NOTICE

All drawings located at the end of the document.

50541

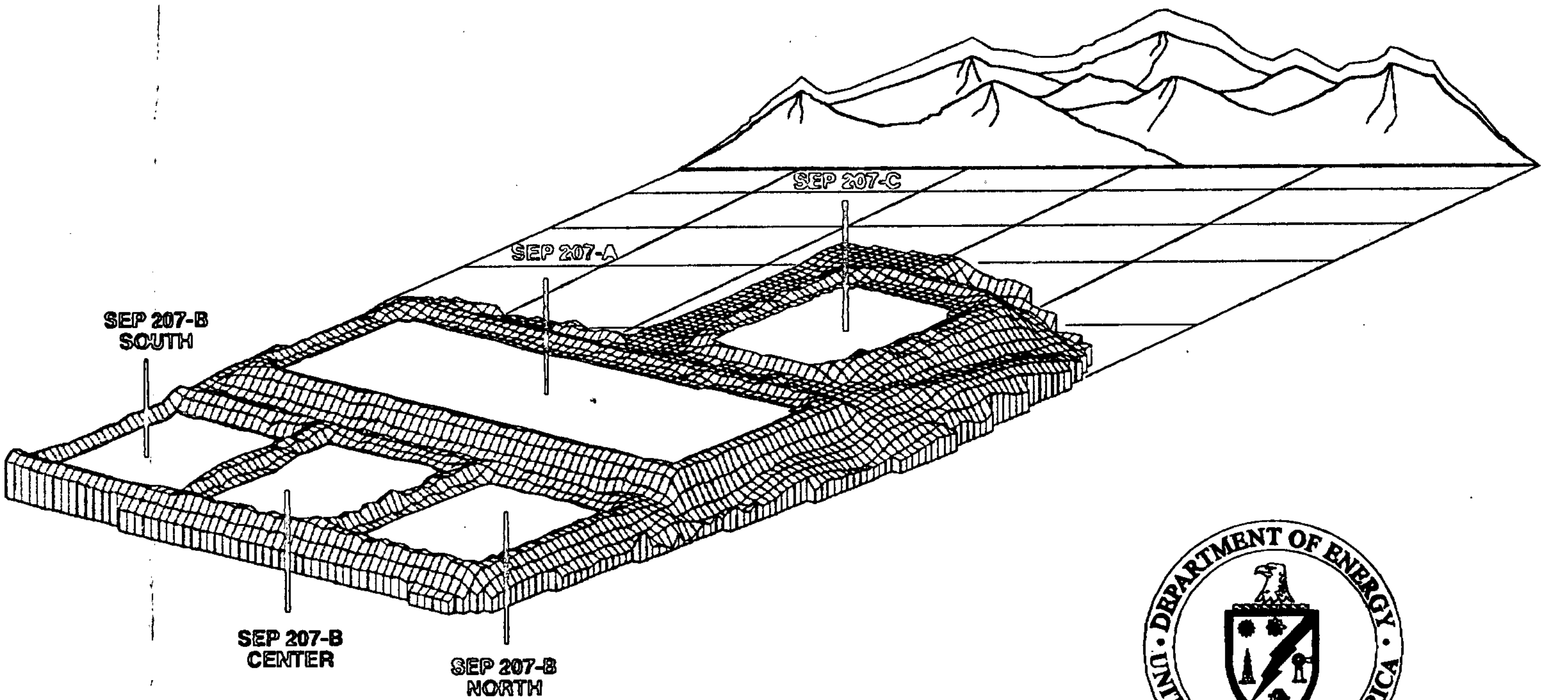
OU4 Solar Evaporation Ponds
Interim Measure/Interim Remedial Action
Environmental Assessment
Decision Document

U.S. Department of Energy
Rocky Flats Environmental Technology Site
Golden, Colorado

February 1995

Revision: Proposed

Part II
Volume 3 - Appendices A through G



ADMIN RECORD

A-OU04-000716

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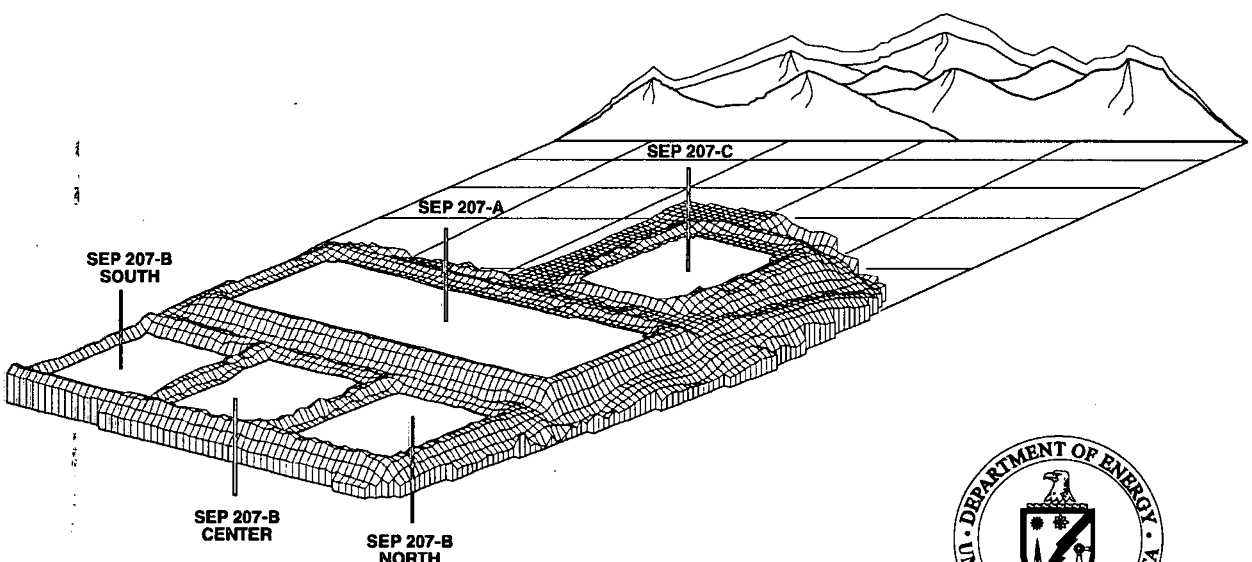


DOCUMENT ORGANIZATION

Operable Unit 4 Solar Evaporation Pond Interim Measure/Interim Remedial Action - Environmental Assessment Decision Document

Part I	-	Executive Summary and Introduction
Part II	-	Operable Unit 4 Phase I RCRA Facility Investigation/Remedial Investigation Report
		Volume 1 - Sections 1 through 8 (Figures for Section 3 are in Volume 2)
		Volume 2 - Section 3 Figures
		Volume 3 - Appendices A through G
		Volume 4 - Appendices H through L
		Volume 5 - Appendices M through O
		Volume 6 - Appendices P through Q
		Volume 7 - Appendices R through V
		Volume 8 - Appendices W through AA
Part III	-	Interim Measure/Interim Remedial Action Design Analysis
Part IV	-	Recommended Interim Measure/Interim Remedial Action Alternative
Part V	-	Post-Closure Monitoring and Assessment Plan

APPENDIX II.A

SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS FROM SOLAR EVAPORATION PONDS

TABLE II.A-1

SOLAR EVAPORATION POND 207A
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207A Liquid	207A Sludge
ANIONS	**Range: mg/l**	**Range: mg/l**
Ammonia	0.3	36 (mg/kg)
Chloride	380-430	20
Cyanide, Amenable	(-0.079)-(-0.047)	NA
Cyanide, Total	0.39-0.47	1.6 (mg/kg)
Nitrite	970-1000	35
Sulfate	460-510 (SO_4)	20
RADIONUCLIDES	**Range: pCI/g**	**Range: pCI/g**
Americium -241	0.23-0.61	NA
Plutonium -239	0.42-1.0	NA
Uranium - 234	300.0-320.0	NA
Uranium -235	10.0-12.0	NA
Uranium -238	330.0-350.0	NA
Gross Alpha	240.0-360.0	NA
Gross Beta	870.0-990.0	NA
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	250	NA
Alkalinity, (Phenolphthalein)	84-89	NA
Total Dissolved Solids	7600-7900	480 (mg/kg)
Total Organic Carbon	68-70	14,000
Total Suspended Solids	14-23	NA
pH	9.7 (Units)	8.9 (Units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	188-224	40.2
Barium	135-141	210
Boron	1400-1460	84.3
Cadmium	5	1300
Calcium	ND	NA

TABLE II.A-1

SOLAR EVAPORATION POND 207A
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207A Liquid	207A Sludge
ANIONS	**Range: mg/l**	**Range: mg/l**
Chromium, Total	38-49	658
Lead	ND	89
Magnesium	120,000-124,000	11,400
Mercury	ND	ND
Nickel	ND	102
Phosphorous	0.06-0.07	0.1 (mg/l)
Potassium	388,000-397,000	ND
Selenium	ND	ND
Silver	ND	ND
Sodium	1,840,000-1,870,000	14,500
VOLATILE ORGANICS	**Range: ug/kg**	**Range: ug/kg**
1,1,1-Trichloroethane	NA	24
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	260
Acetone	ND	ND
Methylene Chloride	ND	ND
Tetrachloroethene	NA	290
Trichloroethene	NA	29

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report
Roy F. Weston, 1991, Characterization Summary (Radiological Data only)

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-2

SOLAR EVAPORATION POND 207B NORTH
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B North Liquid	207B North Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Ammonia	0.3-0.5	9.8-35
Chloride	96-100	4-24
Cyanide, Amenable	(-0.017)-(-0.014)	NA
Cyanide, Total	0.016-0.043	ND
Nitrite	310-330	1.7-9.8 (mg/l)
Sulfate	120-160 (SO_4)	150-160 (mg/l)
RADIONUCLIDES	**Range: pCI/g**	**Range: pCI/g**
Americium -241	0.03-0.25	0.0 < 8.0
Plutonium -239	0.0 < 0.1	1.1-13
Uranium - 234	38-42	12-20
Uranium -235	1.65-1.75	0.18-0.74
Uranium -238	24-28	8.3-13
Gross Alpha	38-80	20-47
Gross Beta	90-130	35-49
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	110	NA
Alkalinity, (Phenolphthalein)	2-3	NA
Total Dissolved Solids	2700-2800	160-220
Total Organic Carbon	35-37	3000-3400 (mg/kg)
Total Suspended Solids	15	NA
pH	8.3-8.5 (units)	7.6-7.7 (units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	60-63	ND
Barium	117-120	89.1-116
Boron	149-171	12.8
Cadmium	ND	6.7-8.5

TABLE II.A-2

SOLAR EVAPORATION POND 207B NORTH
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B North Liquid	207B North Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Calcium	137,000-140,000	NA
Chromium, Total	10-16	7.9-33.3
Lead	ND	13.8-21.3
Magnesium	64,800-65,900	3270-4160
Mercury	ND	0.7-0.8
Nickel	ND	7.1-9.5
Phosphorous	0.02-0.08 (ppm)	0.01-0.05 (mg/l)
Potassium	55,700-56,400	ND
Selenium	76	ND
Silver	ND	ND
Sodium	254,000-345,000	ND
VOLATILE ORGANICS	**Range: ug/l**	**Range: ug/l**
1,1,1-Trichloroethane	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND
Acetone	ND	ND
Methylene Chloride	ND	ND
Tetrachloroethene	ND	ND
Trichloroethene	NA	NA

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report
Roy F. Weston, 1991, Characterization Summary (Radiological Data only)

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-3

SOLAR EVAPORATION POND 207B CENTER
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B Center Liquid	207B Center Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Ammonia	0.2-0.4	25-58
Chloride	ND	210-300 (mg/l)
Cyanide, Amenable	(-0.83)-(-5.3)	NA
Cyanide, Total	0.34-0.57	0.34-1.3
Nitrite	1900-2100	50-74 (mg/l)
Sulfate	740-1000 (SO_4)	33-90 (mg/l)
RADIONUCLIDES	**Range: pCI/g**	**Range: pCI/g**
Americium -241	1-10	0-6.7
Plutonium -239	0.18-0.54	0.09-9.3
Uranium - 234	750-810	68-88
Uranium -235	29-43	1.6-3.4
Uranium -238	860-940	75-96
Gross Alpha	2100-2700	90-160
Gross Beta	3700-4100	230-430
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	1400	NA
Alkalinity, (Phenolphthalein)	230-240	NA
Total Dissolved Solids	16,000	670-770
Total Organic Carbon	93-320	5500-8800 (mg/kg)
Total Suspended Solids	11-16	NA
pH	9.1-9.2 (units)	9.1-9.2 (units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	314-330	ND
Barium	68-70	46.5-120
Boron	3440-3530	151
Cadmium	ND	46.5-84.4

TABLE II.A-3

SOLAR EVAPORATION POND 207B CENTER
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B Center Liquid	207B Center Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Calcium	26,400-27,700	NA
Chromium, Total	22-32	48.5-130
Lead	ND	ND
Magnesium	216,000-220-000	7,190-19,800
Mercury	ND	5.5
Nickel	28-31	ND
Phosphorous	4.2 (mg/l)	1.4-3.9 (mg/l)
Potassium	791,000-807,000	10,900-15,400
Selenium	81	ND
Silver	ND	ND
Sodium	2,060,000-4,060,000	35,200-54,200
VOLATILE ORGANICS	**Range: mg/l**	**Range: mg/kg**
1,1,1-Trichloroethane	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND
Acetone	ND	ND
Methylene Chloride	ND	ND
Tetrachloroethene	ND	37-180
Trichloroethene	NA	NA

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report
Roy F. Weston, 1991, Characterization Summary (Radiological Data only)

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-4

SOLAR EVAPORATION POND 207B SOUTH
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B South Liquid	207B South Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Ammonia	0.5-0.6	17-34
Chloride	ND	NA
Cyanide, Amenable	(-0.86)-(-2.6)	NA
Cyanide, Total	0.28-0.31	0.46-4.1
Nitrite	1600-1800	77-89 (mg/l)
Sulfate	540-600 (SO_4)	23-40 (mg/l)
RADIONUCLIDES	**Range: pCI/g**	**Range: pCI/g**
Americium -241	0.02-0.24	0-7
Plutonium -239	0.02-0.26	0.6-29
Uranium - 234	710-810	0.02-170
Uranium -235	20-42	0.15-5.8
Uranium -238	810-930	0.02-200
Gross Alpha	1400-1800	28-260
Gross Beta	2100-2500	38-730
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	900-910	NA
Alkalinity, (Phenolphthalein)	140-160	NA
Total Dissolved Solids	14,000-15,000	740-790
Total Organic Carbon	58-110	6,800-11,000 (mg/kg)
Total Suspended Solids	11-39	NA
pH	9.1 (units)	9.1 (units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	263-276	59.7
Barium	110-118	62.2-134
Boron	2730-2800	336-349
Cadmium	ND	7.4-30.4

TABLE II.A-4

SOLAR EVAPORATION POND 207B SOUTH
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207B South Liquid	207B South Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Calcium	52,000-52,700	NA
Chromium, Total	14-21	25.2-51.9
Lead	ND	61
Magnesium	187,000-190,000	5140-15,200
Mercury	ND	5
Nickel	20-32	ND
Phosphorous	2.6-2.8 (mg/l)	0.09-1.7 (mg/l)
Potassium	684,000-696,000	8910
Selenium	ND	ND
Silver	ND	ND
Sodium	2,010,000-2,660,000	30,000-44,600
VOLATILE ORGANICS	**Range: mg/l**	**Range: ug/kg**
1,1,1-Trichloroethane	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND
Acetone	ND	ND
Methylene Chloride	ND	ND
Tetrachloroethene	ND	32-460
Trichloroethene	NA	47-57

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report
Roy F. Weston, 1991, Characterization Summary (Radiological Data only)

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-5

SOLAR EVAPORATION POND 207C
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207C Liquid	207C Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Ammonia	1.8-6.4	ND
Chloride	21,000-25,000	660-990 (mg/l)
Cyanide, Amenable	(-120)-(-0.77)	NA
Cyanide, Total	3.3-20	13-170
Nitrite	57,000-66,000	8,900-11,000 (mg/l)
Sulfate	16,000-18,000 (SO_4)	810-1300 (mg/l)
RADIONUCLIDES	**Range: pCI/g**	**Range: pCI/g**
Americium -241	8-9.2	0.01-1.71
Plutonium -239	650-690	0-24
Uranium - 234	2500-2700	0.01-11.6
Uranium -235	90-150	0.02-1.09
Uranium -238	3700-4100	1.2-32
Gross Alpha	64,000-80,000	0-1,300
Gross Beta	160,000-180,000	0-510
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	58,000-63,000	NA
Alkalinity, (Phenolphthalein)	25,000-32,000	NA
Total Dissolved Solids	300,000-510,000	18,000-24,000
Total Organic Carbon	1200-1600	6,400-9,000 (mg/kg)
Total Suspended Solids	220-1400	NA
pH	10.0-10.1 (units)	10.2-10.5 (units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	3350-4110	18-37
Barium	110-150	13.2-61.5
Boron	437,000-494,000	455-781
Cadmium	430-560	27.3-665

TABLE II.A-5

SOLAR EVAPORATION POND 207C
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	207C Liquid	207C Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Calcium	ND	NA
Chromium, Total	3320-3940	252-960
Lead	300	7.9-38.5
Magnesium	1300-3870	1340-6250
Mercury	ND	0.7-1.0
Nickel	2540-2920	17.4-146
Phosphorous	520-610 (mg/l)	22-38 (mg/l)
Potassium	54,500-59,200	64,500-87,200
Selenium	600-3000	ND
Silver	ND	35.1-73.6
Sodium	136,000-142,000 (mg/l)	139,000-193,000
VOLATILE ORGANICS	**Range: ug/l**	**Range: ug/kg**
1,1,1-Trichloroethane	ND	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	33
2-Butanone	77-110	16-160
Acetone	ND	NA
Benzene	NA	7-31
Methylene Chloride	8	NA
Tetrachloroethene	ND	8-73
Trichloroethene	NA	5-7
SEMI-VOLATILES	**Range: mg/l**	**Range: mg/kg**
Pyrene	NA	190-320

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report
Roy F. Weston, 1991, Characterization Summary (Radiological Data only)

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-6

SOLAR EVAPORATION POND CLARIFIER
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	Clarifier Liquid	Clarifier Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Ammonia	5-14	28-84
Chloride	1600-3200	160-180 (mg/l)
Cyanide, Amenable	(-14)-(-3.3)	NA
Cyanide, Total	2.4-3	21-190
Nitrite	5700-10,000	410-450 (mg/l)
Sulfate	2600-3200 (SO_4)	210-280 (mg/l)
RADIONUCLIDES	**Range: pCI/L**	**Range: mg/kg**
Americium -241	NA	NA
Plutonium -239	NA	NA
Uranium - 234	NA	NA
Uranium -235	NA	NA
Uranium -238	NA	NA
Gross Alpha	NA	NA
Gross Beta	NA	NA
MISCELLANEOUS TESTS	**Range: mg/l**	**Range: mg/l**
Alkalinity, (Methyl Orange)	5500-8200	NA
Alkalinity, (Phenolphthalein)	2300-3100	NA
Total Dissolved Solids	46,000-68,000	4600-5400
Total Organic Carbon	140-190	3500-6400 (mg/kg)
Total Suspended Solids	68-180	NA
pH	9.9-10 (units)	9.7-9.8 (units)
METALS	**Range: ug/l**	**Range: mg/kg**
Arsenic	272-342	13.5-21.9
Barium	30-91	94.8-217
Boron	23,300-34,700	420-1380
Cadmium	38-570	2010-4660

TABLE II.A-6

SOLAR EVAPORATION POND CLARIFIER
SUMMARY OF LIQUID AND SLUDGE SAMPLING RESULTS

Compound	Clarifier Liquid	Clarifier Sludge
ANIONS	**Range: mg/l**	**Range: mg/kg**
Calcium	ND	NA
Chromium, Total	138-825	1180-3190
Lead	34-46	83-191
Magnesium	2580-6730	10,400-24,200
Mercury	2.2-4.6	5-14
Nickel	258-393	339-902
Phosphorous	78-84 (mg/l)	33-52 (mg/l)
Potassium	4860-7000 (mg/l)	28,700-67,900
Selenium	ND	ND
Silver	66-110	64.6-166
Sodium	9940-14,800	39,200-96,300
VOLATILE ORGANICS	**Range: ug/l**	**Range: ug/kg**
1,1,1-Trichloroethane	ND	9-29
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	45-150
2-Butanone	NA	87-180
Acetone	ND	ND
Methylene Chloride	ND	ND
Tetrachloroethene	ND	280-1000
Trichloroethene	NA	NA

References: Halliburton Nus Environmental Corporation, 1992, Pond Sludge Characterization Report

NA -- Not Analyzed
ND -- Not Detected

TABLE II.A-7

PONDCRETE
SUMMARY OF SAMPLING RESULTS

Compound	Pondcrete
ANIONS	**Range: mg/kg**
Ammonia	NA
Chloride	NA
Cyanide, Amenable	NA
Cyanide, Total	NA
Nitrite	NA
Sulfate	NA
RADIONUCLIDES	**Range: pCI/g**
Americium -241	NA
Plutonium -239	100-2500
Uranium - 234	28-220
Uranium -235	0.78-13
Uranium -238	33-290
Gross Alpha	2000-6800
Gross Beta	0-1000
MISCELLANEOUS TESTS	**Range: mg/l**
Alkalinity, (Methyl Orange)	NA
Alkalinity, (Phenolphthalein)	NA
Total Dissolved Solids	NA
Total Organic Carbon	NA
Total Suspended Solids	NA
pH	NA
METALS	**Range: mg/kg**
Arsenic	2.1-12.4
Barium	1.1-417
Boron	NA
Cadmium	.99-1570

TABLE II.A-7

PONDCRETE
SUMMARY OF SAMPLING RESULTS

Compound	Pondcrete
ANIONS	**Range: mg/kg**
Calcium	NA
Chromium, Total	3.3-1610
Lead	1.5-116
Magnesium	NA
Mercury	0.08-4.8
Nickel	1.2-548
Phosphorous	NA
Potassium	NA
Selenium	4.1-8.5
Silver	0.16-71.8
Sodium	NA
VOLATILE ORGANICS	**Range: ug/kg**
1,1,1-Trichloroethane	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA
Acetone	NA
Methylene Chloride	NA
Tetrachloroethene	NA
Trichloroethene	NA

References: Lockheed Environmental Systems & Technologies Company, 1994, Characterization of Pondcrete at The Rocky Flats Plant

NA -- Not Analyzed

TABLE II.A-8

SUMMARY OF ANALYTICAL PROGRAM

Matrix	Analysis	Target Detection Limit	Analytical Method	DQO Level [1]
Sludges	**Chemical Characterization**			
	• Selected VOAs [2]	Per Method	SW 8240	IV
	• Selected Semivolatiles [2]	Per Method	SW8270	IV
	• Seclected Alcohols [2]	Per Method	ASTM D3695-82	IV
	• Cyanide (total and ammenable)	Per Method	ASTM D2036	IV
	• Arsenic	Per Method	SW 3050/6010	IV
	• Barium	Per Method	SW 3050/6010	IV
	• Boron	Per Method	SW 3050/6010	IV
	• Cadmium	Per Method	SW 3050/6010	IV
	• Chromium (Total)	Per Method	SW 3050/6010	IV
	• Lead	Per Method	SW 3050/6010	IV
	• Magnesium	Per Method	SW 3050/6010	IV
	• Nickel	Per Method	SW 3050/6010	IV
	• Potassium	Per Method	SW 3050/6010	IV
	• Selenium	Per Method	SW 3050/6010	IV
	• Silver	Per Method	SW 3050/6010	IV
	• Sodium	Per Method	SW 3050/6010	IV
	• Mercury	Per Method	SW 7471	IV
	• Ammonia	1 mg/kg	EPA 350.2	III
	• TCLP (As,Ba,Cd,Cr,Pb,Hg,Ni,Se,Ag,pH)	Per Method	SW 1311 [3]	IV
	• pH	NA	SW 9045	III
	• ASTM Leach	—	ASTM D3987-85	III
	- Phosphorus, Total (as P)	0.01 mg/L	EPA 365.2	III
	- Sulfate	1.0 mg/L	EPA 375.4	III
	- Nitrate	0.1 mg/L	EPA 352.2	III
	- Chloride	2 mg/L	EPA 325.3	III
	- TDS	1 mg/L	EPA 160.A	III
	- % Recovery of Solids	NA	NA	III
	• Total Organic Carbon (TOC)	1 mg/Kg	Walkley-Black	III

TABLE II.A-8

SUMMARY OF ANALYTICAL PROGRAM

Matrix	Analysis	Target Detection Limit	Analytical Method	DQO Level [1]
Sludges (Cont.)	**Geotechnical Parameters**			
	• Moisture - Karl Fisher Method	N/A	ASTM E203-75	III
	• Moisture - Gravimetric Method	N/A	ASTM 209F	III
	• Bulk Density	N/A	AGRONOMY NO. 9 CAHPT. 30	III
	• Specific Gravity	N/A	ASTM D854/D1429	III
	• Atterberg Limits	N/A	ASTM D4318	III
	• Particle Size	N/A	ASTM D436-849	III
	• Swell test	N/A	Free Swell test (Holtz & Gibbs, 1956)	III
	Rad Parameters	N/A	SW 3050/EPA 900.0	III
	• Gros Alpha and Gross Beta			
Waters	**Chemical Characterization**			
	• Selected VOAs [2]	Per Method	SW 8240	IV
	• Selected Semivolatiles [2]	Per Method	SW8270	IV
	• Seclected Alcohols [2]	Per Method	ASTM D3695-82	IV
	• Arsenic	Per Method	SW 3010/6010	IV
	• Barium	Per Method	SW 3010/6010	IV
	• Boron	Per Method	SW 3010/6010	IV
	• Cadmium	Per Method	SW 3010/6010	IV
	• Calcium	Per Method	SW 3010/6010	IV
	• Chromium (Total)	Per Method	SW 3010/6010	IV
	• Lead	Per Method	SW 3010/6010	IV
	• Magnesium	Per Method	SW 3010/6010	IV

TABLE II.A-8

SUMMARY OF ANALYTICAL PROGRAM

Matrix	Analysis	Target Detection Limit	Analytical Method	DQO Level [1]
Waters (Cont.)				
	• Nickel	Per Method	SW 3010/6010	IV
	• Selenium	Per Method	SW 3010/6010	IV
	• Silver	Per Method	SW 3010/6010	IV
	• Potassium	Per Method	SW 3010/6010	IV
	• Sodium	Per Method	SW 3010/6010	IV
	• Mercury	Per Method	SW 7470	IV
	• Cyanide (Total and amenable)	Per Method	ASTM D2036	IV
	• TCLP (As,Ba,Cd,Cr,Pb,Hg,Ni,Se,Ag,pH)	Per Method	SW 1311 [3]	IV
	• Phosphorus, Total (as P)	0.01 mg/L	EPA 365.2	III
	• Sulfate	1.0 mg/L	EPA 375.4	III
	• Nitrate	0.1 mg/L	EPA 352.2	III
	• Chloride	2 mg/L	EPA 325.3	III
	• Ammonia	0.1 mg/L	EPA 350.3	III
	• Total Dissolved Solids (TDS)	1 mg/L	EPA 160.1	III
	• Total Suspended Solids (TSS)	1 mg/L	EPA 160.2	III
	• pH	—	EPA 150.1	III
	• Total Organic Carbon (TOC)	1 mg/L	EPA 415.1	III
	• Alkalinity (phenolphthalein)	1 mg/L	SM403	III
	• Alkalinty (methyl orange)	1 mg/L	SM403	III
	• Specific Gravity	—	ASTM D1429	III
	Rad Parameters • Gross Alpha and Gross Beta	N/A	EPA 900	III

(1) Devlierables for DQO Level IV parameters are a close to CLP as possible. Deliverables for DQO Level III parameters include signed and dated chain-of-custody forms, calculations, copies of analyst logbooks, and data summaries.

TABLE II.A-8

SUMMARY OF ANALYTICAL PROGRAM

(2) F001, F002, F003, and F005 (spent solvents) Land Disposal Restriction (LDR) analytes.

