CR 2005[172]	2005[96]
165	IA	900-165	Triangle Area	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[133]	2003[54]
173	IA	900-173	South Dock - Building 991 (IAG Name: Radioactive Site - 900 Area)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[144]	2004[66]
175	IA	900-175	S&W Building 980 Container Storage Facility	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[131]	2003[49]
176	IA	900-176	S&W Contractor Storage Yard	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[133]	2003[54]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
183	BZ	900-183	Gas Detoxification Area	HRR[1]	Annual 1997[3] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26]	2001[31] 2002[32]
184	IA	900-184	Building 991 Steam Cleaning Area	HRR[1]	Annual 2004[56] Final 2005	CR 2004[144]	2004[66]
210	IA	900-210	Building 980 Cargo Container, Unit 16	HRR[1]	Annual 1997[3] Annual 1999[23] Final 2005	Annual 1997[3]	1999[27]
213	IA	900-213	Unit 15, 904 Pad Pondcrete Storage	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[139]	2003[59]
NA	IA	900-1300	RO Plant Sludge Drying Beds	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[34]
NA	IA	900-1301	Building 991 Enclosed Area	HRR[1]	Annual 2004[56] Final 2005	CR 2004[144]	2004[66]
NA	IA	900-1302	Gasoline Spill	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	900-1303	Natural Gas Leak	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	900-1304	Chromic Acid Spill - Building 991	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]
NA	IA	900-1305	Building 991 Roof	HRR[1]	Annual 2002[35] Final 2005	NA	1992[4] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	900-1306	Transformers 991-1 and 991-2	HRR[1]	Annual 1996[2] Annual 2004[56] Final 2005	Annual 1996[2] NFAA Justification 2004[145]	2004[74]
NA	IA	900-1307	Explosive Bonding Pit	HRR[1]	Annual 1999[23] Annual 2004[56] Final 2005	CR 2004[144]	2004[66]
NA	IA	900-1308	Gasoline Spill Outside of Building 980	Quarterly 6[16]	Quarterly 8[15] Annual 2001[75] Annual 2002[35] Final 2005	Annual 2001[75] DSR 2003[131]	2003[49]
NA	BZ	900-1309	OU 2 Field Treatability Unit Spill	Quarterly 6[16]	Quarterly 7[9] (900-1312) Quarterly 8[15] Annual 1999[23] Annual 2000[26] Final 2005	Annual 1999[23]	2000[29]
NA	IA	900-1310	ITS Water Spill (identified as 000-502 in Quarterly 2; reassigned 900-1310 in Quarterly 7[9])	Quarterly 2[5]	Quarterly 3[6] Quarterly 7[9] Annual 2003[55] Final 2005	CR 2003[129]	2003[50]
NA	IA	900-1311	Septic Tank East of Building 991	Quarterly 7[9]	Annual 1999[23] Annual 2000[26] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1999[23] Annual 2000[26]	2001[31] 2002[32]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	900-1312	OU-2 Water Spill	Quarterly 7[9]	Annual 1999[23] Annual 2000[26] Final 2005	Annual 1999[23]	1999[29]
192	IA	900-1313	Seep Area Near OU-2 Influent	Quarterly 9[13]	Annual 1999[23] Annual 2000[26] Final 2005	Annual 1999[23]	1999[29]
101	IA	900-1314	Solar Evaporation Pond 207B Sludge Release	Quarterly 9[13]	Annual 2002[35] Final 2005	Quarterly 9[13]	2002[34]
NA	IA	900-1315	Tanker Truck Release on East Patrol Road, North of Spruce Ave.	Quarterly 10[11]	Quarterly 11[18] Annual 2002[35] Final 2005	Quarterly 11[18]	2002[34]
NA	BZ	900-1316	Elevated Chromium (total) Identified During Geotechnical Drilling	Quarterly 10[11]	Annual 2002[35] Final 2005	Quarterly 10[11]	2002[34]
176	IA	900-1317	Soil Released from Wooden Crate in 964 Laydown Yard	Quarterly 11[18]	Annual 2002[35] Final 2005	Quarterly 11[18]	2002[34]
NA	IA	900-1318	Release of F001 Listed Waste Water to Soil (misidentified as 900-1307 in Annual 1997; correctly identified as 900-1318 in Annual 1998)	Annual 1997[3]	Annual 1997[3\] Annual 1998[7] Annual 2000[25] Annual 2001[75] Annual 2002[35] Final 2005	Annual 1997[3] Annual 2000[26]	2001[31] 2002[32]