Select VOAs	Select Semivolatiles	Select Alcohols
Tetrachloroethylene	Cyclohexanone	N-butyl Alcohol
Trichloroethylene	Pyridine	Methanol
Methylene Chloride	2-Nitropropane	Isobutanol
1,1,1-Trichloroethane	1,2-Dichlorobenzene	2-Ethoxyethanol
Carbon Tetrachloride		
Chlorobenzene		
1,1,2-trichloro-1,2,2-Trifluoroethane		
Trichlorofluoromethane		
1,1,2-Trichloroethane		
Xylene		
Acetone		
Ethyl Acetate		
Ethylbenzene		
Ethyl Ether		
Methyl Isobutyl Ketone		
Toluene		
Methyl Ethyl Ketone		
Carbon Disulfide		
Benzene		

(3) Extraction was done as per SW 1311.

Reference: Halliburton NUS Environmental Corporation, 1992, Pond Sludge Characterization Report.

APPENDIX II.B

DIGEST OF SOLAR EVAPORATION POND INVESTIGATION AND NARRATIVE TIMELINE

TABLE II.B-1

DIGEST OF SOLAR EVAPORATION POND INVESTIGATION REPORTS

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1951	Report on Findings Pertaining to Underground Waters at the Rocky Flats Plant Site	BY: The Austin Company TO: Dow Chemical DATE: October 13, 1951	States water from the underlying strata are used for domestic uses and recommended the drilling of test wells to each water-bearing formation to check water quality; the wells were recommended to be located both upstream and downstream of the site. The report summarizes that water originating on the ground surface penetrates 1 to 25 feet of pediment gravels then flows along the top of the Arapahoe Formation which is comprised of non-pervious clays and that there are "notable faults in the Arapahoe Formation and where such faults occurred, surface waters seep to the lower formations."	Information on general ground water conditions	There is a reference to "Exhibit B," an electric log of a well which penetrates the Fox Hills, but not found with the report.	N
1952	Rocky Flats Plant - Pond Site Geology and Ground Water of the Rocky Flats Area	BY: M.R. Mudge & R.F. Brown, USGS TO: AEC DATE: 1952	It is concluded in the report that the pediment gravels and the Laramie Formation present at the pond site are capable of transmitting groundwater downward, possibly 100 feet, and laterally for a few feet to a few miles.	This document had special emphasis on the area now occupied by the solar ponds One of the conclusions of the report was that the site was not suitable for an unlined pond. The approximate location of the "proposed pond" was a bit further east of the current ponds, in the apex of the Triangle Area.	Cover letter from D.W. Persons, Project Engineer, USAEC to F.H. Langell, Dow Chemical Co., February 15, 1952 explains that it is a preliminary report pending review by C.V. Theis. No follow-up report has been found. Mr. Mudge (retired) does not recall an updated report.	N
1950s & 1960s	Waste Disposal Coordination Group Monthly History Reports	BY: Waste Disposal Coordination Group of Dow (mostly Ed Ryan) TO: Dow Chemical DATE: Monthly	Although this is not a report per se, the monthy reports include a great deal of information about the solar ponds and surrounding area. In particular, in November 1960, six wells were constructed around the east portion of the solar ponds. Subsequent monthly reports provide analytical results of the well water. Similarly, the drainage tiles east of Ponds 207A and 207B were also sampled since they were installed (1960) and analytical results are provided in the monthly reports.	The information presented in the monthly reports was done so for the purpose of monitoring rather than meeting a regulatory requirement; therefore, no report was written summarizing and presenting the information. This information is very useful to the OU4 program because it does provide relatively long-term results.	Monthly reports are available beginning from January 1953 through the 1960s although many are missing during the period of 1966 through 1969. After 1969, the format and content of the report changed and the analytical information was no longer presented.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1950s & 1960s	Site Survey Group Monthly History Reports	BY: Site Survey Group of Dow TO: Dow Chemical DATE: Monthly	As with the Waste Disposal Coordination Groups monthly reports, the Site Survey Group provided monthly reports regarding their activities. Site Survey was responsible for monitoring radioactivity throughout the site (anywhere not inside or immediately around buildings) and reporting all findings. They performed both routine surveys and surveys brought on by some specific event.	Site Survey often monitored the area around the solar ponds. The water and sometimes soil taken from the hillside seep beginning in 1954 was monitored by Site Survey every time it was sampled. In fact, often Site Survey did the sampling that the Waste Disposal Coordination Group reported. Site Survey reported on the monitoring of the soil in the area of Building 779 when Pond 2-Auxiliary was removed.	Monthly reports are readily available from the period of 1952 through September 1965. After that, some of the reports are available, but not (yet) collected in one location.	N
1970	Geological and Subsoil Investigation at Evaporating Ponds Dow Chemical Rocky Flats Plant, near Denver, Colorado	BY: Woodward-Clyde & Associates TO: Dow Chemical DATE: October, 22, 1970	The stated scope of the study was to present results of an investigation of a potential landslide area north of the evaporating ponds. Ten test holes were drilled to characterize subsurface conditions. The test holes were equipped with perforated PVC for water level monitoring. It was concluded that the hillside was at a high risk for landsliding particularly with the probable addition of water from the ponds themselves. It was recommended that a drainage system to remove groundwater be installed.	Figure 1 identifies many of the same seep areas present now, it is believed that test holes 4 & 5 are still in the field - PVC perforated to surface. Lithologic logs and the screened intervals exist for all 10 holes. The unified soil classification system was used for overburden and weathered bedrock is differentiated from unweathered bedrock.	A drainage tile is shown to exist north of the center of 207C, down the first steep hill. It is believed to be the leak-detection system sump adjacent to the pond rather than further down the hillside as indicated in the drawing. No other drainage tile is known to exist in the area.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1974	Seismic and Geologic Investigations and Design Criteria for Rocky Flats Plutonium Recovery and Waste Treatment Facility	BY: URS/John A. Blume & Associates, Engineers TO: C.F. Braun & Company Engineers (sub to Dow Chemical) DATE: September 1972, Revised June 1974	The geological, seismological, and geophysical data gathered from the proposed building location were evaluated to determine the potential earthquake exposure of the site. In addition to other investigative activities such as trenching, drilling, and downhole geophysical testing, a surface geophysical survey was performed to identify and describe subsurface conditions. There was no intent in this project to delineate the surface of the bedrock or channelling of groundwater. Five geophysical refraction lines were performed to study the subsurface structure (such as displacement caused by historical earthquakes) and provide information of compressional and shear wave velocities within the underlying materials. Profiles of the lines are generalized and indicate three main layers of differing velocities.	This report presents several methods of geophysical application at the RFP. Seismic velocities can be compared and other general subsurface data can be used.	Even though the distance between these study areas is only 2,000 feet, a significant tributary to North Walnut Creek used to exist between the two areas. This tributary had greater topographic variation than the stretch of Walnut Creek near OU4 and likely incised bedrock. The tributary was infilled in the early 1970s with the construction of Sage Avenue and the plutonium recovery complex, and in 1981 with the construction of the PA Fence. Therefore, any correlation made between the bedrock profiles identified in this geophysical study and our OU4 study will have been made with very little bedrock control.	N
1974	Nitrate Inventory North of Solar Evaporation Ponds	BY: Dow Chemical TO: AEC DATE: November 8, 1974	It was recognized that numerous measurements indicated the presence of nitrates in the soil north and northeast of the solar ponds. The evaluation of the total quantity of nitrate present was necessary to identify a cost-effective method of nitrate removal. A soil coring program was undertaken and included the drilling of 56 "wells" in grid patterns in three areas identified as having high concentrations of nitrate in the soil. Soil samples were taken at one-foot intervals and it was concluded that approximately 60 per cent of the total quantity of nitrate was located within 5 feet of the surface. Little if any nitrate was entering North Walnut Creek.	Many statistical tables are presented in the report showing nitrate concentrations with depth from the three areas. Because the data are presented, comparisons can be made to identify how the characteristics have changed in the last 20 years.	These test holes were 10 to 18 feet deep and at 25, 50, or 100 foot spacings depending on the area. All of these test holes would have disturbed the soil, especially in the area of the bifurcated drainage.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1974	Shallow Seismic Compressional and Shear Wave Refraction and Electrical Resistivity Investigations at Rocky Flats, Jefferson County, Colorado	By: Hans D. Ackermann To: Journal of Research of the USGS Date: July-August 1974	The purpose of the study was to delineate the bedrock surface and to determine reports of the overlying gravel cap particularly as they relate to the channeling of groundwater. The study area was located adjacent to Rocky Flats Lake southwest of the RFP. Cross sections are provided showing the highly irregular bedrock surface. In addition, seismic velocities are calculated for the various units.	The geologic units in this report are similar to the OU4 units and acoustic velocities should be very similar. Discussion of refraction, reflection, and resistivity methods are also pertinent.	The underlying claystone bedrock in the area was upturned Pierre Shale as opposed to relatively flat-lying Arapahoe.	N
1974	The Nitrate Problem at Rocky Flats (Slide Presentation notes)	By: C.T. Illsley (Dow Chemical) To: Unknown Date: November 15, 1974	This presents a general overview of the nitrate problem, beginning with the sources of nitrate: 5 N solutions stripped of uranium at the Building 881 Recovery Plant and 6 N solutions from plutonium processing at Building 771. It was recognized from data collected during the early 1970s that the nitrate data was a seasonal problem. Proposed solutions to the nitrate problem included aqueous leaching in place and treating the leachate, strip mining and using the excavated material as organic fertilizer, and insitu bioremediation.	A poorly reproduced drawing shows anomalously high nitrate levels in soil, concentrated in the area of the bifurcated drainage.	Some of the information in this report is so generalized that it is not really correct. It is not recommended that dates be taken as accurate without support from other sources.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1975	An Engineering Study for Water Control and Recycle Supplementary Report	BY: Engineering-Science, Inc. TO: AEC DATE: January 1975	This report presents the results of an investigation concerning the problem of nitrate salts which were being transported from the area of the 207 solar ponds into North Walnut Creek. Three alternatives were presented to mitigate the nitrate problem. It is stated the during the operation of the solar ponds, cracks developed in the lining of the ponds and considerable amounts of concentrated nitrate wastes entered the groundwater and migrated downslope. The nitrate groundwaters appeared at the surface indicated by dead or stimulated vegetation, depending on concentration. Nitrates were found in the A-series ponds but below the Drinking Standards most of the year. Radionuclides were not present due to the filtering action of the soil and ion exchange properties of the clay. Two and a half years' of data were reviewed and 31 test holes were installed in addition to the already existing wells, trenches, and sumps in the area. Drilling and splits analyses were done by Woodward-Thorfinnson. Based on nitrate concentrations in the groundwater samples, isocons were drawn between the ponds and North Walnut Creek. General geologic profiles are presented between some of the test holes and a general description is provided for another test hole. A comparison is made between this report and the 1974 Nitrate Inventory North of the Solar Ponds report. It was concluded that the majority of nitrate was held in the soil in the permeable lenses.	This report provides additional data and site characterization information to the current OU4 program.	Nine of the test holes still exist in the field. They penetrate five feet of bedrock and are believed to be screened the entire length. Other completion information is unknown at this time. It is believed also that the lithologic logs and perhaps soil analyses are archived in Engineering-Sciences' Austin, TX office.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1975	Exploration for Buried Channels by Shallow Seismic Refraction and Resistivity and Determination of Elastic Properties at Rocky Flats, Jefferson County, Colorado"	BY: Ruy Bruno Bacelar de Oliveira Thesis T1718 Masters of Science in Geophysical Engineering Colorado School of Mines DATE: January 6, 1975	The objectives of the investigation were to delineate the bedrock surface particularly as it relates to buried channels; compare different methods of seismic refraction interpretations for the purpose of locating buried channels; and to determine the elastic properties of the material using the dispersion theory of surface waves. Field work was performed in the winter and fall of 1973. The bedrock material in the study area is at a depth of approximately 40 to 90 feet. It is stated that Rocky Flats Alluvium uncomformably overlies the Laramie Formation; however, the distinction between the terms Laramie and Arapahoe has been a small point of controversy since the time of this report, therefore, it is likely that the same material underlies the alluvium in this study area and the OU4 area. Depths to bedrock were calculated using six different methods. Bedrock profiles indicate a highly irregular surface with as much variation as 10 vertical feet in 10 horizontal feet.	The compressional velocities for the layers should be close approximations. In addition, dynamite instead of a strike plate was used as a source for some of the seismic lines. The tributary to North Walnut Creek truncated the area between the study sites and correlations in bedrock topography as identified by seismic refraction cannot be made.	Unrelated to the seismic investigation, the thesis provides a good non-technical overview of the geologic history of the area that includes a discussion of the genesis of groundwater channeling at the RFP which may be informative to some as background information.	N
1976	Technical Memorandum: Summary of Non-Nuclear Remote Sensing at Rocky Flats Sites and Status of Analysis of Geological and Hydrological Indicators - July 1975 through December 1975	BY: J.G. Lackey, E.B. Jones, and H.A. Wollenberg EG&G TO: Unknown DATE: March 19, 1976 (revised from January 6, 1976)	This report provides a summary of different remote sensing studies performed at the RFP focusing on the possible existence of a fault or shear zone on or near the site. CSM was involved in some of the studies. Remote sensing techniques included conventional and four-camera system aerial photography, and infrared thermal mapping. CSM performed a vibroseis reflection survey north and east of the plant. A ground-truthing operation took place in conjunction with the remote sensing activities. Ground shots were taken of vegetation around ground seep areas. It concluded that most flow from solar pond leakage probably surfaces at seeps on the sloping sides of channel valleys and seeps and springs emerge at the interface of the gravels and the Arapahoe Formation. The recommendation of the report was that further studies of the RFP could be divided into two categories: Geological and Hydrological.	Because the seeps north of the solar ponds were of particular interest, the maps and ground shots may be useful in comparing the site from the mid 1970s to today.	It is not known at this time if the maps and photos still exist and are available.	M

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?¹
1979	Supplemental Report Evaluation of Landslide Area Perimeter Security Zone Stations 77+00 to 90+00 Department of Energy Rocky Flats Plant, Golden, Colorado	BY: CTL/Thompton, Inc. TO: Richard Weingardt Associates, Inc. DATE: December 29, 1979	The report presents the results of an investigation of the landslide area north of the solar ponds with respect to the planned construction of the PSZ. Three alternatives were presented to stabilize the hillside. All of them involved dewatering the hillside although dewatering alone was not believed to be adequate because of the conclusion that the groundwater was flowing in distinct channels on the hillside and of the possibility that all of the channels could not be intercepted by a dewatering system. It was believed that relining the ponds would be an effective method of dewatering the hillside because they were believed to be a major source of groundwater.	Although the report was not specific to the solar ponds, there was an emphasis on their presence and role in the hillside stabilization. It was stated that the solar ponds had been previously identified as a source of water containing nitrates. There was a stated concern that the earthwork necessary to alter the hillside for the PSZ could in itself trigger slope instability and impact the solar ponds. There are geotechnical results on soil samples from several depths in seven of the boreholes. Information includes moisture content and dry density.	This report confirms the 1970 report of landslide potential and makes recommendations regarding the area as though landslides were emminent unless some measures were taken to alter the conditions. This report was written based on the proposed plan of the PSZ and new structures (771 Parking Lot and new road alignments) but it is clear that the ultimate construction differed significantly from the proposed design.	N
1980	Final Environmental Impact Statement	BY: Rockwell TO: DOE DATE: April	The three volumes of the FEIS represent a comprehensive reference for environmental issues at the RFP.	In addition to general geologic, hydrologic, and vegetation discussions of the site, specific sections address the operation of the solar ponds.	Most of the information pertaining to the solar ponds can be found in previous documents.	Y

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1984	Subsurface Investigation and Engineering Analysis Report Solar Evaporation Pond Sludge Removal Project US Atomic Energy Commission, Rocky Flats Facility, Boulder, Colorado *sic*	BY: Foundation Engineering Company TO: Lee Wan & Associates, Inc. DATE: June 14, 1984	This report was prepared in preparation prior to the initial construction of Building 788. The investigation was performed to determine the design criteria for the building foundation. Two boreholes were drilled in the area of the proposed building between Ponds 207A and 207C. The 1962 report on the foundation investigation for Building 779 was used as background information. A review of that document and of the borehole information led to the conclusion that the subsurface conditions were "erratic".	The borehole logs presented indicate sand (SM-SC) to be present at the bottoms of both holes at a depth where one would expect to find sandstone, based on the logs of subsequently drilled adjacent holes. The report indicated that bedrock was not encountered; however, if the investigators were using the Building 779 information as a basis for discerning bedrock, they would have been looking for claystone instead of sandstone; at the time, no sandstone had been identified at the solar pond area.	This report was referenced in the OU4 Workplan but erroneously attributed to Geotechnical and Materials Consultants, which was just a descriptive subtitle to the company's name. The title of the report is technically incorrect - the reference to the US AEC ... Boulder, Co - because the report preparers used a 1962 report for background information. In 1962, this title was correct.	N
1985	Hydrogeologic Characterization of the Rocky Flats Plant, Golden, Colorado --Draft--	BY: Hydro-Search, Inc. TO: Rockwell DATE: September 17, 1985	This report was the first comprehensive study of solar pond hydrogeologic data collected to date. Both existing data and new (1985) data were used in the characterization. Existing data included geologic logs, water level records, a long history of water quality sampling and analysis, and a review of published and unpublished reports. New data collected for the study included geophysical logs, single-hole drawdown recovery tests, and a location survey of the wells. The draft report provides site-wide characterization information such as geochemistry data presented as stiff diagrams for surface water, alluvial water, and bedrock water. Appendices to the report are comprised of raw geophysical and analytical data.	This report provides a very good site-wide characterization and a summary of historical reports. It is a good overall reference even though it does not specifically address the solar ponds. Some of the geophysical and hydrological activities took place in wells in the OU4 area.	A plate is provided that identifies the location of all known wells at the site. Interestingly, wells are indicated to have existed at all corners of each solar pond. This is the only figure known to indicate these wells; however, there is no discussion of these wells and the authors of the report do not recall the source. These wells do not appear on the final version of the report.	N
1985	Hydrogeologic Characterization of the Rocky Flats Plant, Golden, Colorado	BY: Hydro-Search, Inc. TO: Rockwell DATE: December 9, 1985	The text of this report is very similar to the draft report; however, there are more figures in the draft. There is also more discussion on draw-down recovery tests in the final, but less discussion on geochemistry.	See entry for draft report.	See entry for draft report.	N

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1985	Comprehensive Environmental Assessment and Response Program Phase 1: Installation Assessment RFP --Draft--	BY: DOE To: Unknown *Check w FJB* DATE: August 30, 1985	This document was prepared by the Albuquerque office to describe potential areas of environmental concern at the RFP. Many of the facts in this document are obscure and difficult to understand.	The solar ponds were identified as an area of concern and several paragraphs summarize the construction and operational history.	The information on the solar ponds is described in better detail in other documents. This document never went final and there are many questions raised about the accuracy of some statements. This document set the framework for the identification of SWMUs (IHSSs).	N
1986	RCRA Part B Operating Permit Application Volume VI, VII, & VIII - Section E: Groundwater Protection	BY: Rockwell, Weston, Chen & Associates, Hydro-Search, and James L. Grant & Associates To: CDH DATE: November 28, 1986	Section E of the Permit Application provides a description of the hydrogeological setting and the uppermost aquifer at the RFP. It also provides detailed plans for groundwater monitoring at the RFP which specifically addresses the RCRA-regulated units (including the solar ponds). Appendix E-1 is the Work Plan for Phase I investigation activities. This report summarizes much of the information generated from the 1985 Hydro-Search report but also includes the preliminary analyses from the 1986 drilling program. It is therefore more comprehensive than the 1985 report and provide much more raw data. This document identifies some regulatory issues such as which wells would be monitored at certain schedules for RCRA compliance.	Apart from the site-wide characterization information, there are sections that particularly address contamination found at the solar ponds, monitoring data from the solar ponds, and other solar pond information; however, most of this information is a summary of the 1985 Hydro-Search report. Other information regarding the regulatory status of the solar ponds is also presented. Solar pond monitoring data from 1982 - 1985 are provided in Appendix E-3. Packer test results from the 1986 wells tested are included in Appendix E-6; many are the same as those presented in the 1988 closure plan. Borehole logs and well completions diagrams are included in Appendix E-5 and E-8 for the 1986 wells.	Section E has 13 appendices which include the Geological and Hydrological Site Characterization as well as great quantities of raw data. Because the Part B Permit Application does not include any operating land disposal units, the section on groundwater protection was not required under RCRA; however, it was submitted for compliance with the 1986 Compliance Agreement. This Section E is identical to the Section E in the Post-Closure Care Permit Application. Well and analytical information from 1986 wells are included in RFEDS. This report presents hardcopies of the information prior to being put in RFEDS and may be useful as a check on discrepancies.	Y

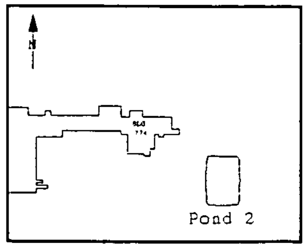
Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?'
1986	Closure Plan - Solar Evaporation Ponds	BY: Rockwell, Weston, Chen & Associates, and Hydro-Search, Inc. To: U.S. Department of Energy DATE: August 29, 1986	This document presents a good brief physical description of the solar ponds including the construction history, use, and operation. There is a discussion of the soil and groundwater contamination known to exist at the time. A summary of closure options is also presented, including diversion, removal, and treatment of groundwater, and flushing or removal of soil. A breakdown of costs for final closure is presented along with a proposed schedule. Closure options include removal as waste and capping in place.	All information in this report is pertinent to the OU4 RFI/RI.	This closure plan was not accepted by the state because the closure schedule indicated more than 180 days would be necessary for closure and because it lacked detail for the proposed characterization.	Y
1986	Electromagnetic Survey, Rocky Flats Plant, Golden, Colorado	BY: Hydro-Search, Inc. To: Rockwell DATE: June 2, 1986	An electromagnetic survey was made of the periphery of the RFP security area and of the downgradient drainages in the buffer zone. The survey was performed to direct future site characterization efforts. A section of the report presents a summary of the site hydrogeology, primarily taken from the 1985 Hydro-Search report on hydrogeology.	The solar ponds were identified as one of eight possible sources of high TDS leaving the site. The hillside north of the solar ponds was surveyed and found to have high conductivity.	One of the recommendations of this report was the installation of new wells around the solar ponds as recommended in the 1985 Part B Permit Application.	N
1987	RCRA 3004(u) Waste Management Units Appendix 1 Revision No. 1	BY: Rockwell, Weston, Chen & Associates, Hydro-Search, & James L Grant To: DOE DATE: December 15, 1987	Attachment 4 of this document lists all of the SWMUs identified to date. The SWMUs were assigned a prioritized reference number. A brief waste history accompanies each SWMU description.	The solar ponds were assigned number 101 indicating a high priority. The waste description deferred to the Interim Status Closure Plan for detail.	Revision 0 was submitted on November 28, 1986.	Y
1987	Closure Plan, Solar Evaporation Ponds	BY: Rockwell To: DOE DATE: March 1, 1987	This document was submitted to CDH after responding to CDH's comments on the 1986 Closure Plan. Most historical information is the same as the 1986 version; however, some additional 1986 data were incorporated.	This document does not contain much information that the 1986 and 1988 closure plans do not have.	This document was submitted for agency review and was found to be inadequate. Deficiencies were to be addressed in the 1988 closure plan.	Y
1988	Solar Evaporation Ponds Closure Plan	BY: Rockwell To: DOE DATE: June 1, 1988	This revised closure plan was submitted in response to comments on the 1987 closure plan and the Part B Permit Application. It includes most of the information from the 1987 closure plan as well as additional subsurface characterization information from the 1987 drilling program.	The main text of this document addresses the regulatory requirements for an interim status closure plan which include a general description of the unit, a brief history of its use, and the design for closure. In addition to SWMU (IHSS) 101, this closure plan also addresses SWMUs 121, 138, 149, and 150.8.	The first 5 appendices contain data and drawings which are useful for the solar ponds but are largely included in RFEDS and other reports. Appendix 6 of this document is the Hydrogeologic Characterization Report for the Solar Ponds and is treated as a separate document for this digest.	Y

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1988	Closure Plan, Solar Evaporation Ponds, Closure Plan, Hydrogeologic Characterization Report --Draft--	BY: Rockwell and Weston TO: DOE DATE: June 1, 1988	This is a very thorough characterization of the solar pond hydrogeology using and presenting data from all wells and boreholes drilled in 1986 and 1987. Because it is a draft, several sections are listed as being "in progress." Included are lithologic descriptions of all materials in the solar pond area and a concise depositional history of the units. There is also a good description of the materials that went into the ponds (source discussion). Sections of this Appendix address regional setting, source characteristics, site hydrogeology, and surface water characterization.	This report is specific to the solar ponds. Much of the information was incorporated into the OU4 RFI/RI Work Plan, but some information was summarized. This report is an excellent reference and contains a lot of data that could be evaluated in the RFI/RI Phase I report. Data include soil and groundwater analyses, packer test results, water level information, and pond contents analyses. Packer test results from the 1986 wells are the same as those presented in the 1986 Part B Permit Application.	The organization of this document is confusing: Appendix 6 is the Hydrogeologic Characterization Report for the Closure Plan; Appendix 6 contains five appendices, Appendix A through E.	Y
1988	RCRA Post-Closure Care Permit Application	BY: Rockwell, Weston, & Chen & Associates TO: CDH DATE: October 5, 1988	Volumes I through IV of this report addresses the regulatory requirements of a post-closure care permit application. In particular, Section E of the report covers groundwater monitoring and protection. Other volumes, V through XXIII, are closure plans for the individual units of the application.	Volumes I through IV address all of the units of the application including the solar ponds. Section E contains similar information as the 1988 Closure Plan's Hydrogeological Characterization Report.	A concise definition of the uppermost aquifer for the solar ponds is presented in Section E. It is the official regulatory definition proposed for the site. Appendix 6 of Appendix I-2 of this Post-Closure Care Permit Application is the same Hydrogeologic Characterization Report as in the 1988 Closure Plan.	Y
1989	1988 Annual RCRA Ground-Water Monitoring Report for Regulated Units at Rocky Flats Plant	BY: Rockwell TO: CDH DATE: March 1, 1989	This document describes the monitoring programs at the solar ponds, the west spray field, and the landfill. The nature and extent of contamination is described for the units and the known characterization of the geology and hydrology are summarized. Groundwater chemistry data are provided.	The sections on the solar ponds is of significance to OU4.	The data presented in this document are on RFEDS.	Y
1990	1989 Annual RCRA Ground-Water Monitoring Report for Regulated Units at Rocky Flats Plant	BY: Rockwell TO: CDH DATE: March 1, 1990	This document describes the monitoring programs at the solar ponds, the west spray field, and the landfill. The nature and extent of contamination is described for the units and the known characterization of the geology and hydrology are summarized. Groundwater chemistry data are provided.	The sections on the solar ponds is of significance to OU4.	The data presented in this document are on RFEDS.	Y

Year	Title	Correspondence	Summary	OU4 Pertinence	Comments	Reg?[1]
1991	Groundwater Protection and Monitoring Program Plan	BY: EG&G Rocky Flats & ASI TO: DOE DATE: November 27, 1991	This document was prepared in response to a DOE order. It addresses the groundwater protection program and the groundwater management plans. In particular, it summarizes the regulatory status of the site with respect to groundwater issues.	Because the solar ponds are under a groundwater assessment program, several sections of the report specifically address the solar ponds. This report is particularly useful in briefly describing the different regulations and regulatory drivers.	This document was updated in 1993 and is currently being reviewed by DOE. Prior to the November 1991 version, many revisions were submitted for review and contain different levels of detail.	Y
1991	Solar Ponds Interceptor Trench System Groundwater Management Study	BY: ASI & Doty & Associates TO: EG&G Rocky Flats DATE: January 15, 1991	This report assessed possible management alternatives for the water collected from the ITS. The study included a review of analytical data of the groundwater to be managed and a computation of the quantity of water collected. The quantitative study assessed discrete portions of the system.	Water quantity values presented in this report were developed during the development of this report and are useful in assessing the ITS efficiency.	This document was Task 7 of the 30-task Zero-Offsite Water-Discharge Study.	Y
1992	Phase I RFI/RI Work Plan, Rocky Flats Plant, Solar Evaporation Ponds	BY: DOE (EG&G & IT) TO: CDH & EPA DATE: January 1992				
1992	Historical Release Report	BY: DOE, EG&G Rocky Flats, Doty & Associates, & IT TO: CDH & EPA DATE: June 1991	This report describes all releases to the environment at the RFP. It includes descriptions of the events, contaminants released, responses, and other pertinent details to all IHSSs as well as newly identified areas of concern.	The solar ponds are IHSS 101 which is described in the report.	The HRR was an IAG-driven document which was accepted by the agencies. IHSS 101 had its boundaries redefined in the HRR. The acceptance by the agencies implied an acceptance of the new boundaries.	Y
1992	Preliminary Investigation on Potential Leakage from the 207B Solar Evaporation Ponds	BY: EG&G Rocky Flats TO: Unknown *check w FJB* DATE: July 13, 1992	This report details the activities of a brief investigation addressing whether the 207B Solar Ponds were currently leaking into the uppermost aquifer. This was done by sampling wells in the solar ponds vicinity for a dye that was present in the 207B ponds. The wells that were sampled collected water in both the alluvium and the silty claystones of the Arapahoe. Based on this study, no leakage was occurring from the ponds.			