OFF-SITE AREA							
199	3	OFF-SITE AREA 1	Off-Site Area 1	HRR[1]	Annual 1997[3] Final 2005	OU 3 CAD/ROD 1997[22]	1997[22]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
200	3	OFF-SITE AREA 2	Great Western Reservoir	HRR[1]	Annual 1997[3] Final 2005	OU 3 CAD/ROD 1997[22]	1997[22]
201	3	OFF-SITE AREA 3	Standley Lake	HRR[1]	Annual 1997[3] Final 2005	OU 3 CAD/ROD 1997[22]	1997[22]
202	3	OFF-SITE AREA 4	Mower Reservoir	HRR[1]	Annual 1997[3] Final 2005	OU 3 CAD/ROD 1997[22]	1997[22]
UNDER BUILDING CONTAMINATION							
NA	IA	UBC-122	Building 122 (UBC-122)	HRR[1]	Final 2005-	DSR 2005[165]	2005[90]
NA	IA	UBC-123	Building 123 (UBC-123)	HRR[1]	Annual 1998[7] Annual 2001[75] Annual 2003[55] Final 2005	CR 2003[118]	2003[39]
NA	IA	UBC-125	Building 125 (UBC-125)	HRR[1]	Annual 2002[35] Final 2005	RLCR 2002[140]	2002[33]
NA	IA	UBC-331	Building 331 (UBC-331)	HRR[1]	Final 2005	DSR 2004[168]	2004[91]
NA	IA	UBC-371	Building 371 (UBC-371)	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[135]	2003[51]
NA	IA	UBC-374	Building 374 (UBC-374)	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[135]	2003[51]
NA	IA	UBC-439	Building 439 (UBC-439)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[154]	2004[76]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	UBC-440	Building 440 (UBC-440)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[160]	2004[83]
NA	IA	UBC-441	Building 441 UBC-441)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[142]	2004[65]
NA	IA	UBC-442	Building 442 (UBC-442)	HRR[1]	Final 2005	CR 2004[170]	2005[94]
NA	IA	UBC-444	Building 444 (UBC-444)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
NA	IA	UBC-447	Building 447 (UBC-447)	HRR[1]	Annual 2004[56] Final 2005	DSR 2003[138]	2003[61]
NA	IA	UBC-528	Building 528 (UBC-528)	HRR[1]	Final 2005	CR 2005[182]	2005[109]
NA	IA	UBC-559	Building 559 (UBC-559)	HRR[1]	Final 2005	CR 2005[182]	2005[109]
NA	IA	UBC-701	Building 701 (UBC-701)	HRR[1]	Final 2005	CR 2005[180]	2005[104]
NA	IA	UBC-707	Building 707 (UBC-707)	HRR[1]	Final 2005	CR 2005[178]	2005[102]
NA	IA	UBC-731	Building 731 (UBC-731)	HRR[1]	Final 2005	CR 2005[178]	2005[102]
NA	IA	UBC-770	Building 770 (UBC-770)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[163]	2004[78]
NA	IA	UBC-771	Building 771(UBC-771)	HRR[1]	Annual 2001[75] Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
NA	IA	UBC-774	Building 774 (UBC-774)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[141]	2004[62]
NA	IA	UBC-776	Building 776 (UBC-776)	HRR[1]	Annual 2003[55] Final 2005	CR 2005[190]	2005[113]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	IA	UBC-777	Building 777 (UBC-777)	HRR[1]	Annual 2003[55] Final 2005	CR 2005[190]	2005[113]
NA	IA	UBC-778	Building 778 (UBC-778)	HRR[1]	Final 2005	CR 2005[190]	2005[113]
NA	IA	UBC-779	Building 779 (UBC-779)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[157]	2004[87]
NA	IA	UBC-865	Building 865 (UBC-865)	HRR[1]	Annual 2004[56] Final 2005	CR 2004[143]	2004[64]
NA	IA	UBC-881	Building 881 (UBC-881)	HRR[1]	Annual 2003[55] Final 2005	DSR 2003[132]	2003[53]
NA	IA	UBC-883	Building 883 (UBC-883)	HRR[1]	Final 2005	CR 2005[183]	2005[106]
NA	IA	UBC-886	Building 886 (UBC-886)	HRR[1]	Annual 2001[75] Annual 2003[55] Final 2005	CR 2003[121]	2003[52]
NA	IA	UBC-887	Building 887 (UBC-887)	HRR[1]	Annual 2004[56] Final 2005	DSR 2004[151]	2004[72]
NA	IA	UBC-889	Building 889 (UBC-889)	HRR[1]	Annual 2003[55] Final 2005	CR 2003[117]	2003[38]
NA	IA	UBC-991	Building 991 (UBC-991)	HRR[1]	Annual 2003[55] Annual 2004[56] Final 2005	DSR 2004[144]	2004[66]-
NA	NA	NA	PICs 1, 2, 3, 5, 7, 8, 10, 12, 13, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 43, 45, 46, 48, 49, 50, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61	HRR[1]	Annual 2002 Final 2005	NA	2002[34]

Appendix 1. HRR Sites at RFETS

IHSS	OU	PAC	Description	Identified	Updated	Proposed For NFA/NFAA	NFA Recommendation Approved
NA	NA	NA	PICs 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, 57	HRR[1]	Annual 2002 Final 2005	NFAA Justification 2004[193]	2004[88]

1. DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.
2. DOE, 1996, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
3. DOE, 1997, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
4. EPA, 1992, Correspondence to R. Schassburger, DOE RFO, from M. Hestmark, EPA Region VIII, RE: Potential Area of Concern Needing Further Investigation, December 23.
5. DOE, 1993, Historical Release Report Second Quarterly Update, October 1, 1992 to January 1, 1993, Rocky Flats Plant, Golden, Colorado.
6. DOE, 1993, Historical Release Report, Third Quarterly Update, January 1, 1993 to April 1, 1993, Rocky Flats Plant, Golden, Colorado.
7. DOE, 1998, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
8. DOE, 1993, Historical Release Report, Fourth Quarterly Update, April 1, 1993 to July 1, 1993, Rocky Flats Plant, Golden, Colorado.
9. DOE, 1994, Historical Release Report, Seventh Quarterly Update, January 1, 1994 to March 31, Rocky Flats Plant, Golden, Colorado.
10. DOE, 1993, Historical Release Report, Fifth Quarterly Update, July 1, 1993 to October 1, 1993, Rocky Flats Plant, Golden, Colorado.
11. DOE, 1994, Historical Release Report, Tenth Quarterly Update, October 1, 1994 to December 31, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado.
12. DOE, 1994, Corrective Action Decision/Record of Decision for OU 16: Low Priority Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August.
13. DOE, 1994, Historical Release Report, Ninth Quarterly Update, July 1, 1994 to September 30, 1994, Rocky Flats Environmental Technology Site, Golden, Colorado.
14. DOE, 1995, Operable Unit 11 Final Combined Phases RFI/RI Report, Rocky Flats Environmental Technology Site, Golden, Colorado, June, 1995.
15. DOE, 1994, Historical Release Report, Eighth Quarterly Update, April 1, 1994 to June 30, 1994, Rocky Flats Plant, Golden, Colorado.
16. DOE, 1994, Historical Release Report, Sixth Quarterly Update, October 1, 1993 to January 1, 1994, Rocky Flats Plant, Golden, Colorado.
17. DOE, 1994, Historical Release Report, Twelfth Quarterly Update, April 1, 1995 to June 30, 1995, Rocky Flats Environmental Technology Site, Golden, Colorado.
18. DOE, 1994, Historical Release Report, Eleventh Quarterly Update, January 1, 1995 to March 31, 1995, Rocky Flats Environmental Technology Site, Golden, Colorado.
19. CDPHE, 1998, Excavated Soil Adjacent to Building 701 (cc mail from C. Spreng to L. Brooks), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

20. DOE, 1997, Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area, IHSS 119.1, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, February.
21. DOE, 1995, Corrective Action Decision/Record of Decision for OU 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, August, 1995.
22. DOE, 1997, Final Corrective Action Decision/Record of Decision Declaration, Operable Unit 3, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
23. DOE, 1999, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September, 1999.
24. DOE, 1992, Historical Release Report, First Quarterly Report submitted September 30, 1992, Rocky Flats Plant, Golden, Colorado.
25. DOE, 2000, Historical Release Report (Interim Update) and Response to Comments for HRR Annual Updates (1997, 1998 & 1999), Rocky Flats Environmental Technology Site, Golden, Colorado, September.
26. DOE, 2000, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September, 2000.
27. CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1997 Annual HRR Review, July 9.
28. CDPHE and EPA, 1999, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1998 Annual HRR Review, July 9.
29. CDPHE and EPA, 2000, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: 1999 Annual HRR Review, June 23.
30. CDPHE and EPA, 2001, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: NFA PAC 100-607, April 12.
31. CDPHE, 2001, Preliminary Electronic Correspondence to M.C. Broussard from C. Spreng CDPHE, RE: 2000 Annual HRR Review, September 2001.
32. CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA Designation for IHSSs and PACs, February 14.
33. CDPHE and EPA, 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: No Further Action Justification for Bldg. 125 UBC, April 2.
34. CDPHE and EPA 2002, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII, RE: Approval of NFA designation for IHSSs, PACs, and PICs, September 26.
35. DOE, 2002, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
36. DOE, 2002, Further clarification of NFA status is provided by NFA Approval Letter, based on FY02 HRR Working Group discussion.
37. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 700-12, May 15.
38. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 800-6, March 25.
39. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 100-4 and 100-5, April 22.
40. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 600-6, May 15.

41. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 500-7, June 9.
42. EPA, 2003, Correspondence to R. DiSalvo, DOE RFFO from T. Rehder, EPA Region VIII, RE: No Further Action Justification for Ash Pits PAC Reference Numbers SW-133.1, SW-133.2, SW-133.4 and 1702 (dated June 11, 2003), NFAA Justification for Trench T-7 PAC Reference Number: NE 111.4 (dated May 21, 2003, NFAA Justification Trenches T-3 and T-4 PAC Reference Number: 111.1 (dated May 21, 2003), June 12.
43. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 600-2, June 19.
44. CDPHE, 2003, Correspondence to R. DiSalvo, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 300-1, June 20.
45. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 600-1, June 24.
46. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 400-10, July 15.
47. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 500-6, July 16.
48. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 300-6, July 21.
49. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 900-4&5, July 23.
50. CDPHE and EPA, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE and T. Rehder, EPA Region VIII RE: Final Closeout Report for IHSS Group 000-1, July 29.
51. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Groups 300-3 and 300-4, August 21.
52. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 800-4, May 15.
53. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Closeout Report for IHSS Group 800-2, July 16.
54. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Data Summary Report for IHSS Group 000-1, July 29.
55. DOE, 2003, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
56. DOE, 2004, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
57. EPA, 2003, Correspondence to J. Legare, DOE RFFO from G. Kleeman; EPA, RE: Characterization Data Summary Report IHSS Group NE/NW, October 7.
58. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: No Further Accelerated Action (NFAA) for IHSS Groups 150.6 and 150.8 (B779), October 20.
59. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Final Approval, Data Summary Report, IHSS Group 900-3 (904 Pad), dated November 2003, December 17.
60. EPA, 2003, Correspondence to J. Legare, DOE RFFO from M. Aguilar; EPA Region 8, RE: Closeout Report for IHSS Group SW-1, December 18.
61. CDPHE, 2003, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Data Summary Report, IHSS Group 400-3 (Buildings 444, 447 et al.), dated November 2003, December 18.

62. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: ER RSOP Notification and Closeout Report for IHSS Group 700-4 (B771 & 774) - Approval, February 6.
63. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval: No Further Accelerated Action (NFAA), PAC 500-169 Waste Drum Peroxide Burial, February 20.
64. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 800-1 (B865) - Approval, March 19.
65. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 400-8 (B441) - Approval, March 19.
66. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 900-1 (B991 & 993) - Approval, March 31.
67. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Data Summary Report for IHSS Group 600-3 (B668) - Approval, May 12.
68. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 500-5, PAC 500-904, April 2004, May 17.
69. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 500-2, IHSS 500-158 Radioactive Site – Building 551, June 2004, June 18.
70. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-4, IHSS 500-117.2, Middle Site Chemical Storage, June 2004, June 18.
71. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 600-5, PAC 600-1004, June 2004, June 18.
72. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Data Summary Report IHSS Group 800-5 (B887 and B885), NFAA - Approval, June 21.
73. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval: No Further Accelerated Action (NFAA), PAC 000-190, Caustic Leak, July 9.
74. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: No Further Accelerated Action Justification PCB Potential Areas of Concern (April 15, 2004), May 6.
75. DOE, 2001, Annual Update for the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
76. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 400-1 (UBC-439) – Radiological Survey - August 23.
77. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Data Summary Report for IHSS Group 400-4, PAC 400-803 – Miscellaneous Dumping, Building 446 Storm Drain, and PAC -804 – Road North of Building 460, August 23.

78. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Data Summary Report IHSS Group 700-5 (B770), NFAA - Approval, September 7.
79. EPA, 2004, Correspondence to J. Legare, DOE RFFO from M. Aguilar; EPA, RE: No Further Accelerated Action Justification for Retention Pond C-1 (PAC Reference Number: SE-142.10, June 17.
80. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: No Further Accelerated Action (NFAA) Request for IHSS 143 (B771) - Approval, September 29.
81. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 700-1 PAC 700-1115 – Identification of Diesel Fuel in Subsurface Soil, dated August 2004, September 14, 2004.
82. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Closeout Report for IHSS Group 700-6, Buildings 712/713 Cooling Tower Blowdown, IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, dated September 2004, September 29.
83. CDPHE, 2004, Correspondence to J. Legare, DOE RFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-2, UBC 440 – Modification Center, dated September 2004, September 27, 2004.
84. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 400-6, IHSS 157.2 Radioactive Site South Area, dated September 2004, September 29, 2004.
85. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 500-1, IHSS 300-186, IHSS 500-117.1 and IHSS 500-197, dated September 2004, September 29, 2004.
86. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Approval, Draft Data Summary Report for IHSS Group 700-10, PAC 700-1101 Laundry Tank Overflow – Building 732, dated September 2004, September 21, 2004.
87. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Closeout Report for IHSS Group 700-7 (B779) - Approval, October 1, 2004.
88. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE, RE: Potential Incidents of Concern (PIC),4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47 and 57 Action/No Action Recommendations, April 15, 2004.
89. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE; RE: Approval, Draft Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump#3 Acid Site, PAC 400-813 and PAC 400-815 – Tank Leaks in Building 460 & Status of "RCRA Unit 8", December 7, 2004.
90. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE; RE: Approval, Draft Data Summary Report for IHSS Group 100-1, UBC 122 (Medical Facility) and IHSS 000-121 Tank T-1 (OPWL), dated December 2004, December 13, 2004.
91. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE; RE: Draft Data Summary Report for IHSS Group 300-2 UBC 331 (Maintenance) and IHSS 300-134(S) (Lithium Metal Destruction Site), November 2004, December 17.
92. CDPHE, 2004, Draft Data Summary Report for IHSS Group 700-8 IHSS 700-214, 750 Pad Pondcrete/Saltcrete Storage, December 2004, December 17.