1. This column indicates whether the document had been submitted to the agencies or whether the agencies may have the document.

SOLAR POND HISTORY TIMELINE



October 1953 - Construction of the first clay-lined evaporation pond, Pond 2, was complete (Ryan, E.S., Dow Chemical Company 1953, "Progress Report - Waste Disposal Unit - October 1953," Internal Letter to J.G. Epp, Dow Chemical Company, November 6).

December 1953 - Waste was first sent to Pond 2 (Ryan, E.S., Dow Chemical Company, 1953, "Progress Report - Waste Disposal Unit - December 1953," Internal Letter to J.G. Epp, Dow Chemical Company, January 7).

June 1954 - Leakage from solar pond was first noted based on the existence of a nitrate-contaminated spring on the hillside to the north of the solar pond (Ryan, E.S, Dow Chemical Company 1954, "Progress Report - Waste Disposal Unit - June 1954," Internal Letter to H.C. Anderson, Dow Chemical Company, July 8).

November 1954 - A series of tests was initiated to determine whether disposing of contaminated coolant into solar pond would be practical (Ryan, E.S., Dow Chemical Company, 1954, "Progress Report for the Month of November 1954 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, December 2).

January 1955 - The coolant evaporation study was temporarily discontinued due to increased operation of the coolant still in Building 444 (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of January 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, February 2).

February 1955 - The spring to the north of the solar pond was sampled twice a week; analyses indicated an increasing nitrate concentration (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of February 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, March 2).

April 1955 - Planning began for the replacement of Pond No. 2 (the original evaporation pond) with two new water tight ponds, each with a capacity of 500,000 gallons (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of April 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, May 2).

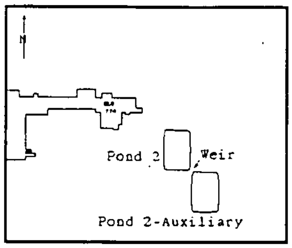
May 1955 - RFP personnel become aware that Great Western Reservoir (field trip to Great Western Reservoir on May 4, 1955) was to be used as a drinking water supply; there was concern regarding movement of nitrates offsite from the Solar Pond area. It was decided to build a "water-tight" solar pond (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of May 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, June 1).

June 1955 - Pond No. 2 required repairs due to liquid appearing south and east of the pond; clay fill was used to prevent seepage (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of June 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, July 1).

July 1955 - Construction of Broomfield Heights homes began. This activity made the construction of a water tight pond more of a priority than it was previously (Ryan, E.S., Dow Chemical Company, 1955, "History Report for the Month of July 1955 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, August 1).

August 1955 - Inspection of Pond 2 revealed another leak on the east side of the pond, and that the pond was too full and would soon overflow. It was suggested that, since the 2 proposed water tight ponds were not under construction yet, excavation be made for the construction of a 1-acre clay-lined pond adjacent to the existing evaporation pond (RYAN, E.S., DOW CHEMICAL COMPANY, 1955, "HISTORY REPORT FOR THE MONTH OF AUGUST 1955 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, SEPTEMBER 1).

September 1955 - A second pond was constructed catty-corner (to the southeast) to Pond 2, due to the lack of capacity in Pond 2. This new pond was designated Pond 2-Auxiliary, and was of earthen construction with no liner whatsoever. Waste only flowed into the pond from a common corner over a weir. Leaks were observed along the east side of the new pond during this same month (RYAN, E.S., DOW CHEMICAL COMPANY, 1955, "HISTORY REPORT FOR THE MONTH OF SEPTEMBER 1955 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, OCTOBER 4).



October 1955 - As a result of a lower liquid level in Pond No. 2, the leaks along the east side of the auxiliary pond subsided (RYAN, E.S., DOW CHEMICAL COMPANY, 1955, "HISTORY REPORT FOR THE MONTH OF OCTOBER 1955 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, NOVEMBER 3).

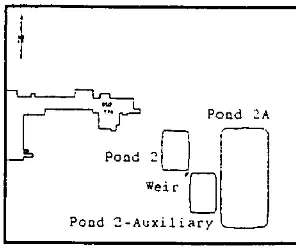
December 1955 - Due to wind, water from Pond 2 was blown to the east. A request for soil and vegetation sampling was made from Waste Disposal to Industrial Hygiene (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF DECEMBER 1955 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JANUARY 4).

January 1956 - Excavation of the first synthetically lined pond (originally designated Pond 2A, later re-designated Pond 207A) began (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF JANUARY 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, FEBRUARY 2).

April 1956 - The subgrade for the water tight pond was completed. Placement of the 3 foot by 14 foot asphalt-impregnated felt planking for the lining began (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF APRIL 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, MAY 1).

May 1956 - Placement of the asphalt lining was completed, and the process of sealing the lining began. A request for the necessary piping changes were made. The changes would allow for direct transfer of certain wastes from Buildings 444 and 881 to the newest evaporation pond. Leaks appeared in the east dike of the original Pond 2 and in the north dike of the auxiliary pond. Clay fill was used to prevent the seepage. It was requested that the auxiliary pond be lined (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF MAY 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JUNE 5).

June 1956 - Construction and lining of the "Facility 207 Asphalt Lined Evaporation Pond" was completed. One discharge line had been installed, and another was in the process of being installed. Inspection of the pond revealed that the felt was separated from the asphalt on several sheets. Corrective action was to be taken. It was recommended that test wells be installed around the new pond for analysis of groundwater. The number of seepage leaks from Pond 2 had decreased. It was stated that the auxiliary pond needed clay lining (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF JUNE 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JUNE 29).



July 1956 - The faulty asphalt sheets were repaired (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF JULY 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, AUGUST 3).

August 1956 - Pond 207A was placed in limited use (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF AUGUST 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, SEPTEMBER 5). Ponds 2 and 2-Auxiliary were taken out of service and being allowed to dry (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).

September 1956 - Dow's approval of the stainless steel pipeline allowed for direct release of liquids to the new pond. Pond 2-Auxiliary was being allowed to dry, and would be clay lined when it was dry (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR THE MONTH OF SEPTEMBER 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, OCTOBER 2).

October 1956 - Stainless steel extension tubes were attached to the end of the discharge pipes on the new pond, resulting in releases of liquid from 18 inches above the pond floor. Approximately 2/3 of the pond floor was covered with liquid at this time (RYAN, E.S., DOW CHEMICAL COMPANY, 1956, "HISTORY REPORT FOR OCTOBER 1956 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, NOVEMBER 5).

January 1957 - Lining of Pond 2-Auxiliary with clay began. Samples of the nitrate spring were still being taken (RYAN, E.S., DOW CHEMICAL COMPANY, 1957, "HISTORY REPORT FOR THE MONTH OF JANUARY 1957 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, FEBRUARY 4). The "unused pond near 77 Building" was filled for abandonment, due to construction of the asphalt pond (SMITH, R.D., DOW CHEMICAL COMPANY, 1957, "MONTHLY PROGRESS REPORT - SITE SURVEY - JANUARY 1957," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, FEBRUARY 5).

February 1957 - Lining of the auxiliary pond was completed. Clay was placed on the inner face of the east dike of Pond 2, which was dry, to prevent leakage which had developed while the pond was in use (RYAN, E.S., DOW CHEMICAL COMPANY, 1957, "HISTORY REPORT FOR THE MONTH OF FEBRUARY 1957 - WASTE DISPOSAL CO-ORDINATION GROUP," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, MARCH 4).

March 1957 - Lining of the inner face of the sides of Pond 2 was complete. A wooden spillway was installed below the three discharge pipes, and the pond was returned to service (RYAN, E.S., Dow Chemical Company, 1957, "History Report for the Month of March 1957 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, April 5).

April 1957 - Releases of wastes from Buildings 883 and 774, which were above drinking water tolerance levels, were made to Pond 2A. Six hundred gallons of salt bath solution were also (?) released to Pond 2A (or was the waste the bath solution?). Activity build-up in the pond was being investigated (Ryan, E.S., Dow Chemical Company, 1957, "History Report for the Month of April 1957 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, May 3).

June 1957 - The study of the activity build-up in Pond 2A was ongoing. The study was a result of a request from Building 881 for higher release levels (Ryan, E.S., Dow Chemical Company, 1957, "History Report for the Month of June 1957 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, July 5).

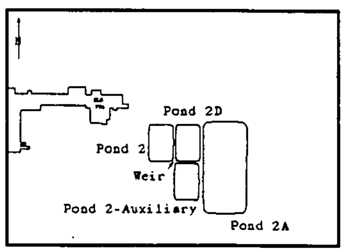
July 1957 - Seven drums of contaminated wash water from decontamination of production personnel was disposed of in Pond 2A. An investigation of possible auxiliary evaporation for Pond 2A was initiated. The study involved determining an appropriate evaporation booster, such as a tower or spray, to extend the life of the pond (Ryan, E.S., Dow Chemical Company, 1957, "History Report - July 1957 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, August 5).

October 1957 - An 8-foot chain link fence was constructed around Ponds 2 and 2A. Studies of the use of clay to reduce activity in the Pond 2A were initiated (Ryan, E.S., Dow Chemical Company, 1957, "History Report - October 1957 - Waste Disposal Co-Ordination Group," Internal Letter to L.C. Farrell, Dow Chemical Company, November 5).

September 1958 - Aluminum paint was applied to the exposed surface of Pond 2A to increase evaporation (Ryan, E.S., Dow Chemical Company, 1958, "History Report - Waste Disposal Co-Ordination Group - September 1958," Internal Letter to L.C. Farrell, Dow Chemical Company, October 8).

October 1958 - A request for authorization for construction of another asphalt-lined pond was submitted. The second pond was needed in case Pond 2A ruptured and leaked, and for additional evaporative surface area (Ryan, E.S., Dow Chemical Company, 1958, "History Report - Waste Disposal Co-Ordination Group - October, 1958," Internal Letter to L.C. Farrell, Dow Chemical Company, November 6).

April 1959 - A third earthen pond was constructed to prevent overflowing of Pond 2A. Plans for a method to mix Pond 2 liquid with Pond 2A liquid to enable transfer to Building 995 were being made as another attempt to lower the liquid level in Pond 2A (Ryan, E.S., Dow Chemical Company, 1959, "History Report - Waste Disposal Co-Ordination Group - April 1959," Internal Letter to L.C. Farrell, Dow Chemical Company, May 12). The new pond was located just east of Pond 2, west of Pond 207A, and north of 2-Auxiliary. This new pond is believed to have been designated Pond 2D, with 2-Auxiliary being designated 2C.



May 1959 - Plans for the use of Pond 2 as an oxidation unit using liquids from Pond 2A were being made (RYAN, E.S., DOW CHEMICAL COMPANY, 1959, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - MAY 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JUNE 8).

June 1959 - Monitoring of the "dumping of alcohol wash from Building 77 into the nitrate pond east of Building 77" was conducted. Following the release, the area above the water line where the wash had been dumped had greater than 100,000 cpm (HILL, J.E., DOW CHEMICAL COMPANY, 1959, "MONTHLY PROGRESS REPORT - SITE SURVEY - JUNE 1959," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, JULY 6). Various analyses were taken of the pond area, results of which were as follows: 1,040 dpm/l water sample at the nitrate pond; 2 dpm/l water sample at the spring on the north slope of the nitrate pond; and 2.7 x 10^6 dpm/kg 100 feet east of the nitrate pond (normal soil background was reported to be 2 x 10^4 to 5 x 10^4 dpm/kg) (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1959, "MONTHLY PROGRESS REPORT - SITE SURVEY - JUNE 1959," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, JULY 6).

July 1959 - The flow pattern of Pond 2 was modified to allow for maximum detention prior to release of the wastes to the sanitary system. The use of Pond 2 as an oxidation pond using liquid from Pond 2A was initiated (RYAN, E.S., DOW CHEMICAL COMPANY, 1959, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JULY 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, AUGUST 10). Monitoring of the sides of the nitrate pond indicated direct readings of greater than 100,000 cpm and smears up to 300,000 dpm (HILL, J.E., DOW CHEMICAL COMPANY, 1959, "MONTHLY PROGRESS REPORT - SITE SURVEY - JULY 1959," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, AUGUST 3).

August 1959 - The dikes on the east sides of Ponds 2C and 2D were raised to provide additional storage volume. Liquids were transferred to Pond 2 instead of Pond 2A whenever possible in an effort to lower the volume of Pond 2A. Water from Pond 2D was pumped to the sanitary system for a period of 7 hours to determine the affect of the liquid on the system. Results were favorable. Another test, with a pumping period of three days, was also conducted (RYAN, E.S., DOW CHEMICAL COMPANY, 1959, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - AUGUST 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, SEPTEMBER 9).

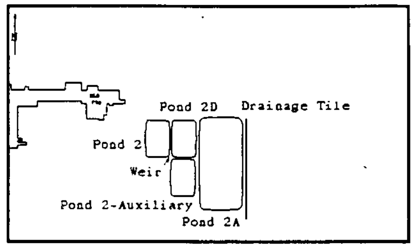
September 1959 - The results of the second aforementioned test indicated that the process was unfavorable. Investigation into nitrate reduction methods was conducted using sulfur dioxide gas and air, with unsuccessful results. A study of nitrate reduction using aluminum was initiated (RYAN, E.S., DOW CHEMICAL COMPANY, 1959, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - SEPTEMBER 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, OCTOBER 7).

October 1959 - It was recommended that the dikes of the ponds be built up for the winter. Bids for construction of the second asphalt-lined pond were sent to ALO for final selection and approval. It was stated that, when the new pond was built, the level of the existing asphalt-lined pond would be lowered to make repairs to planking and sun-checked surface (RYAN, E.S., DOW CHEMICAL COMPANY, 1959, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - OCTOBER 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, NOVEMBER 5).

November 1959 - Construction of the second lined solar pond began. Wind caused considerable spray of pond water, hindering construction activities (RYAN, E.S., DOW CHEMICAL COMPANY, 1959,

"HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - NOVEMBER 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, DECEMBER 10). This pond was to consist of three separate cells, and was also constructed of asphalt planking. The designation for this pond was Pond 2B-North, Center, and South, later changed to Pond 207B-North, Center, and South. Direct readings of the bank of Pond 2A indicated between 250 and 100,000 cpm. High winds spread salt onto equipment parked east of the pond, but their was no indication of contamination (HILL, J.E., DOW CHEMICAL COMPANY, 1959, "MONTHLY PROGRESS REPORT - SITE SURVEY - NOVEMBER, 1959," INTERNAL LETTER TO E.A. PUTZIER; DOW CHEMICAL COMPANY, DECEMBER 3). Samples of the spring on the north slope of the nitrate pond indicated 14 dpm/l (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1959, "SITE SURVEY MONTHLY REPORT - NOVEMBER 1959," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, DECEMBER 9).

December 1959 - Seepage noted at the west end of the 207B pond excavation and a "covered drainage ditch" was constructed to drain the water to the hillside north of the ponds. Samples of the seepage were analyzed daily. The sand and gravel bed was packed in the southern section of the excavation, and a sterilant was applied. The sterilant was then covered with asphalt planking (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - DECEMBER 1959," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JANUARY 11). (No details on the length or invert elevation of the covered drainage ditch has yet been found on this pipe - I believe the man with the best information on it has passed away.) Water samples indicated 84 dpm/l in seepage from the nitrate pond, and 10.5 dpm/l in the spring on the north slope, with enriched uranium being the major component of the activity in the spring water (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1960, "MONTHLY PROGRESS REPORT - SITE SURVEY - DECEMBER 1959," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, JANUARY 13).

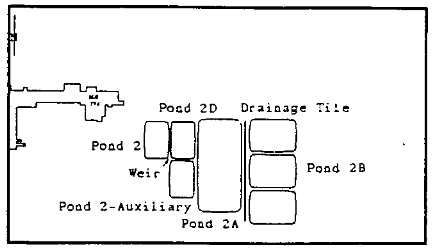


March 1960 - Connecting pipes between the sections of the new asphalt-lined pond, as well as controlling valves, were installed. Cuts in the dike for the connecting pipes were backfilled. Construction of the pump station began. Connecting pipes and control valves from the existing pipes to Pond 2A were installed, completing the pipeline from the new valve pit to the inlet of the new pond. High activity in the effluent, as determined through composite samples from the drainage tile, was attributed to liquids being carried from Pond 2A by high winds (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - MARCH 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, APRIL 11).

April 1960 - Construction activities on the pumping station for the new asphalt-lined pond continued. Placement of planking, as well as mastic application, was completed on the south section. Planking had also been placed in the center and north section, and mastic application had begun. High winds again affected activity levels in the effluent (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - APRIL 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, MAY 6).

May 1960 - Waste was released into the newly completed cells, 207B-Center and South (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - MAY 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JUNE 7). Water samples indicated 2.7

dpm/l at the spring north of the nitrate pond (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1960, "MONTHLY PROGRESS REPORT - SITE SURVEY - MAY 1960," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, JUNE 10).



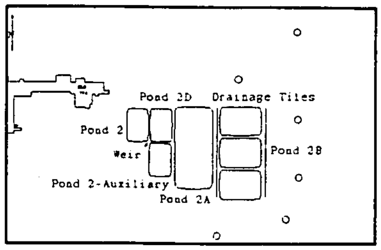
June 1960 - The 207B Solar Ponds, referred to as Pond 2B, were fully completed. Transfer of water from Pond 2A was halted when leaks were discovered in the south and center sections. In order to return the liquid to Pond 2A, it first had to be transferred to the north section, resulting in extensive damage to the north section of the new pond. The problems were caused by the acidic wastes reacting with the soil and producing gas, which lifted the asphalt planking and ruptured the seams. Investigations into the use of sodium sulfite and sulfur dioxide as reducing agents in high nitrate waste were unsuccessful (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JUNE 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, JULY 15). Routine use of the earthen ponds, Ponds 2, 2-Auxiliary and 2C, ceases. (The only other known release to these ponds occurred in March 1963). Water samples indicated 3.1 dpm/l in the spring north of the nitrate pond (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1960, "MONTHLY PROGRESS REPORT - SITE SURVEY - JUNE 1960," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, JULY 11).

July 1960 - All wastes had been transferred from Pond 2B to Pond 2A. The planking of Pond 2B was cut in some areas in order to relieve the pressure from the gas underneath the planking. A stainless steel flashing was constructed and welded around the connecting pipe between the south and middle sections of the pond (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JULY 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, AUGUST 17). Water samples indicated 4.4 dpm/l in the spring north of the nitrate pond (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1960, "MONTHLY PROGRESS REPORT - SITE SURVEY - JULY 1960," INTERNAL LETTER TO T.S. CHAPMAN, DOW CHEMICAL COMPANY, AUGUST 9).

September 1960 - Monitoring of the "three east nitrate ponds" indicated maximum readings of 2,000 cpm direct and 200 dpm removable (HILL, J.E., DOW CHEMICAL COMPANY, 1960, "MONTHLY PROGRESS REPORT - SITE SURVEY - SEPTEMBER 1960," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, OCTOBER 5).

October 1960 - Bids received for relining of the 207B ponds were too high. A request for re-bids for lining only the south section was made, and one was accepted (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - OCTOBER 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, NOVEMBER 11).

November 1960 - The south section of Pond 207B was relined, using asphalt concrete, and seal-coated. The first six groundwater wells were also installed in the immediate vicinity of 207B solar ponds (RYAN, E.S., DOW CHEMICAL COMPANY, 1960, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - NOVEMBER 1960," INTERNAL LETTER TO L.C. FARRELL, DOW CHEMICAL COMPANY, DECEMBER 16).



December 1960 - Pond 207B was again placed into service, but was to be used only for treated alkaline wastes from Building 774 (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - DECEMBER 1960," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, JANUARY 26).

January 1961 - The six monitoring wells were sampled for the first time (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JANUARY 1961," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, FEBRUARY 15).

April 1961 - Preparation for the repair of 207B-Center and North began. The center section was drained, and dirt and gravel were removed. The north section was pumped out (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - APRIL 1961," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, MAY 19). Work activities at this time included the construction of a drainage tile immediately east of the ponds to intercept any leakage flowing to the east. Underdrains in the ponds themselves were not constructed. The asphalt concrete was placed over the asphalt planking except in 207B-North, where difficulties were encountered and the planking was removed. Concern was centered on 207A, which was believed to be leaking.

June 1961 - Cleaning and draining of 207B-Center and North in preparation for repair was completed (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JUNE 1961," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, JULY 11).

July 1961 - Repair on the north and center sections of Pond 207B began. Because of difficulty in laying the asphalt concrete over the asphalt planking, the planking was removed in the north section. A rupture occurred in the asphalt concrete in the south section of the pond, near the outlet from Building 774. Pumping was transferred to Pond 2A so that repairs could be made (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - JULY 1961," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, AUGUST 18).

August 1961 - Ponds 207B-Center and North were returned to service. The contents of the south section were transferred to the center section, and were mixed with sodium silicate as they passed through the transfer pipe. The three sections were then equalized, and spill boxes were installed at the ends of the discharge pipes. The north section was then closed off for use in spray evaporation studies (RYAN, E.S., DOW CHEMICAL COMPANY, 1961, "HISTORY REPORT - WASTE DISPOSAL CO-ORDINATION GROUP - AUGUST 1961," INTERNAL LETTER TO J.G. EPP, DOW CHEMICAL COMPANY, SEPTEMBER 26).

October 1961 - Prior to spraying operations at the nitrate pond, background surface readings and soil samples were taken. Air samples taken during spraying indicated very little airborne activity (HILL, J.E., DOW CHEMICAL COMPANY, 1961, "MONTHLY PROGRESS REPORT - SITE SURVEY - OCTOBER 1961," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, NOVEMBER 6).

February 1962 - The pipeline between the center and north section of Pond 207B was reopened to allow transfer. Spray evaporation had not yet been attempted, and the line would be closed when the study began (RYAN, E.S., DOW CHEMICAL COMPANY, 1962, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - FEBRUARY 1962," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, MARCH 20).

March 1962 - During routine inspection of Pond 2A, several breaks in the asphalt planking were discovered. Liquid was transferred to Pond 2B using a large portable pump. This was the first transfer using the pump from Pond 2A to Pond 2B. It was also discovered at this time that liquid was leaking beneath the planking, seeping into the drainage tile, and being mixed with water in Pond 1 (RYAN, E.S., DOW CHEMICAL COMPANY, 1962, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - MARCH 1962," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, APRIL 18). Silicate was going to be applied to the soil beneath the leak in the planking; however, as of May 10, 1962, this had not yet been done (RYAN, E.S., DOW CHEMICAL COMPANY, 1962, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - APRIL 1962," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, MAY 10).

July 1962 - Water samples indicated 1.8 microcuries per liter in the spring on the northeast slope of the nitrate pond (RAY, E.L., DOW CHEMICAL COMPANY, 1962, "MONTHLY PROGRESS REPORT - SITE SURVEY - JULY 1962," INTERNAL LETTER TO C.W. PILTINGSRUD, DOW CHEMICAL COMPANY, AUGUST 9).

September 1962 - Work on the removal of Pond 2-Auxiliary begins due to the anticipated construction of Building 779, some of which will be over Pond 2-Auxiliary. The floor of the clay-lined pond was monitored prior to the arrival of construction personnel, with results of up to 5,000 cpm. Waste disposal analyses of soil indicated 11,000 to 75,000 dpm/kg. It was recommended that the soil be removed prior to construction activities (HILL, J.E., DOW CHEMICAL COMPANY, 1962, "MONTHLY PROGRESS REPORT - SITE SURVEY - INDUSTRIAL HYGIENE - SEPTEMBER 1962," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, OCTOBER 2).

October 1962 - The clay lining was removed from Pond 2-Auxiliary. Monitoring indicated low surface contamination (HILL, J.E., DOW CHEMICAL COMPANY, 1962, "MONTHLY PROGRESS REPORT - SITE SURVEY - INDUSTRIAL HYGIENE - OCTOBER 1962," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, NOVEMBER 5).

November 1962 - Monitoring of the "large nitrate pond" indicated 500 to 1,000 cpm direct on the exposed surfaces. Analyses of the salt indicated 1,500 to 2,000 dpm/g. Rebuilding of this pond was pending (HILL, J.E., DOW CHEMICAL COMPANY, 1962, "MONTHLY PROGRESS REPORT - SITE SURVEY - INDUSTRIAL HYGIENE - NOVEMBER 1962," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, DECEMBER 3).

February 1963 - Small cracks were discovered in the asphalt concrete of Pond 2B (specific section not mentioned) (RYAN, E.S., DOW CHEMICAL COMPANY, 1963, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - FEBRUARY 1963," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, MARCH 14).

April 1963 - Relining work on 207A begins with the removal of salts and cleaning of exposed lining (RYAN, E.S., DOW CHEMICAL COMPANY, 1963, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - APRIL 1963," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, MAY 20).

May 1963 - The north section of Pond 207B was pumped as low as possible, and cracks in the sides of the pond were sealed. Forty drums of contaminated aluminum scrap were dumped in Pond 2A. Laboratory studies of evaporation were conducted for development of an evaporation unit for high nitrate aqueous wastes (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - May 1963," Internal Letter to G.E. White, Dow Chemical Company, June 17).

June 1963 - Transfer of Pond 2A contents to Pond 2B with an addition of caustic began. Three trailer loads of caustic were added to Pond 2B, and five trailer loads were added to Pond 2A (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - June 1963," Internal Letter to G.E. White, Dow Chemical Company, July 30).

July 1963 - The transfer of liquids from Pond 2A to Pond 2B was completed. A small heel of remaining acid waste was neutralized by pumping basic wastes from 207B-South to Pond 2A, and then from Pond 2A to the 207B-North. A test of the burning capabilities of Pond 2A lining was made to evaluate it as a method of disposal. The planking was not combustible alone, and required fuel for burning (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - July 1963," Internal Letter to G.E. White, Dow Chemical Company, August 19).

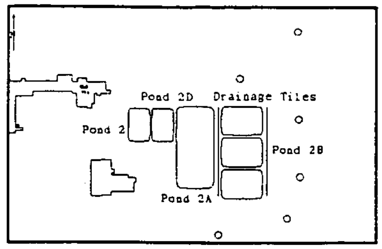
August 1963 - Removal of plank lining and sand sub-grade from Pond 2A began (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - August 1963," Internal Letter to G.E. White, Dow Chemical Company, September 19). Vegetation samples taken from the southwest corner of the "main nitrate pond" indicated 960 dpm/kg (Hammond, S.E., Dow Chemical Company, 1963, "Monthly Progress Report - Site Survey - August 1963," Internal Letter to C.W. Piltingsrud, Dow Chemical Company, September 9).

September 1963 - Removal of asphalt planking and excavation work for 207A re-design was completed (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - September 1963," Internal Letter to G.E. White, Dow Chemical Company, October 16). The planking was disposed of in Trench T-4. The planking contained approximately 16.2 grams of uranium (Freiberg, K.J., Dow Chemical Company, 1973, "Monthly Status Report - Health Physics Operations, Technical and Construction - November 1973," Internal Letter to E.A. Putzier, Dow Chemical Company, December 4). Vegetation samples taken from the northeast corner of the nitrate ponds indicated 310 dpm/kg (Hammond, S.E., Dow Chemical Company, 1963, "Monthly Progress Report - Site Survey - September 1963," Internal Letter to C.W. Piltingsrud, Dow Chemical Company, October 15).

October 1963 - Relining and reforming of Pond 2A began. The pond was to be lined with two asphalt concrete mats (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - October 1963," Internal Letter to G.E. White, Dow Chemical Company, November 14).

November 1963 - The re-design of 207A was completed (Ryan, E.S., Dow Chemical Company, 1963, "History Report - Process Waste Disposal Group - November 1963," Internal Letter to G.E. White, Dow Chemical Company, December 16).

January 1964 - The process waste lines to the asphalt ponds were relocated. This was necessary because of the construction of Building 779 (Ryan, E.S., Dow Chemical Company, 1964, "History Report - Process Waste Disposal Group - January 1964," Internal Letter to G.E. White, Dow Chemical Company, February 13).



March 1964 - Extensions on the Pond 2A discharge pipes were installed, as was a trough from the extensions to the bottom of the pond (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - MARCH 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, APRIL 15).

April 1964 - The coupling of a 1,600 gpm pump at Pond 2A was completed (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - APRIL 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, MAY 18).

May 1964 - Transfer of wastes from 207B-North to 207A was made (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - MAY 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, JUNE 17).

June 1964 - Wastes were transferred from 207B-North and Center to 207A. The exposed portions of Pond 207B were inspected (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - JUNE 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, JULY 29).

July 1964 - Vegetation samples taken from the southwest corner of the west nitrate pond indicate 2,800 dpm/kg (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1964, "MONTHLY PROGRESS REPORT - SITE SURVEY - JULY 1964," INTERNAL LETTER TO C.W. PILTINGSRUD, AUGUST 5).

August 1964 - Vegetation samples taken from the northeast corner of the east nitrate pond indicate 4,500 dpm/kg (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1964, "MONTHLY PROGRESS REPORT - SITE SURVEY - AUGUST 1964," INTERNAL LETTER TO C.W. PILTINGSRUD, SEPTEMBER 8).

September 1964 - A pilot plant evaporator was placed on-line. Trial runs using domestic water were conducted, to be followed by trial runs using Pond 2A water (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - SEPTEMBER 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, OCTOBER 26). Vegetation samples indicated 180 dpm/kg at the southwest corner of the west nitrate pond, and 1,000 dpm/kg east of the south edge of the nitrate ponds (HAMMOND, S.E., DOW CHEMICAL COMPANY, 1964, "MONTHLY PROGRESS REPORT - SITE SURVEY - SEPTEMBER 1964," INTERNAL LETTER TO C.W. PILTINGSRUD, OCTOBER 12).

October 1964 - The sides of 207B-North and Middle were patched using cold patch mastic. Wastes were being pumped to Pond 2A (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - OCTOBER 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, NOVEMBER 16). The sides of 207B-South had not yet been repaired (RYAN, E.S., DOW CHEMICAL COMPANY, 1964, "HISTORY REPORT - PROCESS WASTE DISPOSAL GROUP - NOVEMBER 1964," INTERNAL LETTER TO G.E. WHITE, DOW CHEMICAL COMPANY, DECEMBER 26).

December 1966 - Releases of low nitrate treated wastes from Building 774 were impounded in the asphalt-lined evaporation ponds so that effluent from Building 995 could be used to dilute the nitrates (RYAN, E.S., DOW CHEMICAL COMPANY, 1967, "STATUS REPORT - WASTE DISPOSAL COORDINATION - DECEMBER 1966," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, JANUARY 10).

November 1967 - Twenty-five thousand gallons of waste were taken from Pond 2A and disposed of in the evaporator. Pond 207B-North was repaired, and was expected to be in service in December (MAAS, M.E., DOW CHEMICAL COMPANY, 1967, "PROGRESS REPORT FOR NOVEMBER," INTERNAL LETTER TO K.V. BEST, DOW CHEMICAL COMPANY, NOVEMBER 27).

1968 - 1970 - Lithium scrap was disposed of on the dikes between the evaporation ponds by spraying it with water.

February 1968 - A Fire Department pumper truck was used to spread 250 pounds of "Nigrosine 12525 Acid Black 2" dye into Ponds 2A and 2B in an attempt to increase the evaporation rates. An extra 250 pounds were reserved for later use (MAAS, M.E., DOW CHEMICAL COMPANY, 1968, "PROGRESS REPORT FOR FEBRUARY," INTERNAL LETTER TO K.V. BEST, DOW CHEMICAL COMPANY, FEBRUARY 27).

April 1968 - All wastes were transferred to Pond 207B. Pond 2A was dormant (MAAS, M.E., DOW CHEMICAL COMPANY, 1968, "PROGRESS REPORT FOR FEBRUARY," INTERNAL LETTER TO K.V. BEST, DOW CHEMICAL COMPANY, FEBRUARY 27).

October 1968 - Repairs were made to cracked side walls in 207B-Center with burlap and asphalt. An additional coat of asphalt was also applied to 207B-North (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).

January 1969 - Low-level contamination and salts were blown out and to the east of the solar ponds by high winds (PILTINGSRUD, C.W., 1969, "STATUS REPORT - HEALTH PHYSICS - JANUARY 1969," FEBRUARY 12).

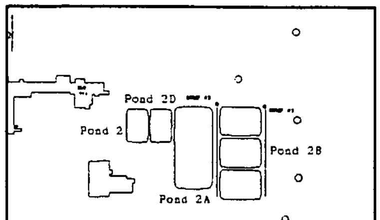
June 1969 - Leakage appeared on the ground surface at the northeast corner of Pond 2B, possibly due to a previous leak in the north and center sections of the pond, which was repaired in 1967(?). Plans were made to transfer the contents of 207B-North and Center to Pond 2A and repair the north and center sections (MAAS, M.E., DOW CHEMICAL COMPANY, 1969, "MONTHLY PROGRESS REPORT - WASTE TREATMENT - JUNE," INTERNAL LETTER TO L.F. GRILL, DOW CHEMICAL COMPANY, JULY 3).

August 1969 - Pond 207B-North was emptied. Burlap was placed in uncovered areas and a coat of asphalt was applied. Another coat of asphalt was to be applied to old and new burlap surfaces by the following month, at which time 207B-North would be returned to service and 207B-Center would be repaired (MAAS, M.E., DOW CHEMICAL COMPANY, 1969, "MONTHLY PROGRESS REPORT - WASTE TREATMENT - AUGUST," INTERNAL LETTER TO L.F. GRILL, DOW CHEMICAL COMPANY, SEPTEMBER 4).

September 1969 - A second coat of asphalt was applied to 207B-North, completing repair. The contents of 207B-Center were transferred to the north section and then to Pond 2A. Burlap and a coat of asphalt were placed in the center section, and a second coat was to be applied the following month (MAAS, M.E., DOW CHEMICAL COMPANY, 1969, "MONTHLY PROGRESS REPORT - WASTE TREATMENT - SEPTEMBER," INTERNAL LETTER TO L.F. GRILL, DOW CHEMICAL COMPANY, OCTOBER 7).

April 1970 - Catch sumps and pumps were installed to return water from the drain tiles to the ponds. Sump No. 1, located at the north end of the drainage tile east of 207B, returned water to

207B-North. Sump No. 2, located at the north end of the drainage tile between Ponds 207A and 207B, returned water to 207A (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).



May 1970 - A soaker hose and pump were installed at the east berm of Pond 207A as an attempt to increase evaporation rates. The new installations would allow water to trickle over the berm. Construction of Pond 207C, a new asphalt-lined pond, began. The pond was to be used to store liquids during repair of the existing ponds (MAAS, M.E., DOW CHEMICAL COMPANY, 1970, "MONTHLY PROGRESS REPORT - WASTE TREATMENT - MAY," INTERNAL LETTER TO L.F. GRILL, DOW CHEMICAL COMPANY, JUNE 10).

June 1970 - Pond 207B-South was emptied for relining (MAAS, M.E., DOW CHEMICAL COMPANY, 1970, "BUILDING 774 - JUNE, JULY PROGRESS REPORT," AUGUST 5). Pond 207C was under construction west of Pond 207A. The "small south nitrate pond" was leaking and thought to be the cause of high nitrate concentrations in North Walnut Creek (FREIBERG, K.J., DOW CHEMICAL COMPANY, 1970, "HEALTH PHYSICS MONTHLY STATUS REPORT - OPERATIONS GROUP TECHNICAL AND CONSTRUCTION - JUNE 1970," INTERNAL LETTER TO E.A. PUTZIER, JULY 9).

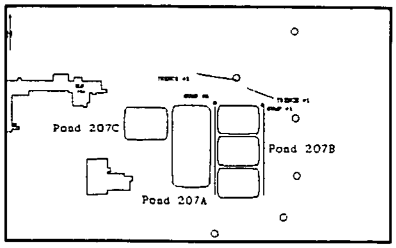
August 1970 - A program to eliminate the use of the solar evaporation ponds was initiated and submitted to AEC (FREIBERG, K.J., DOW CHEMICAL COMPANY, 1970, "HEALTH PHYSICS MONTHLY STATUS REPORT - OPERATIONS GROUP TECHNICAL AND CONSTRUCTION - AUGUST 1970," INTERNAL LETTER TO E.A. PUTZIER, SEPTEMBER 9).

September 1970 - All side walls of Pond 207B-South had been covered with burlap and asphalt (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Paving and earthwork at Pond 207C was completed. Groundwater was seeping into the sump, and this problem was to be resolved prior to sealing the area. Sludge was expected to be removed using liquid from existing ponds to create a slurry which could be pumped, rather than direct removal (FREIBERG, K.J., DOW CHEMICAL COMPANY, 1970, "HEALTH PHYSICS MONTHLY STATUS REPORT - OPERATIONS GROUP TECHNICAL AND CONSTRUCTION - SEPTEMBER 1970," INTERNAL LETTER TO E.A. PUTZIER, DOW CHEMICAL COMPANY, OCTOBER 8).

December 1970 - Pond 207C was placed in service (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).

May 1971 - Test holes were dug and water samples were taken at the location of Trenches 1 and 2 (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Sediment samples taken from 207B indicated up to 10,000 dpm/g uranium and up to 140,000 dpm/g plutonium (PILTINGSRUD, C.W., 1971, "STATUS REPORT - HEALTH PHYSICS - MAY 1971," INTERNAL LETTER TO W.H. LEE, JUNE 10). Direct readings indicated 25,000 cpm. Work using a bulldozer to remove the silt was planned for the area (FREIBERG, K.J., DOW CHEMICAL COMPANY, 1971, "HEALTH PHYSICS MONTHLY STATUS

REPORT - OPERATIONS GROUP TECHNICAL AND CONSTRUCTION - MAY 1971," INTERNAL LETTER TO E.A. PUTZIER, JUNE 9).



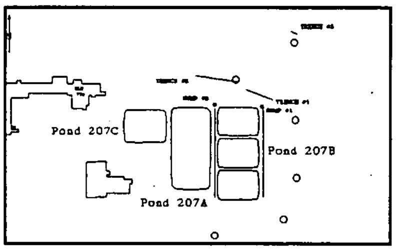
August 1971 - Soaker hoses were installed around the perimeter of Ponds 207A and 207C (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Sludge removal operations were occurring at the evaporation ponds (specific pond not indicated) (PILTINGSRUD, C.W., 1971, "STATUS REPORT - HEALTH PHYSICS - JULY 1971," INTERNAL LETTER TO J.F. WILLGING, AUGUST 10).

October 1971 - All side walls of Ponds 207B-North and Center were covered with Petromat liner and a hydraulic sealant. Catch Trenches 1 and 2 were dug (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Liquid collected in Trenches 1 and 2 went to Sumps 1 and 2, and then to Ponds 207B-North and 207A, respectively (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).

November 1971 - Pond 207B-South was being cleaned (PUTZIER, E.A., 1971, "STATUS REPORT - HEALTH PHYSICS OPERATIONS - OCTOBER 1971," INTERNAL LETTER TO J.F. WILLGING, NOVEMBER 5).

December 1971 - Cleaning of Pond 207B-South continued (PILTINGSRUD, C.W., 1972, "STATUS REPORT - HEALTH PHYSICS INPUT TO OPERATIONS - DECEMBER 1971," INTERNAL LETTER TO J.F. WILLGING, JANUARY 7).

May 1972 - Automatic pump controls were installed in Trenches 1 and 2 (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).



September 1972 - Trench 3 was placed in service (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Liquid collected in Trench 3 was transferred to Pond 207A (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).

October 1972 - The side walls and bottom of Pond 207B-South were relined with Petromat and a hydraulic sealant (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).

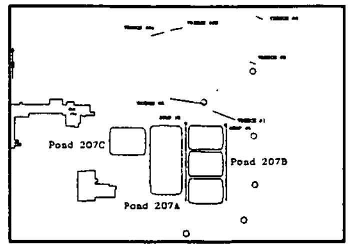
January 1973 - The "nitrate capture trenches located on the hillside north of the process waste holding ponds" were in operation. Water from the trenches was being analyzed and returned to the ponds. Three trenches existed at this time (MAAS, M.E. AND D.E. MICHELS, 1973, "MONTHLY ENVIRONMENTAL PROGRESS REPORT - REMOVAL OF NITRATE FROM SOIL," FEBRUARY?).

April 1973 - Six to ten tons of nitrate leached from the soils north of the evaporation ponds due to high water flows (MAAS, M.E. AND D.E. MICHELS, 1973, "MONTHLY ENVIRONMENTAL PROGRESS REPORT - REMOVAL OF NITRATE FROM SOIL," MAY?).

May 1973 - The trench pumps were turned off because of overloading of the evaporation ponds due to rain (MAAS, M.E. AND D.E. MICHELS, 1973, "MONTHLY ENVIRONMENTAL PROGRESS REPORT - REMOVAL OF NITRATE FROM SOIL," JUNE?).

September 1973 - The side walls and bottom of Pond 207B-North were relined with Petromat and a hydraulic sealant (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10).

April 1974 - Trenches 4 and 5 were placed in service (OWEN, J.B., DOW CHEMICAL COMPANY, 1974, "HISTORY OF 207 SOLAR EVAPORATION PONDS AND NITRATE IN WALNUT CREEK," LETTER TO E.W. BEAN, RFAO, USAEC, APRIL 10). Liquid collected in Trench 5 was transferred to Trench 4, and liquid collected in Trench 4 was transferred to Trench 3 (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).



June 1974 - The Petromat liner of Pond 207B-North was considered to be a problem. Actions were being taken to reline the pond bottom with asphalt concrete three inches thick. A pond leakage study was conducted using Rhodamine WT dye (THOMPSON, M.A., 1974, "PROGRESS REPORT FOR JUNE 1974 - ENVIRONMENTAL SCIENCES AND WASTE CONTROL," INTERNAL LETTER TO H.E. BOWMAN, JULY 12).

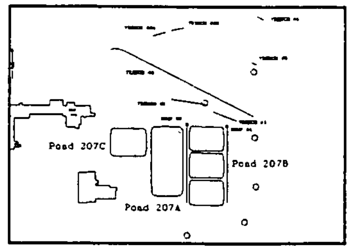
July 1974 - Trench 6 was placed in service. Liquid collected in the trench was transferred to Pond 207A (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1). LIQUID COLLECTED IN THE TRENCH WAS TRANSFERRED TO POND 207A ("EVAPORATOR NOTES & PONDS RECORD," 1978, HANDWRITTEN LOGBOOK, ENTRY OF JULY 8. ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1). Also completed in July was a study to provide for 100% recycle of RFP waters, this study recommended the use of the 207A and 207B solar ponds for storage of water treated through the reverse osmosis system and for storage of treated sanitary effluent awaiting treatment in the reverse osmosis system (ENGINEERING SCIENCE, INC., 1974, AN ENGINEERING STUDY FOR WATER CONTROL AND RECYCLE, PREPARED FOR THE ROCKY FLATS AREA OFFICE OF THE U.S. ATOMIC ENERGY COMMISSION, JULY 21). Future activities related to clean-out and relining of the 207B solar ponds were partly in support of this water recycle project. Following the publishing of this study, once a 207B solar pond was cleaned-out, no further process wastes were placed in the ponds.

September 1974 - An in-depth study including core drilling and soil analysis was initiated. An inventory and maps of nitrate deposits were to be prepared (ILLSLEY, C.T., 1974, "MONTHLY ENVIRONMENTAL PROGRESS REPORT," REPORT FOR SEPTEMBER 1974, OCTOBER?).

October 1974 - An inventory of nitrate deposits northeast of the ponds was in progress (ILLSLEY, C.T., 1974, "MONTHLY ENVIRONMENTAL PROGRESS REPORT," REPORT FOR OCTOBER 1974, NOVEMBER?).

November 1974 - A report of the nitrate inventory in the soil north of the ponds was written (ILLSLEY, C.T., 1974, "MONTHLY ENVIRONMENTAL PROGRESS REPORT," REPORT FOR NOVEMBER 1974, DECEMBER?).

March 1975 - Low level alpha contamination was detected around the perimeter of the solar ponds. It was believed to be caused by the operation of the soaker hose system on the berm of Pond 207A. Soil contamination was also detected on the down-wind side of Pond 207A (Thompson, M.A., 1975, "Progress Report for March 1975 - Environmental Sciences and Waste Control," Internal Letter to H.E. Bowman, April 10).



September 1975 - Cleanout and repair of Pond 207B-North was completed (Kittinger, W.D., Rockwell International, 1975, "Radiation Monitoring - Monthly Report - September, 1975," Internal Letter to E.A. Putzier, Rockwell International, October 10).

April 1976 - Core samples were taken from the solar ponds for the water recycle project (results of the samples were not indicated) (Hornbacher, D.D., Rockwell International, 1976, "Environmental Control Weekly Highlights Week Ending April 9, 1976," Internal Letter to M.A. Thompson, Rockwell International, April 9).

September 1976 - (This may have been in late August 1976.) An unsuccessful trial run was conducted on cleanup of 207B. Contamination was found on and under the liner and in nearby soil. It was thought that an environmental enclosure would be necessary for cleanup activities (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending September 3, 1976," Internal Letter to M.A. Thompson, Rockwell International, September 3). Air monitoring during solar pond cleanup indicated between 0.00102 and 0.17136 pCi/m^3 plutonium concentration (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending October 8, 1976," Internal Letter to Environmental Sciences, October 8).

October 1976 - Eleven core samples were taken from the solar pond area in preparation for the reverse osmosis holding ponds (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending October 22, 1976," Internal Letter to Environmental Sciences, October 22). Fifteen soil samples were also taken during the month to determine contamination levels (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending October 29, 1976," Internal Letter to Environmental Sciences, October 29). Air samples taken during solar pond cleanup during the first half of the month indicated plutonium concentrations ranging from 0.00395 to 0.86791 pCi/m^3 (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending November 5, 1976," Internal Letter to M.V. Werkema, Rockwell International, November 5).

November 1976 - A "crash program" of sampling and direct counting was initiated, providing aid for the completion of the design criteria for the project. The program consisted of coring through the liner and augering into the deeper soil (Hornbacher, D.D., Rockwell International, 1976, "Environmental Analysis and Control Weekly Highlights Week Ending November 5, 1976," Internal Letter to M.V. Werkema, Rockwell International, November 5).

February 1977 - The liner of 207B-North was damaged by high winds, resulting in increased airborne total long-lived alpha concentrations. Water was put in the pond to keep the liner in place (Hornbacher, D.D., Rockwell International, 1977, "Environmental Analysis and Control

WEEKLY HIGHLIGHTS WEEK ENDING FEBRUARY 4, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, FEBRUARY 4). The southeast perimeter of 207C was sandbagged to prevent spillage due to high winds. The liner of 207B-North was weighted down with steel pallets to prevent floatation (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING FEBRUARY 18, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, FEBRUARY 18; HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING FEBRUARY 25, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, FEBRUARY 25).

March 1977 - A recommendation for disposal of 50 liters of toluene containing 20 microcuries of tritium into Pond 207A was made (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL HIGHLIGHTS - WEEK ENDING APRIL 1, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, APRIL 1).

June 1977 - Gravel removal at the solar pond area began. (This may have begun in late May 1977.) Survey of the area during removal operations indicated a high reading of 15,000 cpm (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING JUNE 3, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JUNE 3). A map indicating contamination levels in the vicinity of the solar ponds was prepared (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING JUNE 10, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JUNE 10). Soil removal operations were conducted in the 910 storage yard and along the fence between the solar ponds and the yard using a portable building for manual removal, or a front end loader with a dust suppressant. Air sampling during the activities indicated 0.005 to approximately 0.3 pCi/m^3. Construction of the reverse osmosis building began during this month (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING JUNE 24, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JUNE 24).

July 1977 - Soil was removed from an area south of Pond 207A using a road grader and front end loader (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING JULY 29, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JULY 29).

August 1977 - Activities at Pond 207B-South included water removal, cleaning, and sludge removal. The pallets which had been placed at Pond 207B-North were removed, and cleaning also began at the pond (AUTHOR UNKNOWN, 1977?, "POND CLEAN-UP OPERATIONS," CHRONOLOGY OF POND CLEAN-UP ACTIVITIES FROM AUGUST 17, 1977 TO SEPTEMBER 2, 1977, DATE UNKNOWN).

September 1977 - (This may have been in late August.) An increase in airborne alpha activity was reported during soil removal activities at the solar ponds (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING SEPTEMBER 2, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, SEPTEMBER 2). Air monitoring on September 19 indicated 0.095 pCi/m^3 total long-lived alpha (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING SEPTEMBER 23, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, SEPTEMBER 23). Near the end of the month, air sampling results exceeded the shutdown action level. Cleanup of 207B-North was completed (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING SEPTEMBER 30, 1977," INTERNAL LETTER TO M.V.

WERKEMA, ROCKWELL INTERNATIONAL, SEPTEMBER 30). The water and liner were removed from Pond 207B-North, and cleaning of the pond continued (AUTHOR UNKNOWN, 1977?, "POND CLEAN-UP OPERATIONS," CHRONOLOGY OF POND CLEAN-UP ACTIVITIES FROM AUGUST 17, 1977 TO SEPTEMBER 2, 1977, DATE UNKNOWN).

October 1977 - The highest total long-lived alpha concentration since cleanup activities began, 0.951 pCi/m^3, was measured near a shipping box which was being loaded with soil (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING OCTOBER 7, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, OCTOBER 7). Removal of soil between Ponds 207A and 207B was completed. Removal of soil south of 207B began (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING OCTOBER 17, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, OCTOBER 17). High results during air monitoring were again a problem. Sprinkling over a longer period of time, rather than flooding the area, was recommended, as well as the use of Coherex stabilizer (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1977, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING OCTOBER 21, 1977," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, OCTOBER 21).

March 1978 - Alternate uses of water from the reverse osmosis building and sewage treatment plant were being considered. A proposal for a new pond on the west side of the plant was rejected. The use of spray irrigation was being evaluated (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1978, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING MARCH 23, 1978," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, MARCH 23).

May 1978 - Asphalt from Pond 207B was being removed and boxed. High airborne total long-lived alpha activity was an ongoing problem (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1978, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING MAY 26, 1978," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, MAY 26).

July 1978 - Residual uranium and americium were found in the equalizer between Ponds 207B-Center and 207B-South. The line was cleaned with acid (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1978, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING JULY 28, 1978," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JULY 28).

August 1978 - Lining of Pond 207B-South was near completion (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1978, "ENVIRONMENTAL ANALYSIS AND CONTROL WEEKLY HIGHLIGHTS WEEK ENDING AUGUST 4, 1978," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, AUGUST 4).

January 1979 - Plutonium values of 5.8 to 12.6 pCi/l were detected in Pond 207B-North. This was due to the transfer of sodium hydroxide spillwater from Pond B-1 to Pond 207B-North (BARKER, C.J., ROCKWELL INTERNATIONAL, 1979, "HIGHLIGHTS FOR WEEK ENDING JANUARY 19, 1979 ENVIRONMENTAL ANALYSIS AND CONTROL," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, JANUARY 19).

April 1979 - Release of the caustic spill water in Pond 207B-North into Pond B-2 and A-2 began (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1979, "HIGHLIGHTS FOR WEEK ENDING APRIL 27, 1979 ENVIRONMENTAL ANALYSIS AND CONTROL," INTERNAL LETTER TO M.V. WERKEMA, ROCKWELL INTERNATIONAL, APRIL 27). Plans to run the spill water through the reverse osmosis plant or process it through the sewage treatment plant were not implemented.

May 1980 - Water bubbles appeared under the liner of Pond 207B-South (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1980, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING MAY 16, 1980," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, MAY 16). The pond had been used for storage of sanitary water prior to reverse osmosis treatment, but was drained and cleaned for storage of reverse osmosis treated water for use in the plant's cooling towers. A survey of the liner indicated no smear count, but 50,000 to 500,000 cpm on the west side wall behind the liner, possibly resulting from leakage from Pond 207A. The discovery of leakage delayed approval of use of the water in the plant's cooling towers for fear of contamination (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1980, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING MAY 30, 1980," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, MAY 30).

June 1980 - The source of activity beneath the liner on the west wall of Pond 207B-South was determined to be americium (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1980, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING JUNE 6, 1980," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, JUNE 6).

July 1980 - Salts on the side walls of Pond 207A, resulting from evaporation, had a count of 50,000 cpm (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1980, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING AUGUST 1, 1980," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, AUGUST 1).

September 1980 - Cleanout of Pond 207B-Center began with removal of sand, sludge, tar and debris. Sludge was moved to the northwest corner of the pond for transfer to Pond 207A. Air monitoring prior to the start of cleanup activities indicated 0.06 pCi/m^3 total long-lived alpha (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1980, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING SEPTEMBER 12, 1980," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, SEPTEMBER 12).

April 1981 - The french drain system, located on the hillside north of the ponds, was placed in service. The 6 trenches and 2 sumps were taken out of service. Liquid collected in the drain system would go to the Interceptor Trench Pump House (ITPH) and then be transferred to Pond 207B-North. Periodically, the liquid would be transferred from Pond 207B-North to Ponds 207B-Center and South (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).

July 1981 - Isolated spots of contaminated soil were removed from the berm east of the 207 ponds by hand digging. Soil removal on the east side of the berm was complete. The north side of the berm would be worked on next (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1981, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING JULY 24, 1981," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, JULY 24).

November 1981 - Approximately 1,000 gallons of sewage sludge slurry from the digester and aerator were placed in Pond 207A after a tank truck spilled the material on the ground near the pond. The sewage was pumped from the ground into the pond (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1981, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING NOVEMBER 25, 1981," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, NOVEMBER 30).

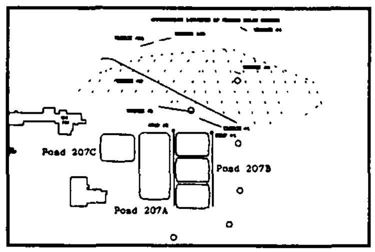
January 1982 - A potential nitrate runoff problem resulting from the hillside seepage below the solar ponds was of concern. Plans were made to construct a collection trench and sump at the base of the hill (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY

HIGHLIGHTS WEEK ENDING JANUARY 8, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, JANUARY 8).

February 1982 - Plans were made to pump high-nitrate water from Pond A-3 to Pond 207B (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING FEBRUARY 19, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, FEBRUARY 19).

April 1982 - (This may have occurred in late February.) Construction activities to expand the nitrate collection system on the south side of the PSZ patrol road began (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING APRIL 2, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, APRIL 2). Spraying of water from 207B-North was conducted at a rate of approximately 89, 445 gallons per acre (HORNBACHER,445 GALLONS PER ACRE. (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING APRIL 23, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, APRIL 23). Note: the area where this spraying was taking place is now known as the West Spray Field, Operable Unit 11. Water for application to the West Spray Field was removed from Solar Ponds 207B-Center and 207B-North. During the time of West Spray Field Operation, Solar Pond 207B-Center contained treated sanitary effluent, while Solar Pond 207B-North contained water collected in the ITPH system (ADVANCED SCIENCES, INC., 1991, "SOLAR POND INTERCEPTOR TRENCH SYSTEM GROUNDWATER MANAGEMENT STUDY, ROCKY FLATS PLANT," TASK 7 OF THE ZERO-OFFSITE WATER-DISCHARGE STUDY, PREPARED FOR EG&G ROCKY FLATS, INC., JANUARY 8).