93. CDPHE, 2004, Correspondence to J. Legare, DOE RFFO from S. Gunderson, CDPHE; RE: Approval, Draft Closeout Report for IHSS Group 600-4, IHSS 600-160 - Radioactive Site, Building 444 Parking Lot, December 2004, December 23.
94. CDPHE, 2005, Correspondence to J. Legare, DOE RFPO from S. Gunderson, CDPHE; RE: Closeout Report for IHSS Group 400-7 (B442 & 443) – Approval, January 10.
95. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group 900-11, IHSS 112 - 903 Pad (903 Drum Storage Area), January 13.
96. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group 900-11; IHSS 900-155, 903 Lip Area and IHSS 900-140, Hazardous Disposal Area, January 13.
97. CDPHE, 2005, Correspondence to J. Legare, DOE RFPO from S. Gunderson, CDPHE; RE: Approval, Draft Closeout Report, IHSS Group 700-11, PAC 700-1108 – Bowman's Pond and IHSS 139(N)(a) – Steam Condensate Tanks, January, 2005, February 4.
98. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group 900-11, PAC SE-1602 East Firing Range and Target Area, February 8, 2005.
99. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Draft Addendum No Further Accelerated Action Justification for Trench T-7, February 23.
100. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group 900-12, East Trenches T-5, T-6, T-8, T-9a, T-9b, T-10, and T-11, February 23.
101. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Draft Addendum No Further Accelerated Action Justification for Trenches T-3 and T-4, March 7.
102. CDPHE, 2005, Correspondence to J. Legare, DOE RFPO from S. Gunderson, CDPHE; RE: Approval, Draft Closeout Report, IHSS Group 700-2 (UBC 707 - Plutonium Fabrication and Assembly, and UBC 731 – Building 707 Process Waste) February 2005, March 15.
103. CDPHE, 2005, Correspondence to J. Legare, DOE RFPO from S. Gunderson, CDPHE; RE: No Further Accelerated Action (NFAA) Request for the Sanitary Sewer System, PAC 000-500, part of IHSS Group 000-3 – Approval, March 21.
104. CDPHE, 2005, Correspondence to J. Legare, DOE RFPO from S. Gunderson, CDPHE; RE: Closeout Report for IHSS Group 700-3 Volume I (B701) - Approval, April 19.
105. EPA, 2005, Correspondence to J. Legare, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group NE-1 B-Ponds (B-1, B-2, and B-3), May 12.
106. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from S. Gunderson, CDPHE; RE: Closeout Report for IHSS Group 800-3 (B883) – Approval, June 7.
107. EPA, 2005, Correspondence to J. Rampe, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group NE-1, North Firing Range, June 13.
108. EPA, 2005, Correspondence to J. Rampe, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group 900-2, Oil Burn Pit No. 2 and IHSS 900-154, Pallet Burn Site), June 13.

109. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from S. Gunderson, CDPHE; RE: Closeout Report for IHSS Group 500-3 (B559) – Approval, June 24.
110. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from D. Kruchek, CDPHE; RE: Closeout Report for IHSS Group 000-2 Original Process Waste Lines (OPWL) - NFAA Approval, October 6.
111. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from D. Kruchek, CDPHE; RE: Data Summary Report for Storm Drains Part of IHSS Group 000-3- Approval, October 6.
112. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from D. Kruchek, CDPHE; RE: Closeout Report for IHSS Group 000-4 New Process Waste Lines (NPWL) – NFAA Approval, October 6.
113. CDPHE, 2005, Correspondence to J. Rampe, DOE RFPO from D, Kruchek, CDPHE; RE: Closeout Report for IHSS Group 700-3 UBCs 776/777/778, October, 12.
114. EPA, 2005, Correspondence to J. Rampe, DOE RFPO from C.M. Aguilar, EPA Region 8; RE: Closeout Report for IHSS Group NE-1 Ponds, October 18.
115. CDPHE and EPA, 2006; Correspondence to R. Schassburger, DOE RFPO from C. Spreng, CDPHE, and C.M. Aguilar, EPA Region 8, RE: Closeout Report for IHSS Group 000-5, Present Landfill (IHSS-114) (September 2005), Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan (May 2006), May 15.
116. CDPHE and EPA, 2006, Correspondence to R. Schassburger, DOE RFPO from C. Spreng, CDPHE, and C.M. Aguilar, EPA Region 8, RE: Closeout Report for IHSS Group SW-2 Original Landfill (IHSSs 115 and 196) (November 2005), May 15.
117. DOE, 2003, Final Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, March.
118. DOE, 2003, Closeout Report for IHSS Groups 100-4 (UBC 123, IHSS 148, PAC 100-611, and 100-5 (PAC 100-609), Rocky Flats Environmental Technology Site, Golden, Colorado, April.
119. DOE, 2003, Data Summary Report IHSS Group 600-6, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
120. DOE, 2003, Data Summary IHSS Group 700-12, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
121. DOE, 2003, Final Closeout Report for IHSS Group 800-4, UBC 886 - Building 886, IHSS 164.2 - Radioactive Site #2, Building 886 Spill, IHSS 000-121 - Building 828 Sump, Tanks, OPWL, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
122. DOE, 2003, Characterization Data Summary IHSS Group 700-3, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
123. DOE, 2003, Data Summary Report IHSS Group 500-6, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
124. DOE, 2003, Data Summary Report IHSS Group 900-2, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
125. DOE, 2003, Closeout Report for IHSS Group 300-1, IHSS 300-128, Oil Burn Pit #1; IHSS 300-134(N), Lithium Metal Site; and IHSS 300-171, Solvent Burning Grounds; Rocky Flats Environmental Technology Site, Golden, Colorado, June.
126. DOE, 2003, Data Summary Report IHSS Group 500-7, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
127. DOE, 2003, Draft Closeout Report for IHSS Group 600-1 (PAC 600-1001), Rocky Flats Environmental Technology Site, Golden, Colorado, June.

128. DOE, 2003, Final Closeout Report for IHSS Group 600-2, PAC 400-802, Storage Shed South of Building 334, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

129. DOE, 2003, Closeout Report for IHSS Group 000-1, Solar Evaporation Ponds Area of Concern, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

130. DOE, 2003, Data Summary Report IHSS Group 400-10, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

131. DOE, 2003, Data Summary Report IHSS Group 900-4&5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

132. DOE, 2003, Data Summary Report IHSS Group 800-2, UBC 881, Laboratory and Office; PAC 800-1205, Building 881 East Dock; and IHSS 000-121, OPWL Tank 39; Rocky Flats Environmental Technology Site, Golden, Colorado, July.

133. DOE, 2003, Data Summary Report IHSS Group 000-1, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

134. DOE, 2003, Characterization Data Summary IHSS Group 300-6, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

135. DOE, 2003, Draft Data Summary Report IHSS Groups 300-3 and 300-4, UBC 371and UBC 374, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

136. DOE, 2003, Data Summary Report IHSS Group NE/NW, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

137. DOE, 2003, Closeout Report for IHSS Group SW-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

138. DOE, 2003, Data Summary Report IHSS Group 400-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

139. DOE, 2003, Data Summary Report IHSS Group 900-3, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

140. DOE 2002, Reconnaissance Level Characterization Report for Buildings 125, 763, and Trailer 900C, September.

141. DOE, 2004, ER RSOP Notification and Closeout Report IHSS Group 700-4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

142. DOE, 2004, Closeout Report for IHSS Group 400-8, UBC 441, IHSS 400-122, and Portions of IHSS 000-121, Including Tanks T-2 and T-3, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

143. DOE, 2004, Closeout Report for IHSS Group 800-1 UBC 865, PAC 800-1204, PAC 800-1210, PAC 800-1212, IHSS 000-121, and PAC 000-504, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

144. DOE, 2004, Closeout Report for IHSS Group 900-1 UBC 991, IHSS 900-173, IHSS 900-184, PAC 900-1301 and PAC 900-1307, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

145. DOE 2004, No Further Accelerated Action Justification for Polychlorinated Biphenyl (PCB) Potential Areas of Concern (PAC) Sites PAC 300-708, PAC 300-709, PAC 500-900, PAC 500-901, PAC 500-902, PAC 500-905, PAC 600-1000, PAC 600-1002, PAC 600-1003, PAC 700-1102, PAC 700-1103, PAC 700-1104, PC 700-1111, PAC 700-1112, PAC 800-1207, PAC 800-1208, PAC 800-1209, PAC 900-1306, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

146. DOE, 2004, No Further Accelerated Action Justification for Retention Pond C-1, PAC Reference Number: SE-142.10, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