May 1982 - The new nitrate collection system near the northeast security road was reported to be operating properly (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING MAY 7, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, MAY 7).

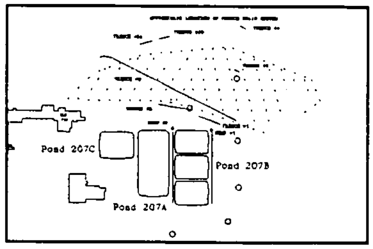


July 1982 - Nitrate concentrations in the solar ponds were as follows: 310 mg/l for Pond 207B-North on July 6; 158 mg/l for 207B-North on July 12; and 250 mg/l for 207B-Center on July 12 (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING JULY 16, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, JULY 16). The valve between 207B-North and Center was repaired to prevent the accidental spraying of water from 207B-North (HORNBACHER, D.D., ROCKWELL INTERNATIONAL, 1982, "ENVIRONMENTAL ANALYSIS WEEKLY HIGHLIGHTS WEEK ENDING JULY 23, 1982," INTERNAL LETTER TO T.R. CRITES, ROCKWELL INTERNATIONAL, JULY 23).

November 1985 - Use of the West Spray Field ended (ADVANCED SCIENCES, INC., 1991, "SOLAR POND INTERCEPTOR TRENCH SYSTEM GROUNDWATER MANAGEMENT STUDY, ROCKY FLATS PLANT," TASK 7 OF THE ZERO-OFFSITE WATER-DISCHARGE STUDY, PREPARED FOR EG&G ROCKY FLATS, INC., JANUARY 8).

October 1986 - Construction of the new pondcreting building was complete (ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).

May 1988 - First spill of pondcrete occurred. This spill occurred on the 904 Pad (ROCKY FLATS PLANT, 1988, "RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NO. 88-001, ROCKY FLATS PLANT, EPA ID NUMBER CO 7890010526," JUNE 7). Other spills of pondcrete occurred after this first spill.



June/July 1988 - Last process waste sludge and water removed from Solar Pond 207A (BLAHA, F.J., ROCKWELL INTERNATIONAL CORPORATION, 1988, INTERNAL MEMORANDUM FROM F.J. BLAHA TO G. HEWITT, JUNE 23; ROCKWELL INTERNATIONAL, 1988, "SOLAR EVAPORATION PONDS CLOSURE PLAN," JULY 1).

August 1989 - The Solar Pond's Interceptor Trench Central Collection Sump Pit overflowed. The water which flowed out of the pit was not recovered, and the water that remained in the pit was pumped to Pond 207B-North. The amount of liquid released to the environment was unknown (U.S. DEPARTMENT OF ENERGY, 1989, "RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NO. 89-012," DATE UNKNOWN).

March 1990 - Levels of established freeboard were exceeded in the 207B Ponds. These levels were set to prevent overflow caused by high winds. No release to the environment occurred. To lower the water level in the 207B Ponds, transfer of approximately 1.3 million gallons was made to Pond 207A. The excess water in Pond 207A was then to be transferred to Building 374 for evaporation (U.S. DEPARTMENT OF ENERGY, 1990, "RCRA CONTINGENCY PLAN IMPLEMENTATION REPORT NO. 90-003," DATE UNKNOWN).

September 1990 - Some seepage, which was not collected by the ITPH because of soil blocking the gravel and disallowing collection of the material, flowed over the eastern extension of the ITPH (EG&G ROCKY FLATS, 1991, "SOLAR PONDS INTERCEPTOR TRENCH SYSTEM GROUNDWATER MANAGEMENT STUDY ROCKY FLATS PLANT SITE," JANUARY 15).

September 1992 - Only limited quantities of water and sediments are present in Pond 207A, all other ponds have considerable quantities of water present.

Note: Add in information regarding SEP IM/IRA Activities
End 1989/begin of 1990 - construction of sprung structures

APPENDIX II.C

DOCUMENT CHANGE NOTICES

This is a CONTROLLED DOCUMENT
This is a RED Stamp

ENVIRONMENTAL MANAGEMENT DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS-F~~D~~O.14, Rev. 2 MS 3-1-93

Title	Date	DCN Number
Field Data Management	~~1/19/93~~ 3-17-93 SERD	93.04 SERD

Expires 3-17-94 SERD   Procedure Revision Required ☒ Yes ☐ No

Scope Limitation: None

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for Additional Spaces)
1	10 of 13	Section 5.7 paragraph (2)	The sentence "At the end of each week...RFEDs Field Module will be backed up onto tape." The end of the sentence should be changed to "backed up onto tape or 3 1/2-inch double sided, high density diskettes."
	11 of 13	Section 5.7 paragraphed (4)	Replace "The computer will be backed up weekly, using a tape drive...," with; "using a taped drive or 3 1/2 diskette...". Replace "At least four weeks of backups...and the tapes..." with; "and the tapes or 3 1/2-inch diskettes..."

DOCUMENT CLASSIFICATION REVIEW WAIVER
PER R.B. HOFFMAN, CLASSIFICATION OFFICE
JUNE 11, 1991

Justification (Reason for Change-Provide Numbers to Reference Corresponding Items Above)
3 1/2-inch diskettes should be equivalent to computer tape for archiving, and diskettes are more available.

Concurrence	Organization	Req	Date	Concurrence	Organization	Req	Date
RT Ogg	Solar Ponds		2/12/93	Dennis Smith	EQS	X	2/17/93
M.C. Broussard	EOM	X	3/2/93	[illegible]	RFEDs	X	2-19-93
[illegible]	QAPM	X	3/16/93	[illegible]	EQS	X	3-1-93

Approval of Responsible Manager	Date	Is Posting Reqd?	If Yes, By What Date?	Date Posted
[illegible]	2-19-93	☒ Yes ☐ No	upon receipt	

ADMIN\FORMS\DCN.6

CONTROLLED DOCUMENT
ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT
This is a RED Stamp

ENVIRONMENTAL MANAGEMENT DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS FO.06 (Rev. 2)

Title	Date	DCN Number
Handling of Personal Protective Equipment	~~1/6/93~~ 2-17-94	93.01 SLRD 3-11-93

Expires 2-17-94 SLRD   Procedure Revision Required ☐ Yes ☐ No

Scope Limitation NONE

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for Additional Spaces)
1	9 of 11	Section 6.2 paragraph (2) Procedures (6) & (8)	Replace (3) mil plastic bags with "(3) mil or (5) mil". Replace double (3) mil plastic bags with "either double (3) mil plastic bags or single (5) mil plastic bags".
	5 of 11	Section 6.0 paragraph (4)	
	4 of 11	Section 5.0 item (10	
	8 of 11	Section 6.2 paragraph (1)	

Justification (Reason for Change-Provide Numbers to Reference Corresponding Items Above)

1) Double (3) mil bags and single (5) mil plastic bags should be approximately equal in the ability to contain contamination.

DOCUMENT CLASSIFICATION REVIEW WAIVER
PER R.B. HOFFMAN, CLASSIFICATION OFFICE
JUNE 11, 1991

Concurrence	Organization	Req	Date	Concurrence	Organization	Req	Date
R T Ogg	Solar Ponds	✓	2/12/93	[illegible]	EQS	X	2/17/93
A L Primm	ES&E	✓	2/17/93	[illegible]	EQS	X	2-17-93
[illegible]	QAPM	✓	2/17/93				

Approval of Responsible Manager	Date	Is Posting Reqd?	If Yes, By What Date?	Date Posted
M.C. Broussard	3/2/93	☑ Yes ☐ No	upon receipt	

ADMIN\FORMS\DCN.7

ENVIRONMENTAL MANAGEMENT
DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS-GT.6 Rev 2

Title	Date	DCN Number
Monitoring Wells and Piezometer Installation	2-4-93 ~~12/24/92~~ MHS	93.03 SEP 2D 5-21000-OPS-GT.06.R2

Expires ~~12/24/93~~ MHS 2-4-94

Procedure Revision Required [X] Yes [ ] No

Scope Limitation OU-4

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for Additional Space)
1	Page 5 of 18 Sect 5.2	2nd Paragraph	ADD AS ~~Replace~~ last Sentence ~~with~~: "Selected piezometer borehole samples will be logged according to SOP GT.1, Logging Alluvial and Bedrock material. The remaining piezometer borehole samples will be field logged."
	7 ~~6~~ of 18 Sect 5.2	~~3rd~~ 1ST Paragraph ~~on page 6 of~~	ADD AS LAST ~~Replace First~~ Sentence ~~with~~: "A 1" inside diameter PVC casing will be completed in a 3¼" inside diameter auger."

Justification (Reason for Change – Provide Numbers To Reference Corresponding Items Above)

1) Four clusters of six piezometers will be completed in the ITS area. The piezometers in a cluster are spaced very closely. Therefore, only the piezometers at each end of the cluster will be logged according to GT.1.

2) Piezometers are constructed for groundwater level measurements only. This completion technique will adequately provide a mechanism to obtain the required DATA

Concurrence	Organization	Req	Date	Concurrence	Organization	Req	Date
[signature]	QAPM	X	1/29/93	[signature]	User	X	12/24/92
[signature]	EOM	X	1/29/93	[signature]	User	X	12/24/92
S. LUKER	EQS		1-26-93	[signature]	EQM	X	1/5/93
				[signature]	EQS	✓	1/8/93

Approval of Responsible Manager	Date	Is Posting Reqd?	If Yes, By What Date?	Date Posted
[signature]	12/24/92	[X] Yes [ ] No	upon receipt	

ENVIRONMENTAL MANAGEMENT DOCUMENT CHANGE NOTICE (DCN)

Procedure Number 5-21000-OPS.FO 10 (Rev. 2)

Title	Receiving, Labeling or Handling Environmental Material Containers	Date 5-11-93 SRPD ~~03/30/93~~ 5/3/93	DCN Number 9303 SRPD

Expires ~~03/30/94~~ 6/3/93 5-11-94 SRPD 5-11-93

Procedure Revision Required ☒ Yes ☐ No

Scope Limitation ~~OU4~~ SNP NONE

Item Number	Page	Step or Paragraph	Changes (Use DCN CONTINUATION SHEET for Additional Spaces)
1	15 of 19	7.2.2 paragraph 2, bullet 4 AM 5/3/93	Replace "Gray drums will be placed on leveled wood pallets containing a maximum of 3 drums at the drilling site." with "Gray drums...containing a maximum of (3) 55-gallon drums or (4) 30-gallon drums at the drilling site.".

Justification (Reason for Change - Provide Numbers to Reference Corresponding Items Above)

1 The (3) drum limit per pallet is intended to safely accomodate 55-gallon drums. (4) 30-gallon drums can be accomodated safely on a pallet and decrease the need for extra pallets.

DOCUMENT CLASSIFICATION REVIEW WAIVER
PER R.B. HOFFMAN, CLASSIFICATION OFFICE
JUNE 11, 1991

Concurrence	Organization	Req	Date	Concurrence	Organization	Req	Date
[signature]	QAPM	X	5/10/93	[signature]	User	X	5/3/93
[signature]	EOM	X	5-7-93	[signature]	EQS		5/3/93
				[signature]	User	X	5/6/93

Approval of Responsible Manager	Date	Is Posting Reqd?	If Yes, By What Date?	Date Posted
[signature]	5/6/93	☒ Yes ☐ No	upon receipt	

APPENDIX II.D

SOLAR EVAPORATION PONDS VISUAL SURVEY REPORTS

DRAFT FINAL

POND 207A VISUAL INSPECTION REPORT

ROCKY FLATS PLANT
SOLAR EVAPORATION PONDS
(OPERABLE UNIT NO. 4)

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

EG&G ROCKY FLATS, INC.
ENVIRONMENTAL MANAGEMENT PROGRAM

MARCH 1993

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APPENDICES

1.0 INTRODUCTION

A visual inspection of the 207 series Solar Evaporation Ponds (Solar Ponds) is required in the Phase I RFI/RI Work Plan for Operable Unit No. 4 (OU4). As described in the Work Plan, the objective of the visual inspection is to identify potential cracks or liner breaches and use the visual survey results to refine planned Phase I borehole locations. Phase I boreholes are intended to be distributed throughout each pond, some in locations observed to be cracked or deteriorated, and some at locations where the liner appears intact. The Phase I Work Plan was written with the assumption that all of the Solar Ponds would be emptied of liquid and sludge, exposing the liners for visible inspection. Developments occurring since Work Plan approval have resulted in a deviation from the planned approach at the Solar Ponds in that only one of the five Solar Ponds has been cleaned out. Pond 207A is the only pond that has been drained and cleaned.

Pond 207A was accessible for the visual inspections that occurred on December 9, 1992 and February 26, 1993. Two visual inspections of the pond were conducted because ice and snow, which covered the northeastern one-third of the pond in the December inspection, melted in mid-February and exposed nearly all the remaining liner for the second inspection. The results of the visual survey were supplemented with a pilot geophysical survey in Pond 207A using Ground Penetrating Radar (GPR) technology. The GPR survey was conducted to locate potentially buried objects, but variations with GPR antennae were attempted to also define lithology and survey the integrity of the pond liner. A separate report has been prepared for the geophysical survey, but applicable findings from the survey are included in this report. The remaining Solar Ponds contain liquid and they were not inspected during the visual surveys.

2.0 HISTORY AND CONSTRUCTION

Pond 207A is approximately 250 feet by 525 feet at the crest. When operating at its maximum allowable level, the ponds' liquid covers an area approximately 230 feet by 505 feet. This corresponds to a surface area of approximately 116,200 square feet (about three acres). The maximum operating depth is approximately 7-1/2 feet corresponding to a maximum waste volume of about 5,050,000 gallons (Rockwell International, 1988).

Pond 207A was placed in service in August 1956. The original construction consisted of asphalt planking approximately one-half inch thick. Figure 2-1 is a photograph taken in May 1956 which depicts the original liner installation. It is believed that Pond 207A entered service shortly after construction.

Pond 207A was redesigned in November 1963 and the asphalt planking was replaced with approximately a four inch thickness of asphaltic concrete and tack coats. The asphaltic concrete was applied in two 1-1/2 inch lifts, adhered with asphalt tack coat. The slopes of both the pond bottom and the pond sides were significantly modified in this redesign. Based on these modifications, the bottom slope of the pond drained to a sump at the northeast end of the pond, and the side slopes, which had been 1:2, were changed to 1:3.7.

The side slopes of Pond 207A were relined in the Fall of 1988 to repair cracks in the side slopes as part of the closure operations. This relining consisted of a minimum of one-eighth inch thick, rubberized, crack-sealing material laid over the side slopes of the pond. Relining was performed to minimize potential leakage from the pond in preparation for the transfer of pumped-back ground water into the pond for evaporation.

Pond 207A is believed to have contained liquid almost continuously from its redesign and construction in 1963 through pond cleanout in Summer 1988. The pond was believed to have remained dry after cleanout and was exposed to the weather from approximately July 1988 to June 1990. It again held water after June 1990, and then was drained and cleaned in Fall 1992.

3.0 FINDINGS

The liner inspections where conducted in Pond 207A on two separate occasions, on December 9, 1992, and again, on February 26,1993. The weather conditions during both inspections were cold and clear.

On December 9, 1992 approximately two-thirds of the liner was exposed for visual inspection. The northeast one-third of the pond was covered with ice and snow-covered ice. The pond was inspected by entering the pond from the approximate midpoint of the western edge, walking south to the southern edge, east to the eastern edge, and northwest to the northern end, following the edge of the ice. Several photographs were taken, and color photo copies most representative of pond conditions are in Appendix A. Photograph numbers correspond to the film exposure number, which started at exposure 10.

On February 26,1993 the pond liner was inspected after the ice and snow-covered ice had melted. The pond was inspected by entering from the midpoint of the western edge, walking toward the northern edge, walking toward the northeastern corner, near the sump and lowest area of the pond, and then walking back and forth between the eastern and western edges of the pond, inspecting all areas previously inaccessible due to ice and snow. The area in the northeastern edge of the pond surrounding the sump was observed to have standing water approximately four inches deep.

Results of the visual surveys are depicted on Figure 3-1. Figure 3-1 is a sketch of the pond which includes approximate locations of cracks, mud-cracked, breached, or bubbled areas, and vantage points from which photographs were taken.

The uppermost layer of pond liner material was observed to be cracked extensively and otherwise deteriorated throughout most of the area inspected. The northeastern one-third of the pond liner exhibiting the least amount of crackling and bubbling, and the western and southern two-thirds of the pond liner and slanting berm slopes exhibiting the most extensive crackling and bubbling. Bubbles and crackling in the liner are believed to be caused by thermal/UV deterioration during periods when the liner was exposed. Several long continuous cracks were observed in the liner, apparently caused by moving vehicles. Tire track imprints were also observed, but no breaching of the liner was associated with these imprints. Many of the long continuous cracks have deteriorated, causing localized widening and exposing significant portions of the underlying liner. Some of the mud cracks and longer cracks were observed to have soil underneath, although it is unknown if this soil was residual solids in the pond sludge that were unable to be removed during pond cleanout. Mud cracking was observed to be dominant along the slanting berms which had been exposed to the heat of the sun for a longer time.

Visual observations of the Pond 207A liner did not allow conclusive identification of obvious liner breaches because it was unable to be determined if observed cracks extended through the underlying asphaltic concrete. The visual results were therefore compared to results from a pilot geophysical study using GPR technology. The GPR survey was conducted in visually deteriorated and relatively intact areas of the pond, and showed indications both of severe cracks and subsurface liner deterioration in areas visually observed to be deteriorated. In less visually disturbed areas, fewer indications of liner deterioration were noted. Results of the geophysical survey are presented in a separate report, although both this visual survey report and geophysical survey report will be incorporated into the OU4 Phase I RFI/RI Report.

4.0 RECOMMENDATIONS

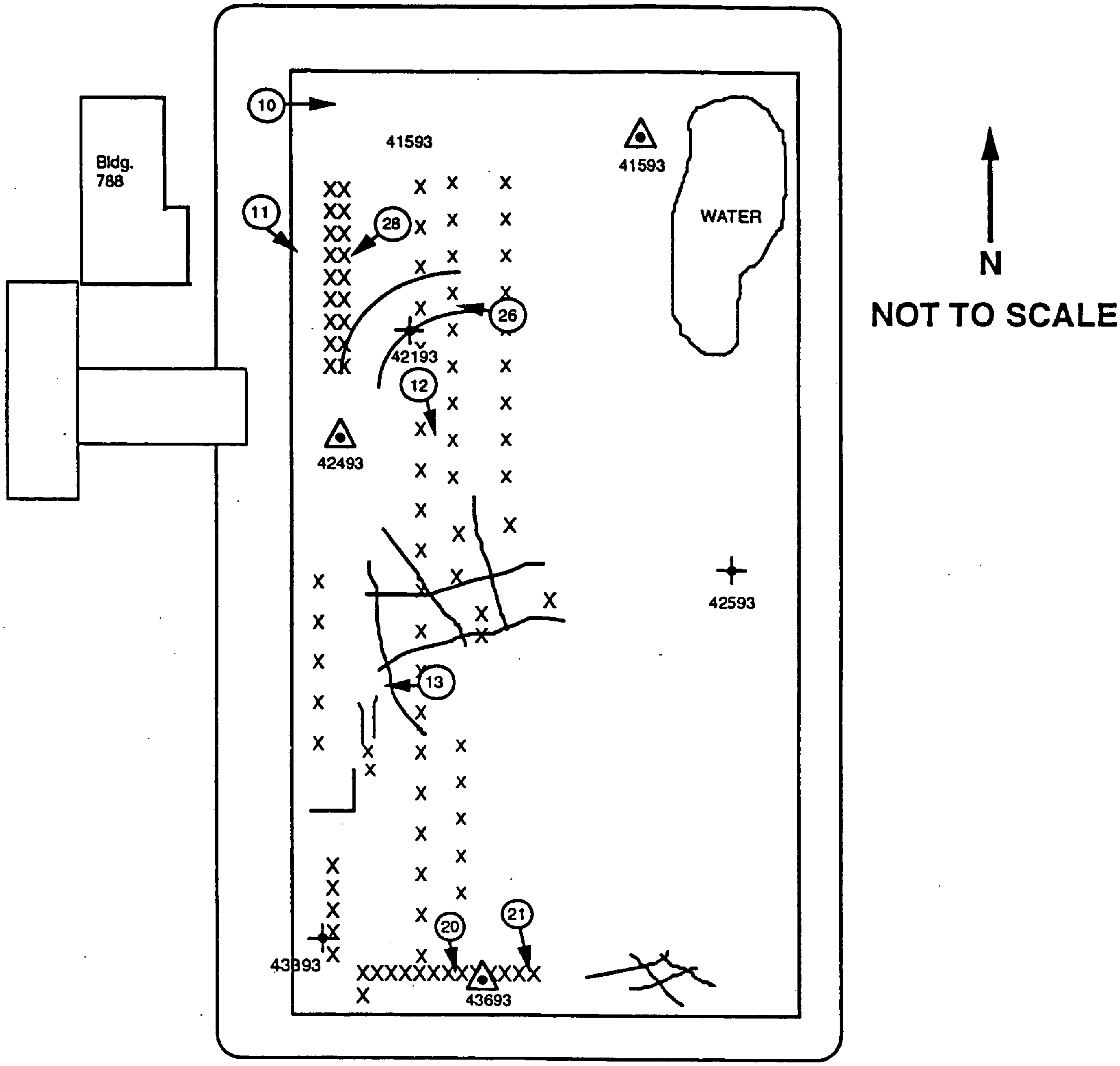
Borehole locations are specified in the Phase I RFI/RI Work Plan to coincide with cracked and uncracked locations in the liner to investigate the possibility of contaminant migration from the pond sludge and liquids into the subsurface. The visual survey confirmed that there were visibly deteriorated and potentially cracked areas, and the geophysical survey generally confirmed that subsurface deterioration coincided with visual surface deterioration. Based on the visual and geophysical survey, the six proposed borehole locations as shown in OU4 Technical Memorandum No. 1 have been relocated into three of the most damaged locations and into three areas considered to be relatively intact. The resulting borehole locations in Pond 207A are shown on Figure 3-1. These locations supersede those shown in Phase I RFI/RI Work Plan maps and maps in Technical Memorandum No. 1, Vadose Zone Investigation. Relocation of these boreholes is documented in Technical Memorandum No. 2, Modifications to Field Activities.

5.0 REFERENCES

Rockwell International, 1988. "Solar Evaporation Ponds Closure Plan", U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, July 1, 1988, Volume I.

FIGURE 2-1

POND 207-A ORIGINAL CONSTRUCTION OF ASPHALT PLANKING (MAY 1968)



12 = Camera Vantage Point and Exposure Number

x = Mud Crack or Bubbling

= Distinct Individual Crack

43693 = Proposed Vadose Zone Borehole Location

43393 = Proposed Borehole Location

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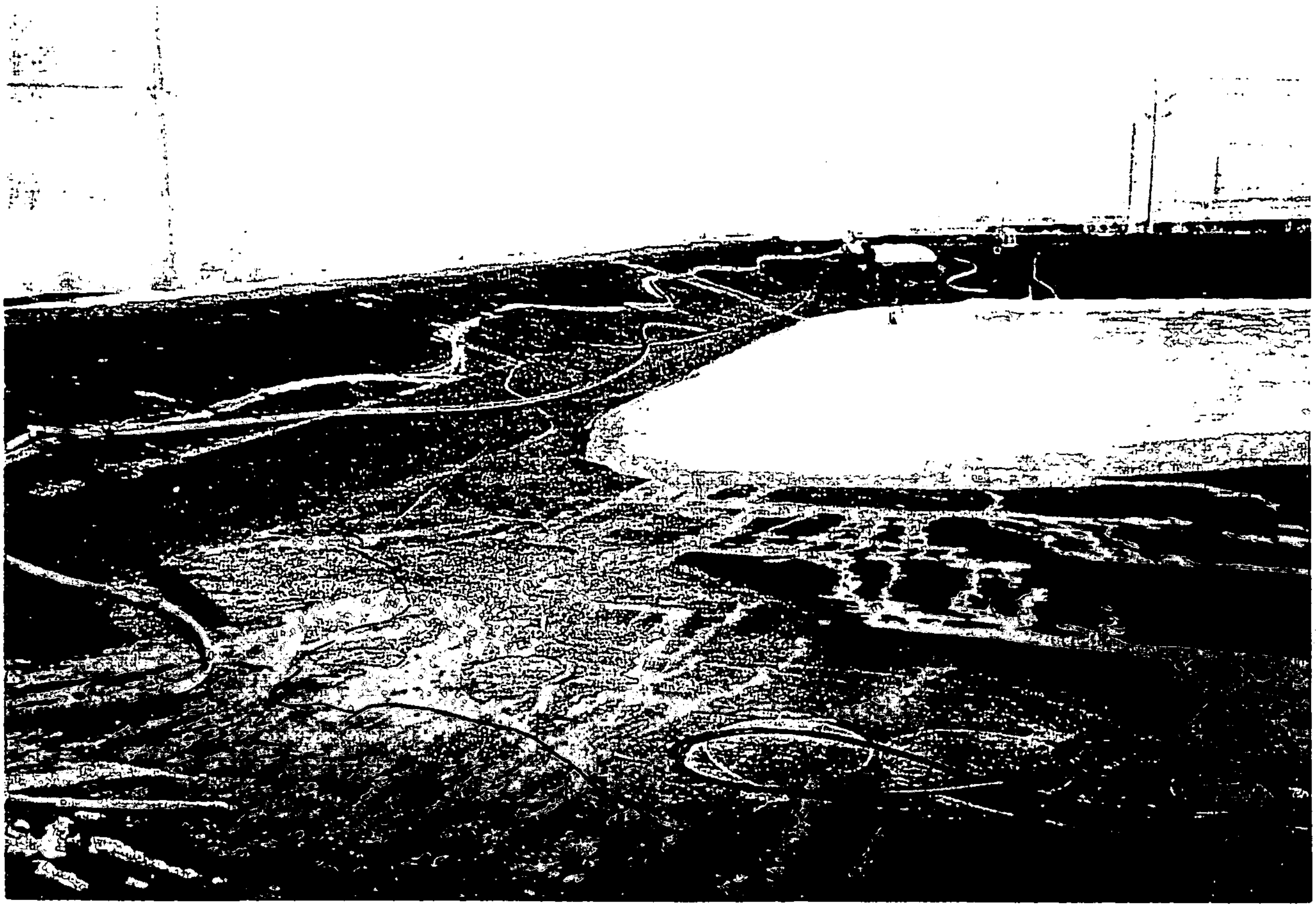
ROCKY FLATS PLANT
GOLDEN, COLORADO

FIGURE 3-1
POND 207A VISUAL INSPECTION
DECEMBER 9, 1992 and FEBRUARY 26, 1993

REVISION: 1
FILE NAME: McD207Afg1
DATE: 03/08/93
DRAWN BY: JAL
APPROVED BY:
CHECKED BY:

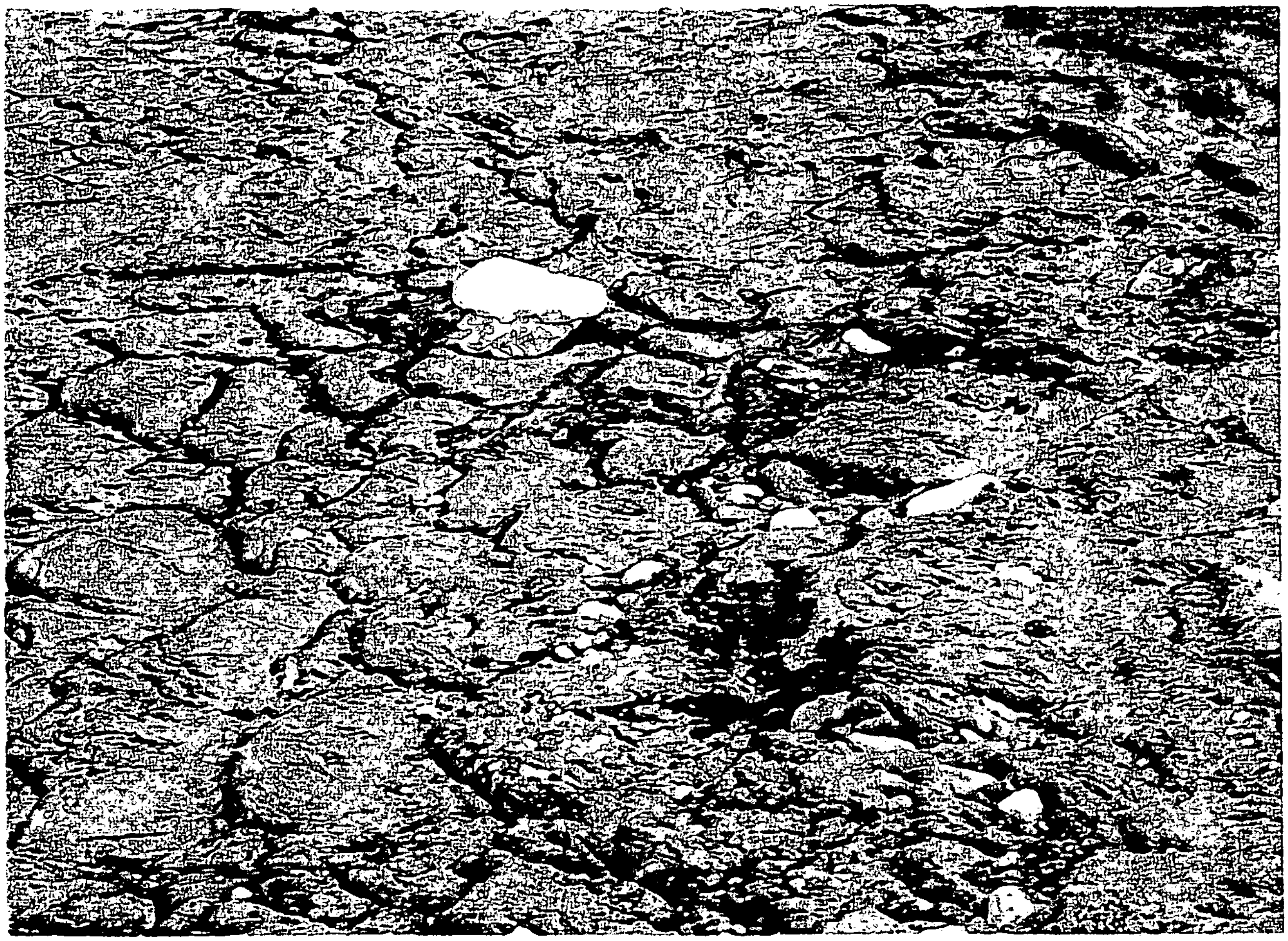


PHOTOGRAPH NO. 10

PHOTOGRAPH NO. 11

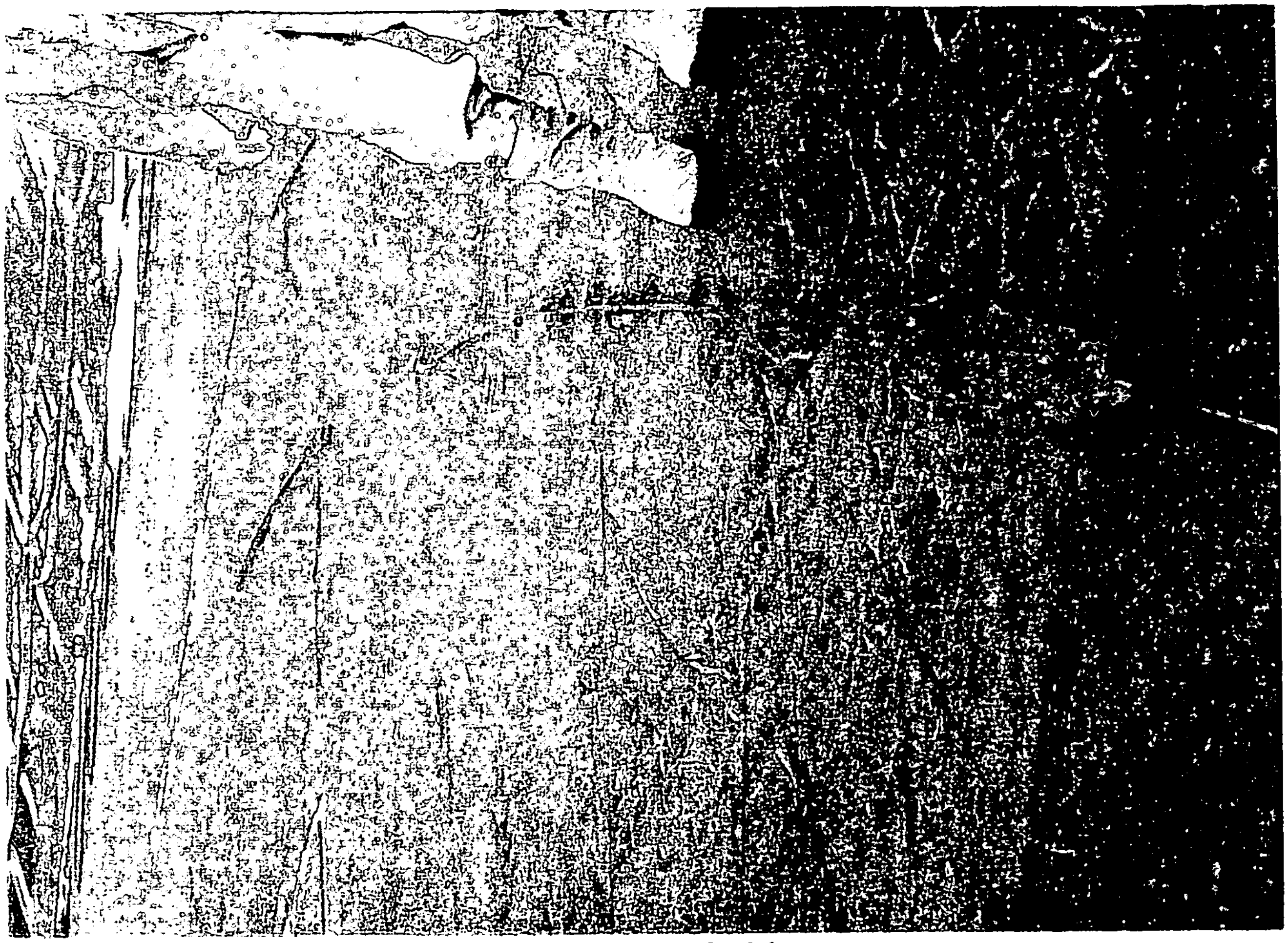
PHOTOGRAPH NO. 12

PHOTOGRAPH NO. 13

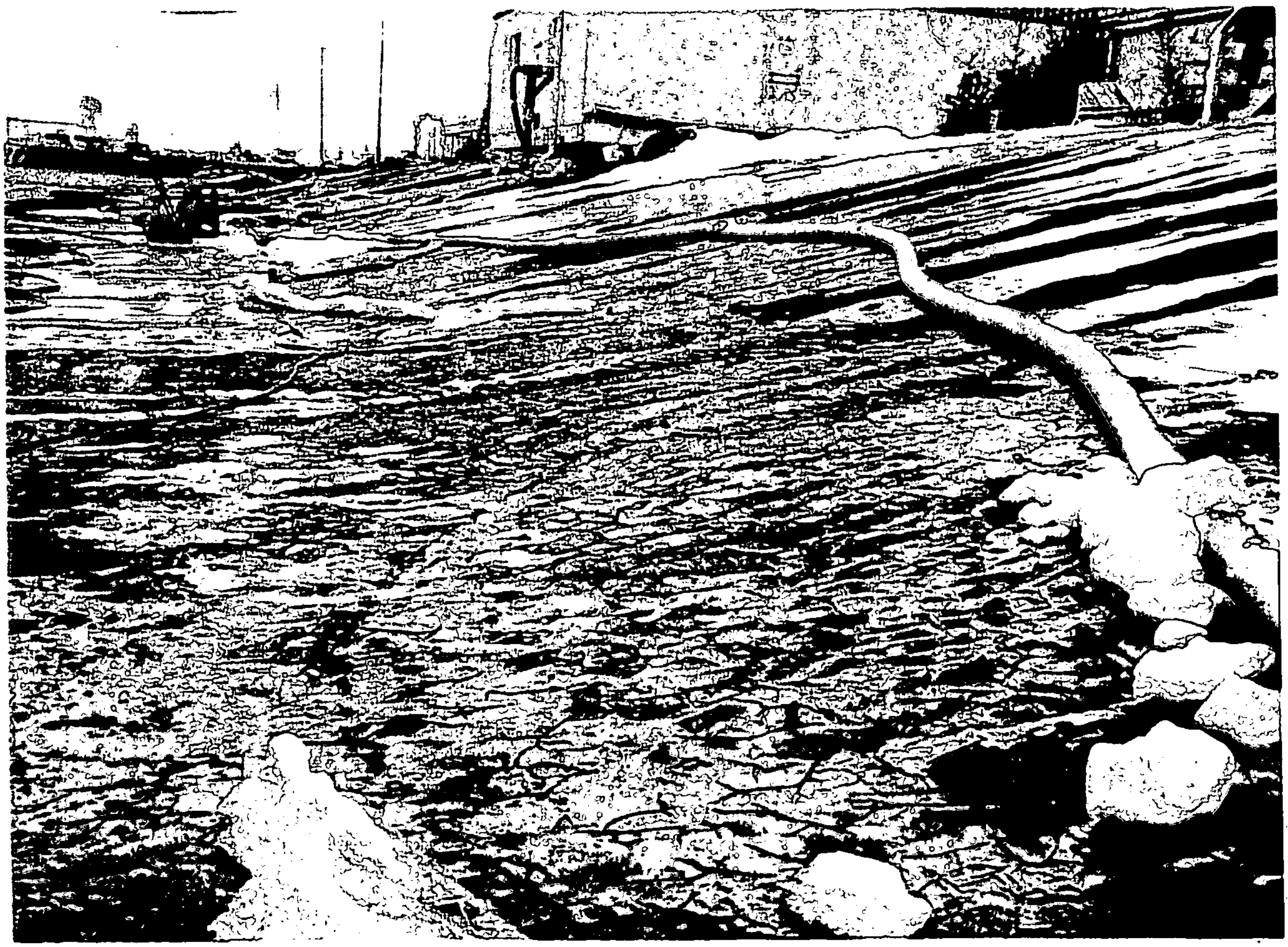


PHOTOGRAPH NO. 20

PHOTOGRAPH NO. 21



PHOTOGRAPH NO. 26



PHOTOGRAPH NO. 28

DRAFT

POND 207-B CENTER AND 207-B North VISUAL INSPECTION REPORT

ROCKY FLATS PLANT
SOLAR EVAPORATION PONDS
(OPERABLE UNIT NO. 4)

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

February, 1994

R9-18-7

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LIST OF FIGURES

1.0 INTRODUCTION

A visual inspection of the 207-B North pond and 207-B Center pond asphaltic liner was conducted on September 1, 1993 and required approximately two hours to complete. Weather conditions were warm and clear during the inspection. Pond 207-B North was inspected first followed by pond 207-B Center. The visual inspection was conducted by walking around the perimeter of the ponds and on the pond floor. Access to the pond floor was via stairs located at the east side of the ponds.

An EG&G photographer was present to take documenting photographs of the pond liner condition. Photographs were taken from the pond corners, pond sides and from the pond floor. Close up photographs provide details of typical liner conditions. A total of 37 photographs were taken; 18 in the Pond 207-B North and 19 in Pond 207-B Center. North Pond photographs are on EG&G film roll #45142 and Center pond photographs are on roll #45141. Eight photographs from each pond were selected for inclusion into this report to document typical pond liner conditions. Detailed captions for the photographs are provided in Tables 1 and 2. Schematic maps of the ponds are provided in Figures 1 (North Pond) and Figure 2 (Center pond). Information on the maps includes camera vantage points and photograph numbers, approximate borehole locations and general information on liner conditions.

2.0 POND LINER CONDITION

The following provides a description of general and specific observations made during the visual survey of the 207-B ponds.

2.1 General Observations

The liners on ponds 207-B North and 207-B Center are in a deteriorated condition. The liner surface is rough and irregular. A tar tack coat, originally applied as a seal over asphaltic concrete, is missing from most areas of the pond floor. A pattern of thin, shallow cracks is typically present on areas of bare asphaltic concrete where the tar tack coat is missing. Where the tar tack coat is present the liner surface is typically rough and irregular and no longer smooth. Sketch maps of ponds 207-B North and 207-B Center are provided in Figures 1 and 2. Included on the maps are camera vantage points, photograph numbers, approximate borehole locations and notes on general liner conditions.

Several potential breaches in the liner were noted during the initial inspection and during subsequent trips into the ponds. Potential liner breaches were noted on the pond floor where cobbles are pressed down into the asphaltic concrete. Borehole 46693 in Pond 207-B North is located next to cobbles pressed into the liner. Borehole 46993 in Pond 207-B Center was originally located next to a cobble pressed into the liner; however, it was moved to a location where the liner was intact due to drilling difficulties.

Potential liner breaches on the berm slopes were noted in both ponds, however the 207-B Center pond berm slopes are more extensively cracked than the 207-B North pond berm slopes. The berm slopes on both ponds appear to have a more recently installed fabric material and tar tack coat than the pond floor.

The berm slopes in Pond 207-B North are in relatively good condition except for one area of loose fabric on the south berm slope and another area with a sheet metal patch on the north berm slope, near the northeast corner. Berm slopes in Pond 207-B Center are in a deteriorated condition with numerous obvious cracks that extend down to soil. Weeds are growing through many of the cracks in Pond 207-B Center.

2.2 Specific Observations at Pond 207-B North

General overview photographs of Pond 207-B North are provided in Figures 3 and 4. These photographs show the drained and cleaned ponds with patchy discoloration on the pond floor and white staining on the berm slope marking high and low water levels. Also visible in these photographs are heater soaker hoses at the top of the berm slope on the west, south and north sides and access stairs located at the southeast pond corner. Figure 5 illustrates the patchy, irregular condition of the pond liner with light color areas where the tar tack coat is missing and darker color area where the tar tack coat is present.

Figure 6 shows the area where the berm slope and pond floor meet. The berm slope has a more recently installed fabric liner and tar tack coat present and is in better condition than the pond floor. The patchy irregular pond floor condition with tar tack coat and bare asphalt is visible in the photograph.

Figure 7 illustrates conditions near the southwest corner of Pond 207-B North and shows details of the patchy, irregular liner condition and circular indentations presumed to be marks left by barrels. A sheet metal patch, located on the berm slope near the northeast corner of the pond, is present as shown in Figure 8. It is unknown what the patch is covering and if this area is a potential breach in the liner.

Torn and loose fabric liner from the south berm slope is shown in Figure 9. Only the top layer of this fabric liner appears to be loose and an obvious liner breach is not indicated at this location. Figure 10 shows a cobble indented into the pond liner. It is unknown if the cobble is pushed completely through the liner. No subgrade roadbase material is visible around the cobble indicating that the cobble has not breached the liner. Borehole 46693 is located at a spot where another cobble has been pushed into the liner.

The pond berm slopes at Pond 207-B North are typically smooth with no obvious liner breaches. The most obvious liner deficiencies exists on the south side berm slope where the fabric liner is ripped loose and on the berm slope near the northeast corner at the sheet metal patch.

During subsequent drilling activities on November 4, 1993, a circular hole approximately 4 inches in diameter was noted in the extreme southwest corner of the pond near the drain pipe. It is unknown if the hole extends through the asphalt liner. Borehole 46593 is located approximately 40 feet from this hole.

2.3 Specific Observations at Pond 207-B Center

Overview photographs showing the general condition of Pond 207-B Center are provided in Figures 11 and 12. These photographs show weeds growing on the berm slopes on the east, north and west sides of the ponds. The weeds are growing through cracks that extend through to soil. Cracks of the same magnitude are also present on the south side berm slope as shown in Figures 13 and 14. The cracks are present above a line approximately one half way between the bottom and top of the berm slope which corresponds to white mineralization discoloration and high and low water marks. Soil is visible through the liner cracks shown in Figure 14.

Figure 15 shows general pond floor conditions and the south berm slope. The patchy, irregular color of the pond floor and light brown residual dirt in the foreground can be noted in the photograph. Details of the pond floor showing the patchy, irregular liner condition with ripped up clumps of tar tack coat are shown in Figure 16. The northeast pond corner is shown in Figure 17. Weed growth is through cracks in the liner approximately one half way up the berm slope and torn, loose fabric liner on the berm in the corner of the pond can be seen in the photograph. Stairs provide access to the pond floor.

Details of the pond floor and berm slope area are shown in Figure 18. The berm slope with more recently installed fabric liner and tar tack coat is visible in the upper one third of the photograph. The pond floor with bare asphalt (note aggregate) and tar tack coat is visible in the lower two thirds of the photograph.

3.0 SUMMARY

The liners on Ponds 207-B North and 207-B Center are in a deteriorated condition. A tar tack coat, originally applied as a seal over asphaltic concrete, is missing from most areas of the pond floor. The liner surface in some areas has a rough, irregular texture due to ripped up clumps of tar tack coat. In other areas the liner surface is smooth where the tar tack coat is missing and bare asphalt remains.

Obvious liner breaches, in the form of cracks extending through to soil, are present on the berm slopes of Pond 207-B Center. A sheet metal patch, and an area of loose liner fabric on the berm slopes of pond 207-B North may cover potential liner breaches. Potential liner breaches also exist on the floors of both ponds where cobbles are imbedded into the asphalt. A circular hole of unknown depth near the southwest corner of pond 207-B North is another potential liner breach. Results of the visual inspection were used to place borehole locations. Some boreholes were placed near potential liner breaches and other boreholes were placed where the liner appeared to be intact.

Table 1
Photograph Captions
Pond 207-B North
September 1, 1993
EG&G Media Arts Roll Number 45142

Figure 3. Photograph #1. View from Northwest corner, view to the southeast. General view of pond, note discoloration of liner, white staining at liquid high water line. Note: Drain/fill pipe extending to bottom of pond. Note heater/soaker pipes in foreground, extending to left side photo.

Figure 4. Photograph # 4. View from northeast corner, view to southwest. General view of pond, note discoloration of liner, white staining at liquid high water line. Note heater/soaker pipe at right side photograph. Note drain pipe at far southwest corner of pond.

Figure 5. Photograph # 5. View from pond center, view to west. General view of pond, note irregular condition of liner surface consisting of bare asphalt with missing tar tack coat (light color areas) and patches with tar tack coat intact (black areas).

Figure 6. Photograph #9. Detail view, north side of pond at berm slope/ pond floor interface. Lower third of photograph shows berm slope with intact tar tack coat. Upper two-thirds of photograph shows pond floor with patchy, remnant tar tack coat and bare asphalt. Note thin shallow cracks in bare asphalt at upper edge of photograph.

Figure 7. Photograph # 12. Detail view, at southwest corner of pond. Note rough, irregular surface consisting of remnant tar tack coat. Note circular marks, presumably from barrels.

Figure 8. Photograph # 17. Detail view, at northeast corner, view to north. Sheet metal patch secured by nails. Note also heater/ soaker hose at top of berm and white discoloration.

Figure 9. Photograph # 14. Detail view at south-center part of pond, view to south. Torn, loose fabric liner on berm slope.

Figure 10. Photograph # 18. Detail view near northwest corner of pond. Cobbles pressed down into asphalt liner. Long axis of largest cobble approximately 4 inches. Tar tack coat missing in this area as evidenced by aggregate visible in asphalt.

Table 2
Photograph Captions
Pond 207-B Center
September 1, 1993
EG&G Media Arts Roll Number 45141

Figure 11. Photograph #3. View from southwest corner, view to northeast. General view of pond. Note discoloration of liner including white staining at level of water level fluctuations. Green staining at southwest corner of ponds presumed to be residual water dye. Note weeds growing through cracks in loner at approximate high water mark on east and north sides of pond.

Figure 12. Photograph #2. View from southeast corner, view to northwest. General view of pond. Note discoloration of liner and weed growth.

Figure 13. Photograph #5. View from north side, center, view to south. General view of pond. Note patchy, irregular condition of pond liner. Weeds not present on south berm slope of pond.

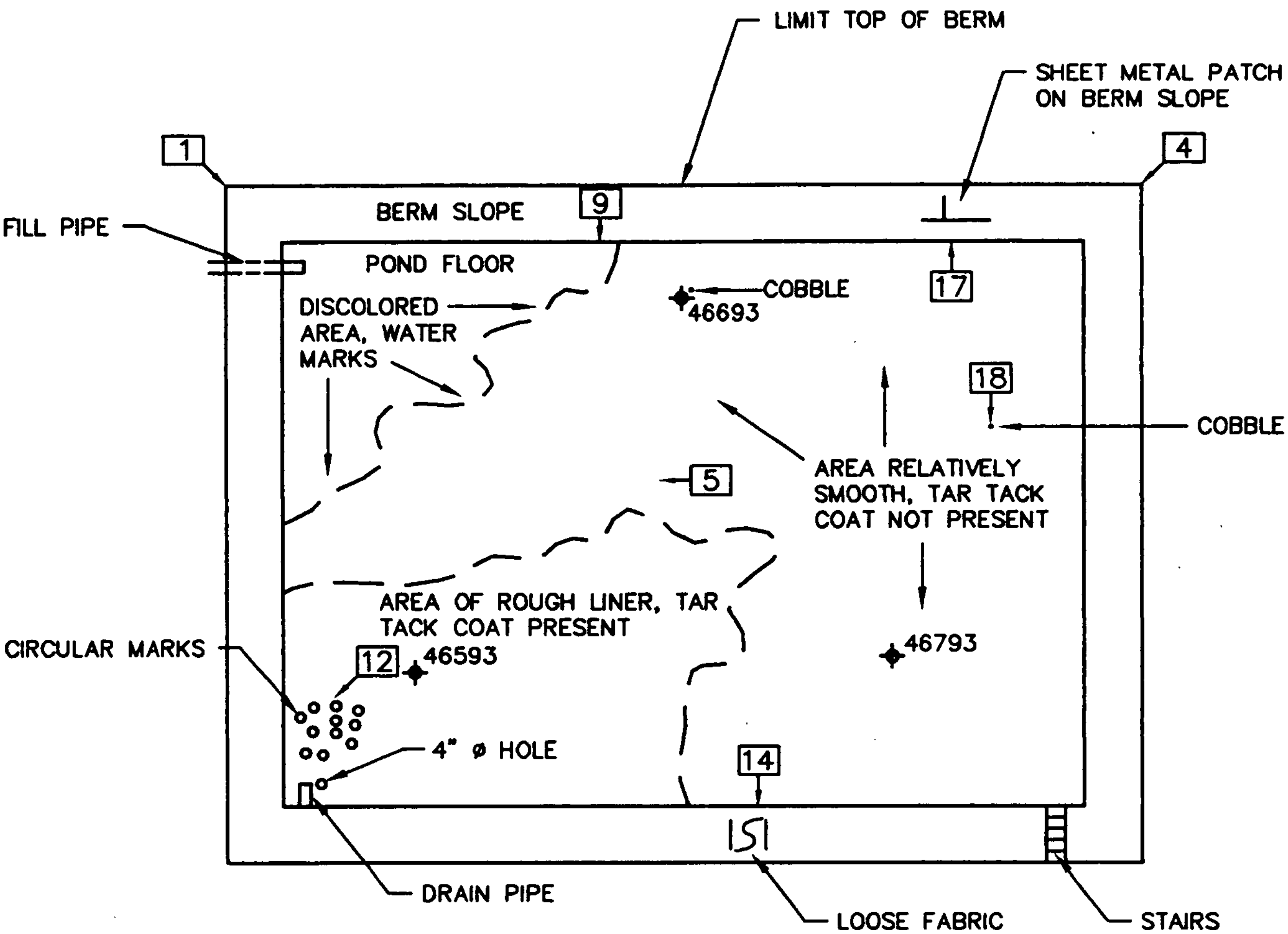
Figure 14. Photograph #17. View from northeast corner of pond, view to southwest. Note irregular condition of liner, with patched of bare asphalt mixed with areas of partially torn up tar tack coat.

Figure 15. Photograph #16. View from northeast corner, view to northeast. Note abundant weed growth along berm slope and torn fabric liner at corner of pond.

Figure 16. Photograph #11. Detail view at south side of pond. Upper one-third of photograph is berm slope with fabric liner and intact tar tack coat. Lower two thirds of photograph is pond floor with bare asphalt (as evidenced by visible aggregate) and tar tack coat (no aggregate visible).

Figure 17. Photograph #10. Detail view at south side pond berm slope. Note cracks in liner, white staining at former water level and evidence of tar tack coat flowing down slope in lower part of photograph.

Figure 18. Photograph #9. Detail view at south side pond, on berm slope. Note cracks through liner.