147. DOE, 2004, Data Summary Report for IHSS Group 600-3, IHSS 600-120.1 (Fiberglass Area North of Building 664), Rocky Flats Environmental Technology Site, Golden, Colorado, May.
148. DOE, 2004, Data Summary Report for IHSS Group 500-5, PAC 500-904, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
149. DOE, 2004, Closeout Report for IHSS 500-2, IHSS 500-158 Radioactive Site - Building 551, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
150. DOE, 2004, Data Summary Report for IHSS Group 500-4, IHSS 500-117.2, Middle Site Chemical Storage, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
151. DOE, 2004, Data Summary Report IHSS Group 800-5, UBC 887 - Process and Sanitary Waste Tanks and PAC 800-177 - Building 885 Drum Storage, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
152. DOE, 2004, Data Summary Report IHSS Group 600-5 - PAC 600-1004 - Central Avenue Ditch Cleaning, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
153. DOE, 2004, No Further Accelerated Action Justification for Caustic Leak, PAC Reference Number: 000-190, Rocky Flats Environmental Technology Site, Golden, Colorado, July.
154. DOE, 2004, Data Summary Report for IHSS Group 400-1 UBC 439 - Radiological Survey, Rocky Flats Environmental Technology Site, Golden, Colorado, August.
155. DOE, 2004, Data Summary Report for IHSS Group 400-4, PAC 400-803 - Miscellaneous Dumping, Building 446 Storm Drain, and PAC 400-804 Road North of Building 460, Rocky Flats Environmental Technology Site, Golden, Colorado, August.
156. DOE, 2004, No Further Accelerated Action Justification for Old Outfall – Building 771, PAC Reference Number 700-143, Rocky Flats Environmental Technology Site, Golden, Colorado, August
157. DOE, 2004, Closeout Report for IHSS Group 700-7, UBC 779, IHSS 700-138, IHSS 700-149.2, IHSS 700-150.6, IHSS 700-150.8, PAC 700-1105, and Portions of IHSS 000-101 and IHSS 000-121, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
158. DOE, 2004, Data Summary Report for IHSS Group 400-6, IHSS 157.2, Radioactive Site South Area, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
159. DOE, 2004, Data Summary Report for IHSS Group 500-1, IHSS 300-186, 500-117.1 and 500-197, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
160. DOE, 2004, Data Summary Report for IHSS Group 400-2, UBC 440 - Modification Center, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
161. DOE, 2004, Data Summary Report for IHSS Group 700-1, PAC 700-1115 - Identification of Diesel Fuel in Subsurface Soil, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
162. DOE, 2004, Data Summary Report for IHSS Group 700-10, PAC 700-1101 Laundry Tank Overflow Building 732, Rocky Flats Environmental Technology Site, Golden, Colorado, September.
163. DOE, 2004, Data Summary Report for IHSS Group 700-5, Building 770 Under Building Contamination Site, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

164. DOE, 2004, Closeout Report for IHSS Group 700-6, IHSS 700-137, Buildings 712/713 Cooling Tower Blowdown, and IHSS 700-139.1(S) Caustic/Acid Spills Hydroxide Tank Area, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

165. DOE, 2004, Data Summary Report for IHSS Group 100-1, UBC 122 (Medical Facility) and IHSS 000-121 Tank T-1 (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, December.

166. DOE, 2004, Data Summary Report for IHSS Group 400-5, IHSS 400-205 – Sump #3 Acid Site, PAC 400-813 – RCRA Tank Leak in Building 460, PAC 400-815 – RCRA Tank Leak in Building 460, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

167. DOE, 2004, Data Summary Report for IHSS Group 700-8, IHSS 700-214, 750 Pad Pondcrete/Saltcrete Storage, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

168. DOE, 2004, Data Summary Report for IHSS Group 300-2 (UBC 331 Maintenance and IHSS 300-134[S] Lithium Metal Destruction Site), Rocky Flats Environmental Technology Site, Golden, Colorado, December.

169. DOE, 2004, Closeout Report for IHSS Group 600-4, IHSS 600-160 – Radioactive Site, Building 444 Parking Lot, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

170. DOE, 2004, Closeout Report for IHSS Group 400-7, UBC 442, IHSS 400-129, IHSS 400-157.1, and IHSS 400-187, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

171. DOE, 2005, Closeout Report for IHSS Group 900-11, IHSS 112 - 903 Pad (903) Drum Storage Area), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

172. DOE, 2005, Closeout Report for IHSS Group 900-11 - IHSS 900-155, 903 Lip Area IHSS 900-140, Hazardous Disposal Area, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

173. DOE, 2005, Closeout Report for IHSS Group 700-11 - PAC 700-1108 - Bowman's Pond, and IHSS 139.1 (N)(a) - Steam Condensate Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

174. DOE, 2005, Closeout Report for IHSS Group 900-12 - East Trenches T-5 (IHSS NE-111.2), T-6 (IHSS NE-111.3), T-8 (IHSS NE-111.5), T-9a (IHSS NE-111.6s), T-9b (IHSS NE-111.6b), T-10 (IHSS NE-111.7), T-11 (IHSS NE 111.8), Rocky Flats Environmental Technology Site, Golden, Colorado, February.

175. DOE, 2005, Addendum, No Further Accelerated Action Justification for Trench T-7, PAC Reference Number NE-111.4, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

176. DOE, 2005, Addendum, No Further Accelerated Action Justification for Trenches T-3 and T-4, PAC Reference Number NE-110 and NE-111.1, Rocky Flats Environmental Technology Site, Golden, Colorado, February.

177. DOE, 2005, No Further Accelerated Action Justification for the Sanitary Sewer System PAC 000-500, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

178. DOE, 2005, Closeout Report for IHSS Group 700-2 (UBC 707 – Plutonium Fabrication and Assembly, UBC 731 – Building 707 Process Waste, and PAC 000-121 – Building 731, Tanks 11 and 30), Rocky Flats Environmental Technology Site, Golden, Colorado, March.
179. DOE, 2005, Closeout Report for IHSS Group 900-11, PAC SE-1602, East Firing Range and Target Area, Rocky Flats Environmental Technology Site, Golden, Colorado, March.
180. DOE, 2005, Closeout Report for IHSS Group 700-3, Volume 1, UBC 701, IHSS 700-118.1, IHSS 700-118.2, IHSS 700-131, IHSS 700-132, IHSS 700-144(N), IHSS 700-144(S), IHSS 700-150.2(S), IHSS 700-150.4, IHSS 700-150.7, PAC 700-1100, PAC 700-1116, and Portion of IHSS 000-121 including Tanks T-9 and T-10, Rocky Flats Environmental Technology Site, Golden, Colorado, May.
181. DOE, 2005, Closeout Report for IHSS Group NE-1 (Ponds B-1 [IHSS NE-142.5], B-2 [IHSS NE-142.6], and B-3 [IHSS NE-142-7], Rocky Flats Environmental Technology Site, Golden, Colorado, May.
182. DOE, 2005, Closeout Report for IHSS Group 500-3, UBC 559 – Service Analytical Laboratory, UBC 528 – Temporary Waste Holding Building, IHSS 500-159 – Radioactive Site, Building 559, and Portions of IHSS 000-121, including Tank 7 and Tanks 33, 34, and 35; Rocky Flats Environmental Technology Site, Golden, Colorado, June.
183. DOE, 2005, Closeout Report for IHSS Group 800-3, UBC 883, PAC 800-1200, PAC 800-1201, and Portion of IHSS 000-121, including Tanks 25 and 26, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
184. DOE, 2005, Closeout Report for IHSS Group NE-1 (North Firing Range [PAC NW-1505]), Rocky Flats Environmental Technology Site, Golden, Colorado, June.
185. DOE, 2005, Closeout Report for IHSS Group 900-2 (IHSS 900-153 Oil Burn Pit No. 2, and IHSS 900-154 Pallet Burn Site), Rocky Flats Environmental Technology Site, Golden, Colorado, June.
186. DOE, 2005, Closeout Report for IHSS Group 000-2, Original Process Waste Lines (OPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.
187. DOE, 2005, Data Summary Report IHSS Group 000-3, PAC 000-505, Storm Drains, Rocky Flats Environmental Technology Site, Golden, Colorado, October.
188. DOE, 2005, Closeout Report for IHSS Group 000-4, New Process Waste Lines (NPWL), Rocky Flats Environmental Technology Site, Golden, Colorado, October.
189. DOE, 2005, Data Summary Report for IHSS Group NE-1, IHSS NE-142.1 - Pond A-1, IHSS NE-142.2 - Pond A-2, IHSS NE-142.3 - Pond A-3, IHSS NE-142.4 - Pond A-4, IHSS NE-142.12 - Pond A-5, IHSS NE-142.8 - Pond B-4, IHSS NE-142.9 - Pond B-5, IHSS NE-142.11 - Pond C-2, Rocky Flats Environmental Technology Site, Golden, Colorado, October.
190. DOE, 2005, Closeout Report for IHSS Group 700-3, Volume II, UBCs 776, 777, and 778, Rocky Flats Environmental Technology Site, Golden, Colorado, October.
191. DOE, 2005, Closeout Report for IHSS Group 000-5 Present Landfill (IHSS 114), Rocky Flats Environmental Technology Site, Golden, Colorado, September.
192. DOE, 2005, Final Closeout Report for IHSS Group SW-2 Original Landfill (IHSS-115 & 196), Rocky Flats Environmental Technology Site, Golden, Colorado, November.
193. DOE, 2004, No Further Accelerated Action Justification PICs 4, 6, 9, 11, 14, 15, 17, 18, 41, 42, 44, 47, 57, Rocky Flats Environmental Technology Site, Golden, Colorado, April.
194. DOE, 2003, No Further Accelerated Action Justification for Trench T-7, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

Appendix 2