Not To Scale
(Approximately 1"=50')

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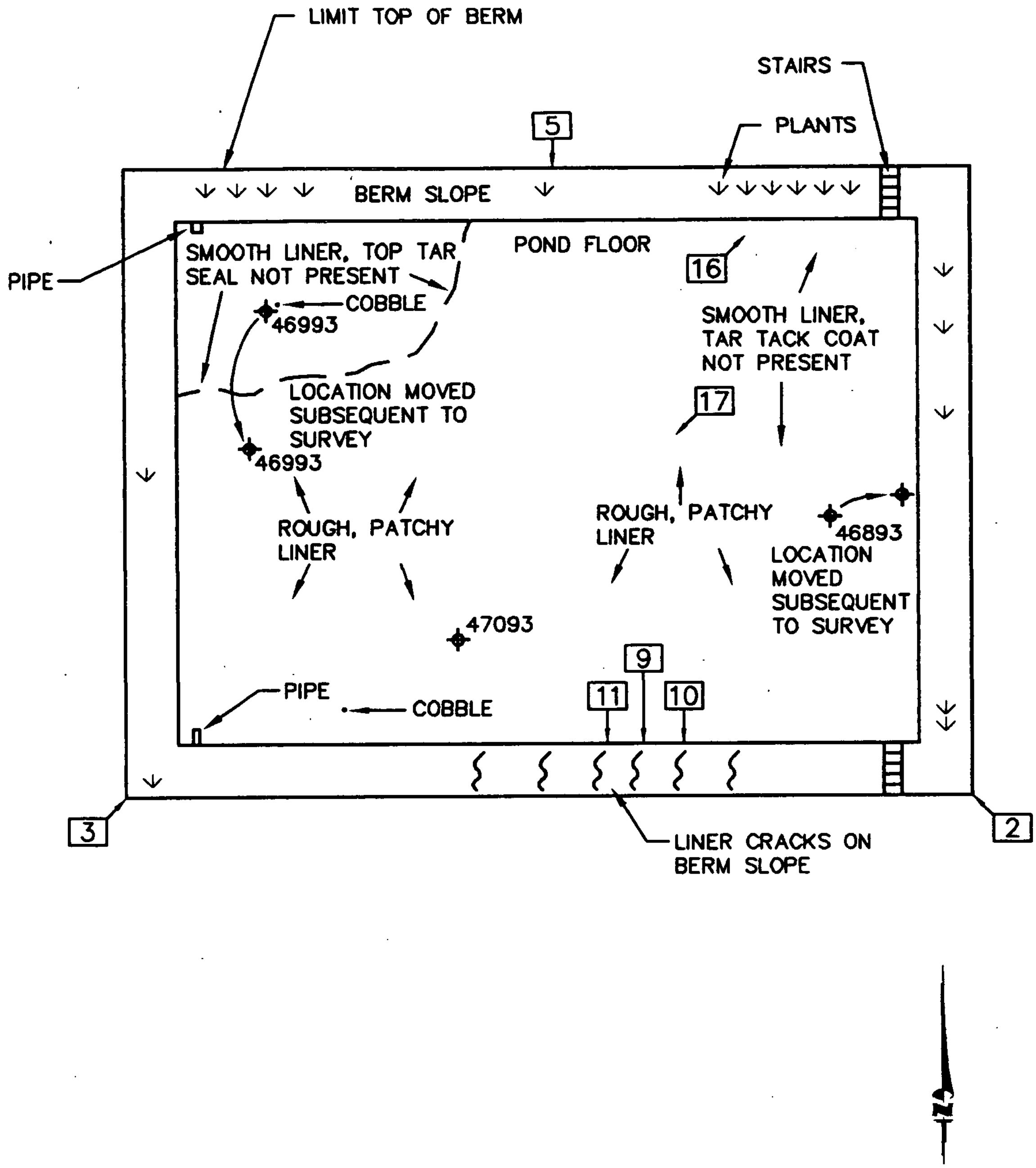
GOLDEN, COLORADO

Figure 1

OU4 Phase I RFI/RI
Sketch of Pond 207-B North
Visual Survey Results

1 Camera Vantage Point and Photograph Number (EG&G Roll No. 45142)

46793 Approximate Borehole Location



Not To Scale
(Approximately 1"=50')

1 Camera Vantage Point and Photograph Number (EG&G Roll No. 45142)

47093 Approximate Borehole Location

PREPARED FOR
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

Figure 2

OU4 Phase I RFI/RI
Sketch of Pond 207-B Center
Visual Survey Results

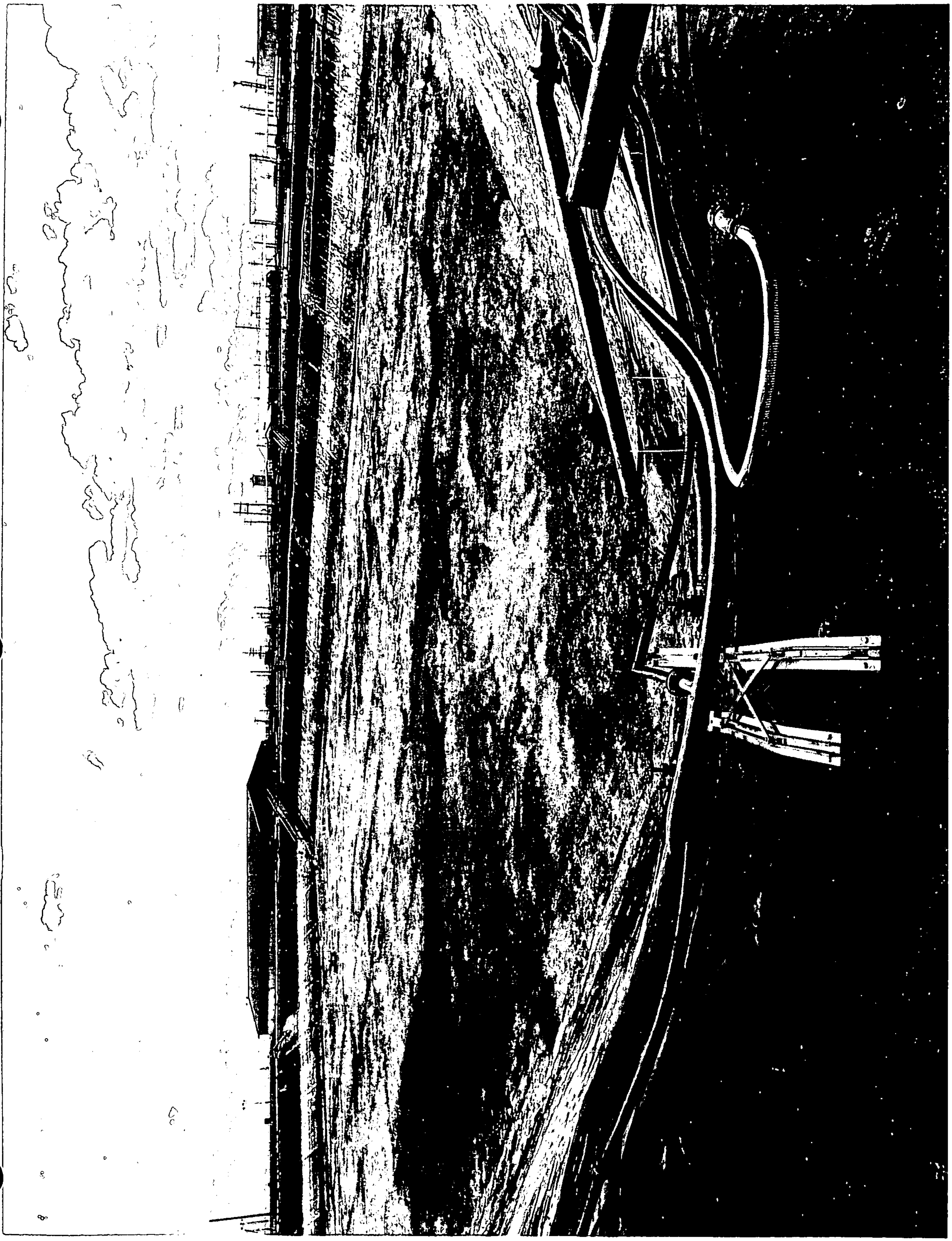


Figure 3

Photograph No. 45142-01
General View Pond 207-B North,
View to Southeast

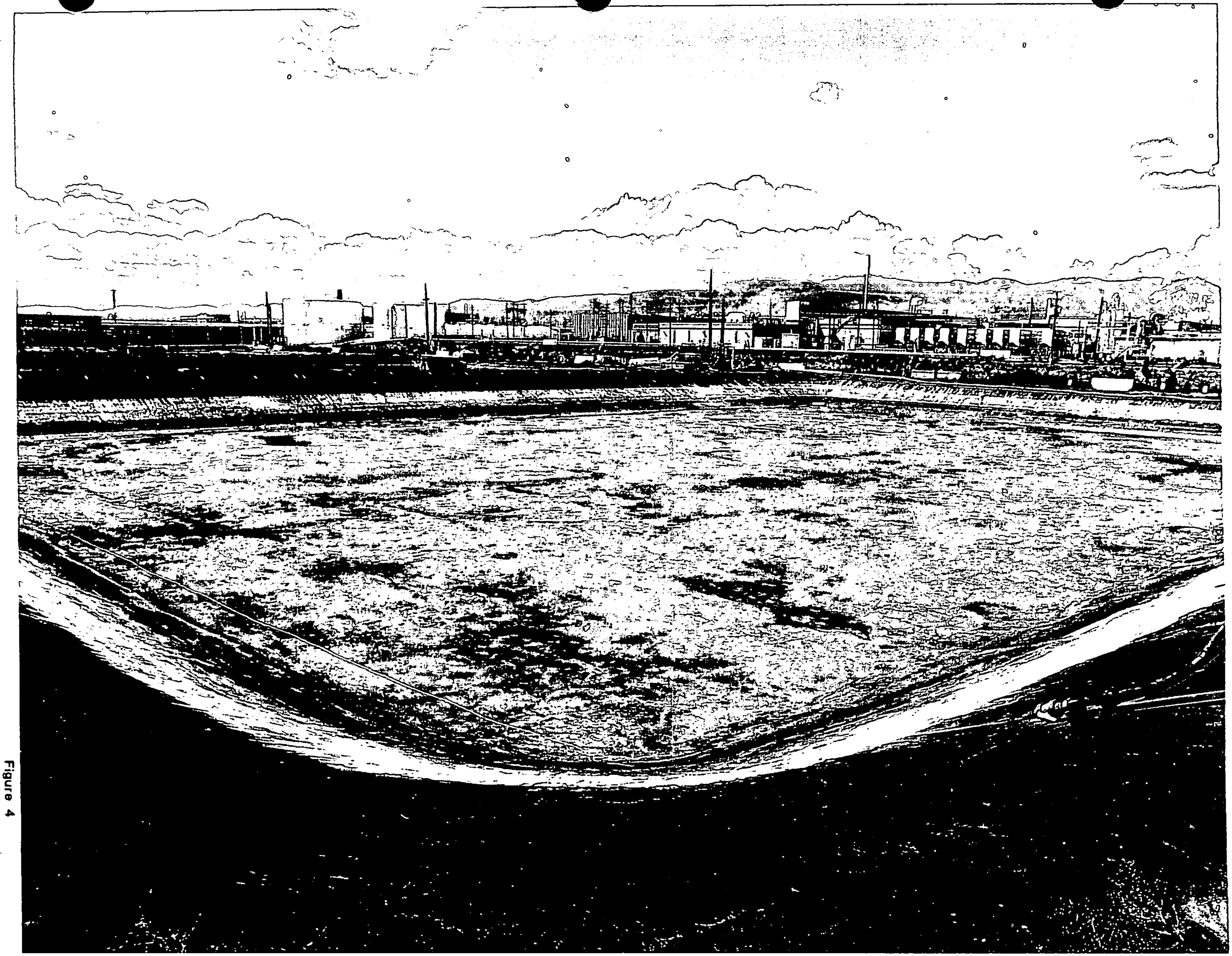


Figure 4
Photograph No. 45142-04
General View Pond 207-B-North,
View to Southwest

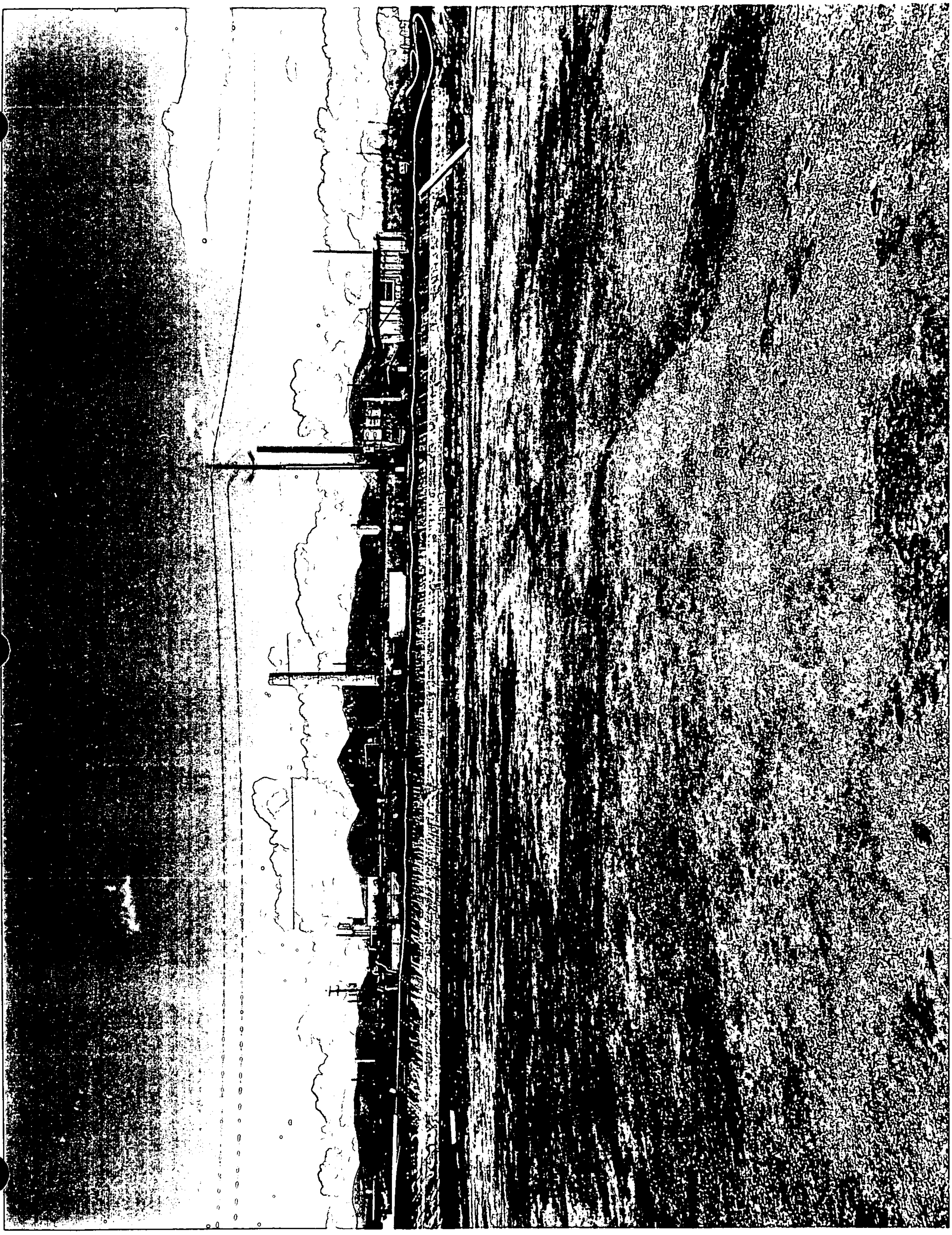


Figure 5
Photograph No. 45142-05
Pond 207-B North,
Note Light-Colored Bare Asphalt and
Darker Areas of Tar Tack Coat

Figure 6
Photograph No. 45142-09
Pond 207-B North. -
Note Rough, Irregular Pond Floor and
Smooth Berm Slope

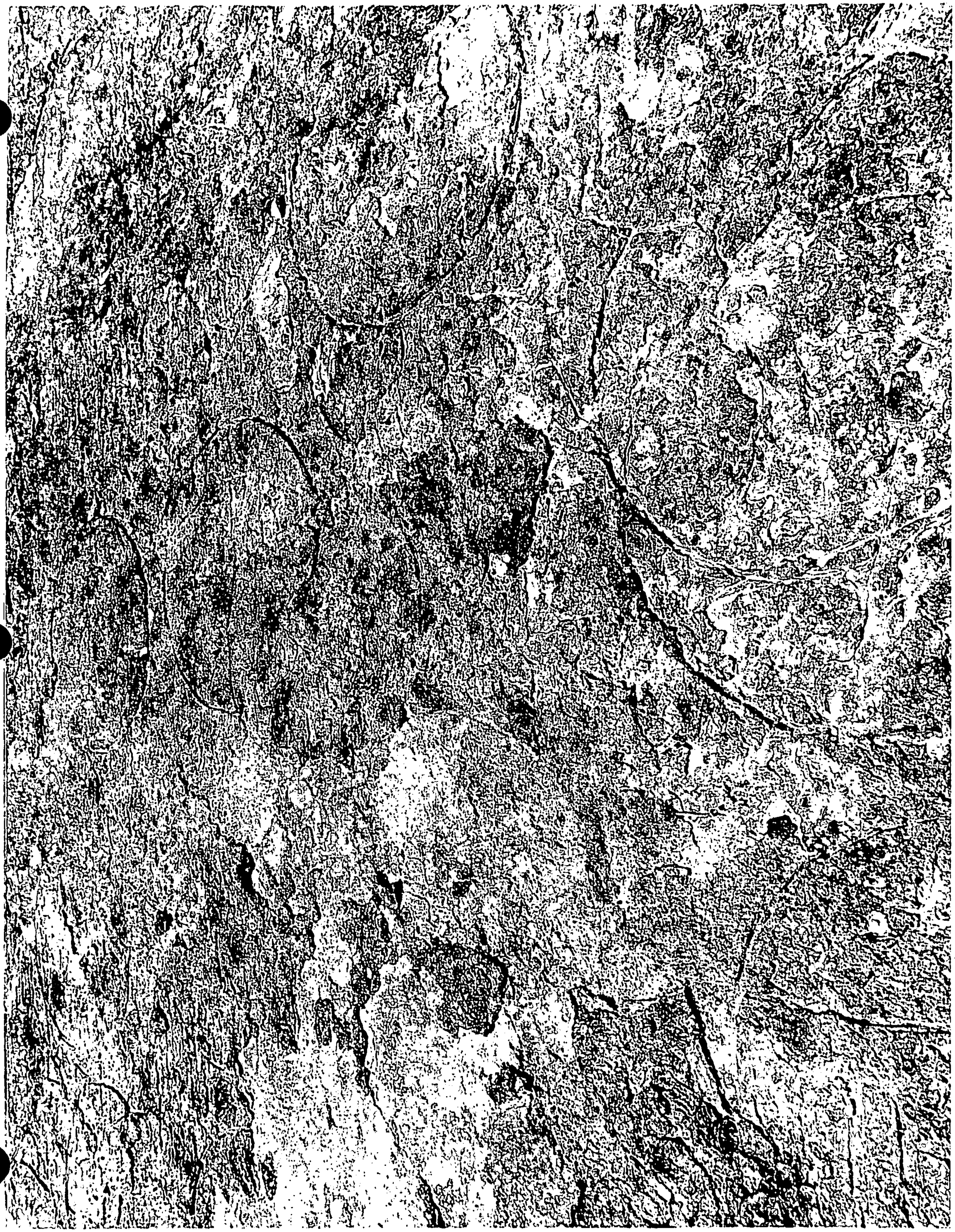


Figure 7
Photograph No. 45142-12
Pond 207-B North,
Note Rough, Irregular
Liner with Circular Indentations

Figure 8

Photograph No. 45142-17
Pond 207-B North,
Note Sheet Metal
Patch and White Discoloration

Figure 9

Photograph No. 45142-14
Pond 207-B North,
Note Torn Fabric Liner

Figure 10

Photograph No. 45142-18
Pond 207-B North,
Note Cobble Pressed Down into
Asphaltic Concrete, A Potential Liner Breach

Figure 11
Photograph No. 45141-03
General View, Pond 207-B Center,
View to Northeast

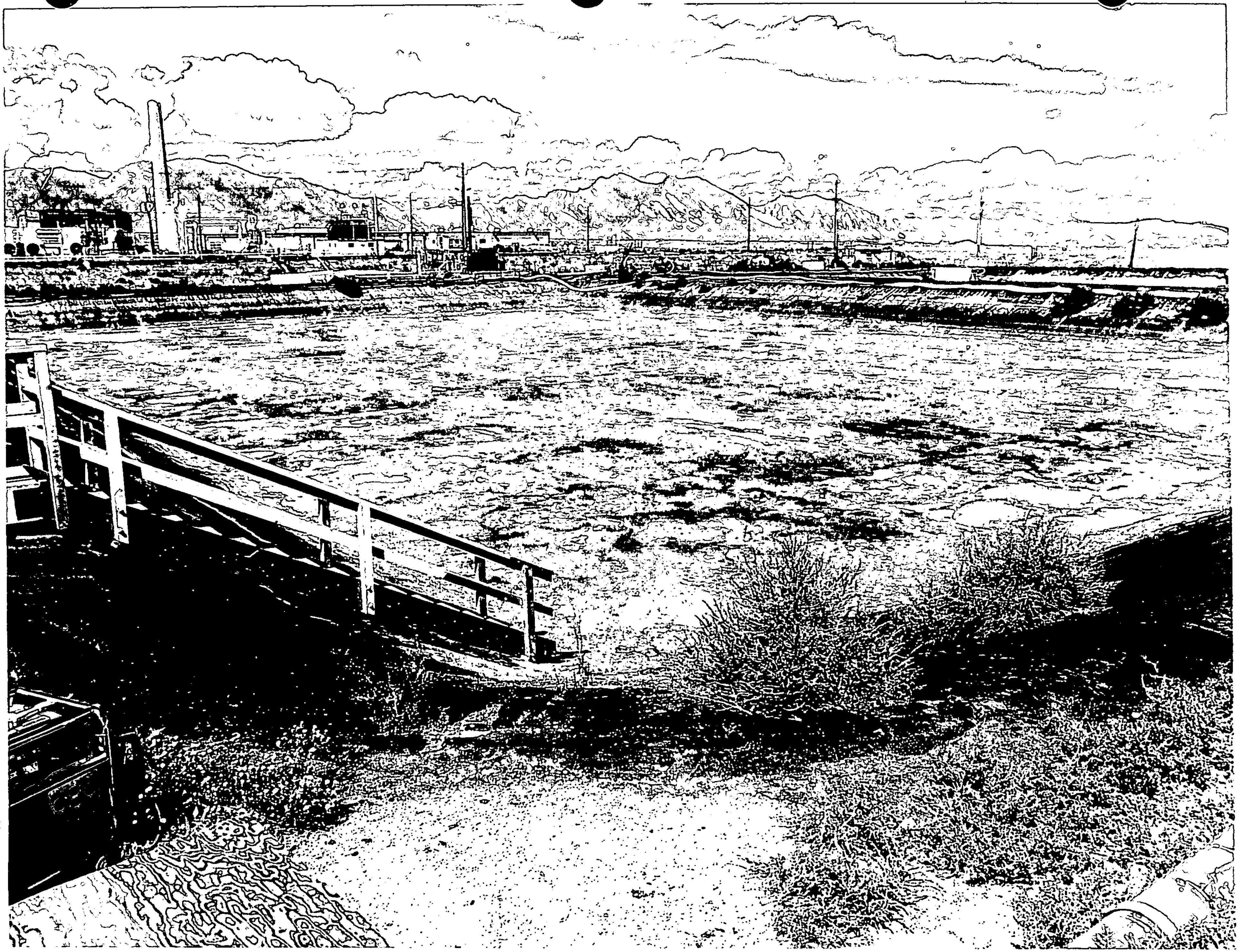


Figure 12
Photograph No. 45141-02
Pond 207-B Center,
View to Northwest

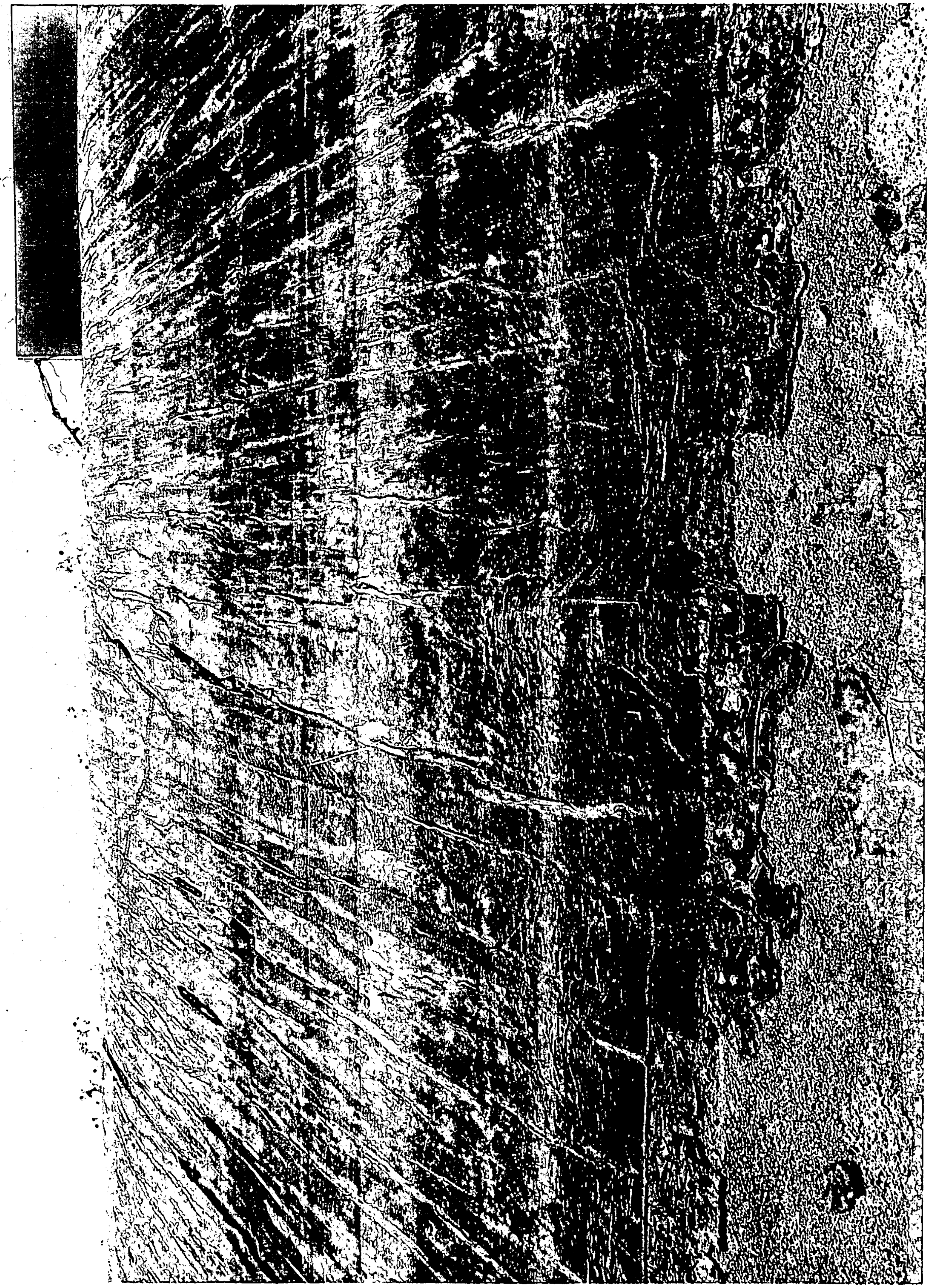


Figure 13

Photograph No. 45141-10
Pond 207-B Center,
Note Cracks Through Fabric Liner and
Tar Tack Coat on Berm Slope

Figure 14

Photograph No. 45141-09
Pond 207-B Center,
Detail View of Cracks on Berm Slope

Figure 15

Photograph No. 45141-05
Pond 207-B Center,
Note Rough, Irregular Liner Condition

Figure 16

Photograph No. 45141-17
Pond 207-B Center,
Note Ripped-Up Clumps of Tar Tack Coat

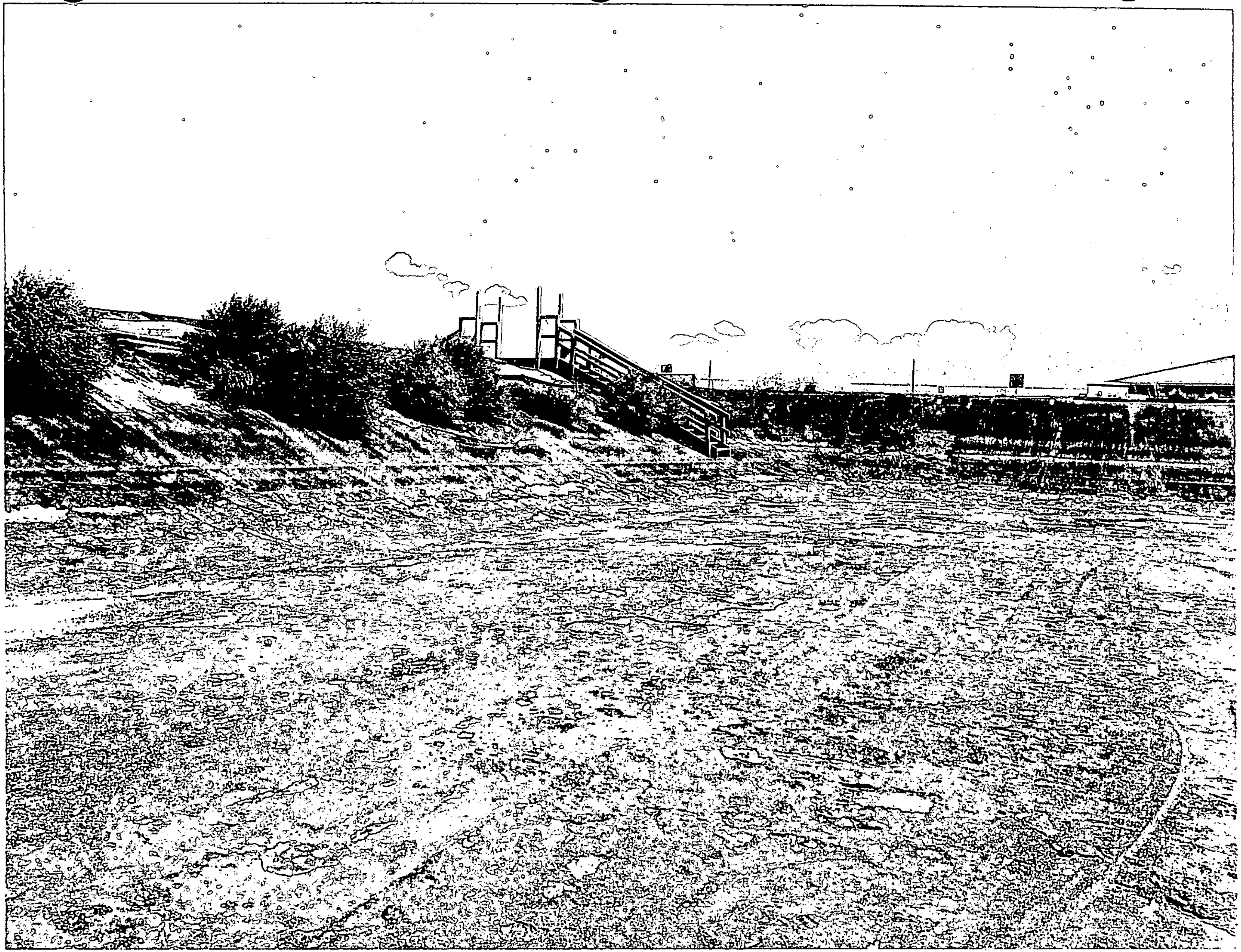


Figure 17
Photograph No. 45141-16
Pond 207B-Center,
Note Weed Growth Through Berm Liner Crack

Figure 18

Photograph No. 45141-11
Pond 207-B Center,
Note Patchy Tar Tack Coat
on Pond Floor and Fabric on Berm

APPENDIX II.E

SOLAR EVAPORATION PONDS RADIATION SURVEY RECORDS

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: March 19, 1993

TO: R. T. Ogg, Project Manager OU4, Bldg. 080, X8608

From: R. W. Norton, Radiological Engineering, T690B, X4075

SUBJECT: RADIOLOGICAL SURVEY 207A SOLAR POND - RWN-007-93

Attached is the Bicron fiddler survey of the liner of the 207A Solar Pond. This completes the radiological survey of the 207A Solar Pond for the Phase I RCRA facility Investigation Remedial Investigation of OU4.

If you have any questions concerning this please contact me at Extension 4075 or Pager D-0971.

rwn

Attachment
As stated

cc:
G. M. Aldrich, w/o Attachment
K. D. Anderson, w/o Attachment
D. J. Davidson, w/o Attachment
J. D. Roberts, w/o Attachment

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ______________

Taken by: J. Klatz Emp. # [redacted] Reviewed by:
Taken by: M. Aragon Emp. # Rad Ops Forman Wm W. Baile Emp. # [redacted]
Taken by: Maria M. Nicholacci Emp. # Name/Organization RAD. OPS. Emp. # N/A

Date: 3-16-93 Building: 788
ne: 1300 Room #: 207 A POND
Shift: DAY

Survey Description: 207 A POND

BICRON FILDER

	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	BICRON	BICRON			
Serial #:	A 513 P	A 531 P			
Date Perf. Ck:	3-16-93	3-16-93			
Date Calib'd:	10-27-92	12-8-92			
Cal. Due Date:	10-93	12-93			

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
1.	3500	35000	34374	Y	12.	3500	4000	4000	Y
2.	3500	9500	9624	Y	13.	3500	4200	4084	Y
3.	3500	5000	4989	Y	14.	3500	3900	3808	Y
4.	3500	4000	4386	Y	15.	3500	4500	4714	Y
5.	3500	4000	4326	Y	16.	3500	13500	13642	Y
6.	3500	8000	8296	Y	17.	3500	8000	8573	Y
7.	3500	9000	9283	Y	18.	3500	5000	5129	Y
8.	3500	8500	8619	Y	19.	3500	3000	3098	Y
9.	3500	4200	4223	Y	20.	3500	3000	3029	Y
10.	3500	3900	3882	Y	21.	3500	3000	3053	Y
11.	3500	4500	4736	Y	22.	3500	3000	2935	Y

RADIOLOGICAL OPERATIONS
Contamination Survey

RESULTS

	BKG	c/m METER	SCALER

	BKG	c/m METER	SCALER
46.	3500	3700	3707
47.	3500	4000	4165
48.	3500	4200	4164
49.	3500	4100	4224
50.	3500	3000	3195
51.	3500	3600	3687
52.	3500	3000	3018
53.	3500	4000	3933
54.	3500	3000	3289
55.	3500	3900	3725
56.	3500	15000	14441
57.	3500	4800	5058
58.	3500	3000	3244
59.	3500	2700	2691
60.	3500	3300	3415
61.	3500	6000	5731
62.	3500	4800	4822
63.	3500	4000	4165
64.	3500	3500	3298
65.	3500	5000	4307
66.	3500	3600	3244
67.	3500	3000	3374
68.	3500	3200	3255
69.	3500	3100	3191
70.	3500	3000	3281
71.	3500	3500	3714
72.	3500	4000	3976
73.	3500	5000	4736
74.	3500	3200	3332
75.	3500	3100	3322
76.	3500	3200	3119
77.	3500	3000	3108
78.	3500	3800	3741
79.	3500	6500	6539
80.	3500	4000	3938
81.	3500	4000	4164
82.	3500	5400	5548
83.	3500	3500	3375
84.	3500	3000	3091
85.	3500	3000	3291
86.	3500	3100	3217
87.	3500	3000	3379
88.	3500	5100	5470
89.	3500	3800	3533
90	3500	3100	3481

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ____________

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
23.	3500	3000	2976	Y
24.	3500	4000	3958	Y
25.	3500	25000	27334	Y
26.	3500	4000	4060	Y
27.	3500	4000	3896	Y
28.	3500	3800	3702	Y
29.	3500	4000	3696	Y
30.	3500	3800	3748	Y
31.	3500	4000	3949	Y
32.	3500	5000	5257	Y
33.	3500	5000	4602	Y
34.	3500	3000	3179	Y
35.	3500	3000	3104	Y
36.	3500	3000	2625	Y
37.	3500	3000	2979	Y
38.	3500	3000	2848	Y
39.	3500	3000	3227	Y
40.	3500	4000	3958	Y
	3500	5000	5196	Y
42.	3500	3800	3709	Y
43.	3500	3800	3777	Y
44.	3500	3900	3902	Y
45.	3500	4000	3849	Y
46.	3500	3700	3707	Y
47.	3500	4000	4165	Y
48.	3500	4200	4164	Y
49.	3500	4100	4224	Y
50.	3500	3000	3195	Y
51.	3500	3600	3687	Y
52.	3500	3000	3018	Y
53.	3500	4000	3933	Y
54.	3500	3000	3288	Y
55.	3500	3900	3725	Y
56.	3500	15000	14441	Y
57.	3500	4500	5058	Y
58.	3500	3000	3244	Y
59.	3500	2700	2691	Y
60.	3500	3300	3415	Y
61.	3500	6000	5731	Y
62.	3500	4800	4822	Y
63.	3500	4000	4165	Y
64.	3500	3500	3298	Y
65.	3500	5000	4307	Y
66.	3500	3000	3244	Y
67.	3500	3000	3374	Y
68.	3500	3200	3255	Y
69.	3500	3100	3191	Y
70.	3500	3000	3281	Y
71.	3500	3500	3714	Y
72.	3500	4000	3976	Y
73.	3500	5000	4736	Y
74.	3500	3200	3332	Y
75.	3500	3100	3322	Y
76.	3500	3200	3119	Y

RADIOLOGICAL OPERATIONS
Contamination Survey

RESULTS

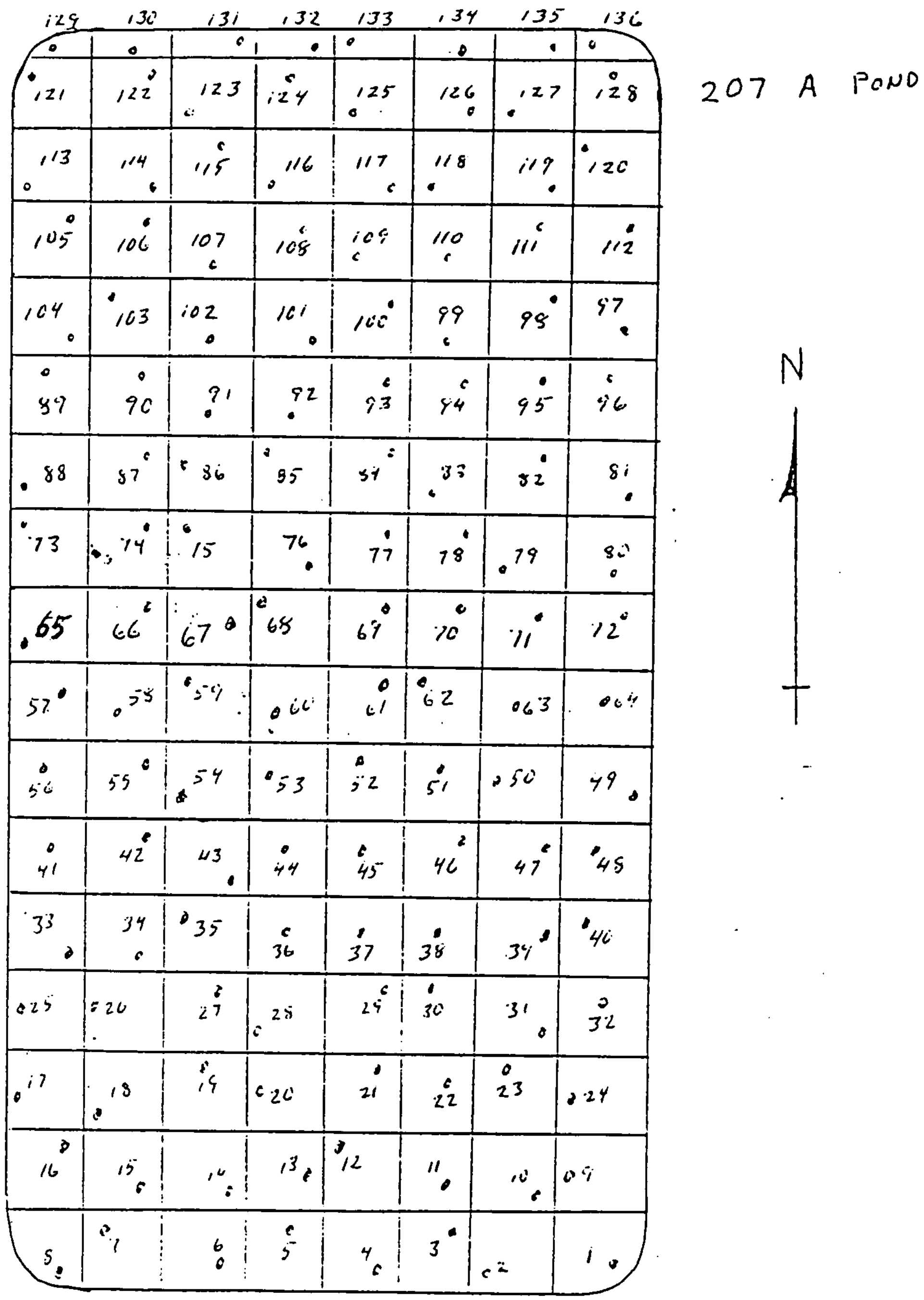
	BKG	c/m METER	SCALER		BKG	c/m METER	SCALER
91.				91.	3500	3100	3348
92.				92.	3500	3500	3478
93.				93.	3500	3600	3566
94.				94.	3500	6000	5483
95.				95.	3500	5000	5131
96.				96.	3500	4300	4460
97.				97.	3500	3500	3627
98.				98.	3500	3500	3936
99.				99.	3500	4800	4621
100.				100.	3500	3800	3744
101.				101.	3500	3500	3605
102.				102.	3500	3500	3373
103.				103.	3500	3300	3576
104.				104.	3500	3500	3217
105.				105.	3500	3000	3225
106.				106.	3500	4000	3765
107.				107.	3500	3900	3802
108.				108.	3500	2900	2875
109.				109.	3500	5000	5197
110.				110.	3500	3000	3244
111.				111.	3500	3000	3374
112.				112.	3500	3200	3255
113.				113.	3500	3700	3949
114.				114.	3500	2500	2730
115.				115.	3500	2900	2860
116.				116.	3500	3100	3841
117.				117.	3500	4500	4611
118.				118.	3500	4500	4496
119.				119.	3500	6000	5805
120.				120.	3500	4500	4041
121.				121.	3500	4000	3519
122.				122.	3500	4200	4023
123.				123.	3500	3000	2814
124.				124.	3500	3400	3320
125.				125.	3500	3900	3873
126.				126.	3500	3700	3533
127.				127.	3500	3700	3737
128.				128.	3500	3600	3590
129.				129.	3500	4100	4265
130.				130.	3500	3600	3534
131.				131.	3500	3900	3683
132.				132.	3500	3500	3488
133.				133.	3500	3600	3366
134.				134.	3500	3500	3463
135.				135.	3500	4000	3969
				136	3500	4000	3931

EG&G ROCKY FLATS

Control No. ____________

Radiation Protection

Area or Equipment Drawing Showing Survey Points

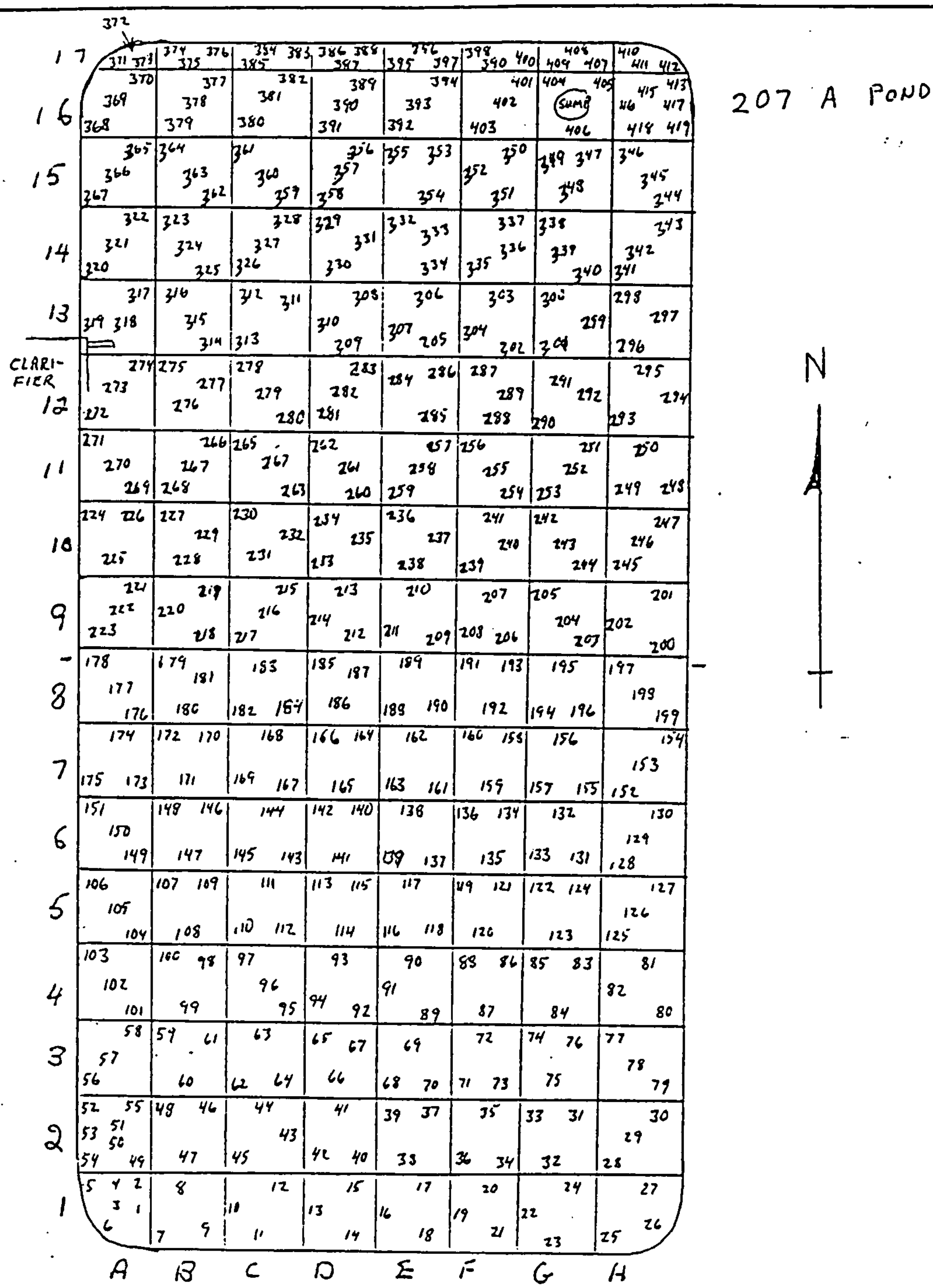


EG&G ROCKY FLATS

Control No. ____________

Radiation Protection

Area or Equipment Drawing Showing Survey Points



Page 1 of 2

RADIOLOGICAL
CONTAMINATION SURVEY

y: Lee A Thompson (Signature) Emp.# [redacted]

ken by: LC Abila (Signature) Emp.#

ken by: J.C. K[illegible] (Signature) Emp.#

ate: 11-11-92 THROUGH 11-20-92 Building: 750 Pad

ime:

Room#: As Required

hift: DAY SHIFT & PM SHIFT FOR 10 DAYS

Survey Description: Control Point Survey

207 A POND

Diagram/Sketch Attached: ✓ Yes ___ No

INSTRUMENTATION USED

Smear Counters

Mfg:	Eberline	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4	SAC-4
Serial #:	960	773	992	972	837
Date Calib'd:	3-2-92	2-17-92	2-4-92	2-27-92	5-20-92
Due Date:	2-93	2-93	2-93	2-93	5-93

Mfg:	EBERLINE	EBERLINE	EBERLINE		
Model:	BC-4	BC-4	BC-4		
Serial #:	BC 387	BC 383	BC 700		
Date Calib'd:	11-13-92	11-13-92	11-11-92		
Cal. Due Date:	11-93	11-93	11-93		

Survey Instruments

Mfg:	LUDLUM	LUDLUM	LUDLUM		
Model:	12-1A	12-1A	12-1A		
Serial #:	62717	75985	73270		
Date Calib'd:	10-92	1-8-92	7-92		
Cal. Due Date:	10-93	1-93	7-93		

STATUS:

_____ Within Limits

_____ Limits Exceeded

__ Posted

_____ Deposted

COMMENTS

ALPHA SMEARS COUNTED 11-12-92 + 11-16-92

BETA SMEARS COUNTED 11-16-92

DIRECT & REMOVEABLE ALPHA 11-13-92 THROUGH 11-19-92

Radiological Operations Foreman:

[signature] Signature 11-23-92 Date

IPjC 20571

RADIOLOGICAL
Contamination Survey

Taken by: ______________________ Emp. # [redacted]
Signature

Taken by: ______________________ Emp. #
Signature

Taken by: ______________________ Emp. # ________
Signature

Date: ________ Building: ________

Time: ________ Room #: ________

Shift: ________

Survey Description: ______________________

Diagram/Sketch Attached: __ Yes __ No

INSTRUMENTATION USED

Smear Counters

Mfg:
Model:
Serial #:
Date Perf. Test:
Date Calib'd:
Cal. Due Date:

Mfg:
Model:
Serial #:
Date Perf. Test:
Date Calib'd:
Cal. Due Date:

Survey Instruments

Mfg:
Model:
Serial #:
Date Perf. Test:
Date Calib'd:
Cal. Due Date:
Background:

COMMENTS

Status:
__ Within Limits
__ Limits Exceeded
__ Posted
__ Deposted

Radiological Operations Foreman:

Signature Date

RADIOLOGICAL
Contamination Survey

RESULTS

Date: 11-11-92 Time: 0900 Building: 788 Room: A POND

	cpm Removable (Swipe)	Initial cpm Direct	dpm/100cm² Removable (Smear)			cpm Removable (Swipe)	BETA ~~Resurvey~~ cpm Direct	dpm/100cm² Removable (Smear)
1.	<250	300	0		1.			24
2.	<250	300	3		2.			0
3.	<250	400	3	1A	3.			3
4.	<250	350	0		4.			3
5.	<250	500	3		5.			0
6.	<250	500	0		6.			0
7.	<250	<250	0		7.			0
8.	<250	<250	0	1B	8.			21
9.	<250	<250	3		9.			33
10.	<250	<250	3		10.			33
11.	<250	250	0	1C	11.			0
12.	<250	500	0		12.			0
13.	<250	<250	3		13.			3
14.	<250	<250	0	1D	14.			12
15.	<250	<250	6		15.			45
16.	<250	<250	3		16.			0
17.	<250	<250	0	1E	17.			0
18.	<250	<250	0		18.			0
19.	<250	<250	0		19.			27
20.	<250	<250	6	1F	20.			0
21.	<250	400	0		21.			0
22.	<250	<250	6		22.			0
23.	<250	300	0	1G	23.			33
24.	<250	<250	3		24.			0
25.	<250	300	3		25.			0
26.	<250	<250	0	1H	26.			0
27.	<250	<250	3		27.			33
28.	<250	<250	3		28.			9
29.	<250	<250	0	2H	29.			0
30.	<250	500	3		30.			3
31.	<250	500	3		31.			0
32.	<250	1000	6	2G	32.			0
33.	<250	500	6		33.			0
34.	<250	<250	3		34.			15
35.	<250	600	6	2F	35.			0
36.	<250	<250	9		36.			0
37.	<250	<250	3		37.			27
38.	<250	<250	3	2E	38.			0
39.	<250	500	0		39.			0
40.	<250	<250	0		40.			6
41.	<250	300	3	2D	41.			6
42.	<250	300	6		42.			24
43.	<250	<250	0		43.			0
44.	<250	<250	6	2C	44.			3
45.	<250	500	108		45.			45

Control No. 3 of 11

RADIOLOGICAL OPERATIONS
Contamination Survey

RESULTS

Initial

BETA
~~Resurvey~~

Date Completed: 11-15-92

	CPM Removable (Swipe)	CPM Direct		DPM/100cm2 Removable (Smear)		CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
5.	< 250	< 250	2	0	46.			18
7.	< 250	< 250		3	47.			0
3.	< 250	600	B	9	48.			18
9.	< 250	< 250		6	49.			48
0.	< 250	< 250		9	50.			6
1.	< 250	< 250	2	0	51.			0
2.	< 250	< 250		0	52.			0
3.	< 250	< 250	A	0	53.			0
4.	< 250	< 250		0	54.			0
5.	< 250	< 250		18	55.			36
6.	< 250	< 250	3	0	56.			9
7.	< 250	< 250		15	57.			0
8.	< 250	< 250	A	12	58.			27
	< 250	800	3	12	59.			0
	250	800		6	60.			0
1.	< 250	800	B	0	61.			30
2.	< 250	< 250	3	0	62.			0
3.	< 250	500		3	63.			0
4.	< 250	< 250	C	0	64.			0
5.	< 250	300	3	6	65.			6
6.	< 250	< 250		3	66.			0
7.	< 250	< 250	D	0	67.			42
8	< 250	< 250	3	3	68.			0
9.	< 250	< 250		3	69.			27
0.	< 250	600	E	0	70.			0
1.	< 250	< 250	3	3	71.			27
2.	< 250	< 250		0	72.			12
3.	< 250	< 250	F	3	73.			18
4.	< 250	< 250	3	0	74.			0
5.	< 250	500		0	75.			15
6.	< 250	< 250	G	9	76.			9
7.	< 250	< 250	3	6	77.			18
8.	< 250	500		0	78.			0
9.	< 250	500	H	6	79.			0
30.	< 250	< 250	4	3	80.			0
31.	< 250	< 250		0	81.			3
32.	< 250	< 250	H	3	82.			24
33.	< 250	500	4	3	83.			0
	< 250	< 250		0	84.			6
	< 250	500	G	3	85.			0
36.	< 250	< 250	4	9	86.			0
37.	< 250	500		0	87.			0
38.	< 250	< 250	F	9	88.			27
39.	< 250	< 250	4	9	89.			9
40	< 250	< 250	F	3	90			15

Control No. 4 of 11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial | ~~Resurvey~~ BETA

Date Completed: 11-15-92

Initial

	CPM Removable (Swipe)	CPM Direct		DPM/100cm2 Removable (Smear)
91.	<250	<250	4 E	0
92.	<250	<250	4	9
93.	<250	<250	D	12
94.	<250	<250		6
95.	<250	<250	4	0
96.	<250	<250	C	3
97.	<250	300		0
98.	<250	<250	4	0
99.	<250	<250	B	6
100.	<250	300		6
101.	<250	<250	4	0
102.	<250	300	A	3
103.	<250	<250		0
104.	<250	700	5	3
105.	<250	<250	A	3
106.	<250	<250		0
107.	<250	<250	5	3
108.	<250	<250		3
109.	<250	<250	B	6
110.	<250	500	5	3
111.	<250	<250	C	0
112.	<250	<250		0
113.	<250	<250	5	15
114.	<250	<250	D	0
115.	<250	<250		0
116.	<250	<250	5	3
117.	<250	<250	E	6
118.	<250	300		0
119.	<250	<250	5	0
120.	<250	300	F	3
121.	<250	<250		0
122.	<250	<250	5	6
123.	<250	500	G	6
124.	<250	<250		0
125.	<250	<250	5	6
126.	<250	<250	H	3
127.	<250	<250		3
128.	<250	<250	6	0
129.	<250	<250	H	3
130.	<250	<250		6
131.	<250	300	6	0
132.	<250	1000	G	6
133.	<250	300		12
134.	<250	750	6	3
135.	<250	500	F	6

BETA

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
91.			0
92.			0
93.			0
94.			0
95.			0
96.			0
97.			3
98.			3
99.			0
100.			3
101.			0
102.			0
103.			0
104.			36
105.			0
106.			9
107.			18
108.			0
109.			12
110.			18
111.			0
112.			6
113.			0
114.			30
115.			0
116.			12
117.			0
118.			12
119.			0
120.			0
121.			0
122.			0
123.			9
124.			21
125.			3
126.			12
127.			0
128.			3
129.			12
130.			0
131.			0
132.			21
133.			15
134.			6
135.			15

Control No. 5 of 11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

	Initial: CPM Removable (Swipe)	Initial: CPM Direct		Initial: DPM/100cm2 Removable (Smear)		Resurvey: CPM Removable (Swipe)	Resurvey: CPM Direct	Resurvey: DPM/100cm2 Removable (Smear)
136.	<250	400	6F	0	136.			6
137.	<250	300		6	137.			36
138.	<250	300	6E	0	138.			0
139.	<250	300		3	139.			0
1[illegible]	<250	<250		3	140.			0
14[illegible].	<250	<250	6D	0	141.			0
142.	<250	<250		3	142.			42
143.	<250	<250		3	143.			3
144.	<250	<250	6C	6	144.			3
145.	<250	<250		0	145.			33
146.	<250	<250		3	146.			0
147.	<250	<250	6B	6	147.			0
[illegible]	<250	<250		3	148.			36
[illegible]	<250	<250		3	149.			27
150.	<250	<250	6A	0	150.			12
151.	<250	<250		0	151.			0
152.	<250	<250		3	152.			0
153.	<250	<250	7H	0	153.			0
154.	<250	<250		0	154.			0
155.	<250	500		15	155.			0
15[illegible].	<250	1000	7G	6	156.			0
1[illegible].	<250	750		3	157.			0
158.	<250	500		3	158.			0
159.	<250	500	7F	9	159.			3
160.	<250	500		0	160.			9
161.	<250	300		0	161.			6
162.	<250	300	7E	3	162.			0
163.	<250	<250		3	163.			0
164.	<250	<250		0	164.			0
165.	<250	<250	7D	0	165.			0
166.	<250	<250		3	166.			3
167.	<250	<250		3	167.			24
168.	<250	<250	7C	12	168.			0
169.	<250	<250		0	169.			0
170.	<250	<250		0	170.			0
171.	<250	<250	7B	6	171.			0
172.	<250	<250		6	172.			3
17[illegible].	<250	700		0	173.			0
[illegible]	<250	700	7A	6	174.			0
[illegible]	<250	700		3	175.			0
176.	<250	<250		0	176.			9
177.	<250	<250	8A	6	177.			0
178.	<250	<250		0	178.			6
179.	<250	<250	8	0	179.			0
180.	[illegible]	<250	[illegible]	3	180.			3

Date Completed: ______

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial / Resurvey

Date Completed: ______

No.	Initial CPM Removable (Swipe)	Initial CPM Direct		Initial DPM/100cm2 Removable (Smear)	Resurvey CPM Removable (Swipe)	Resurvey CPM Direct	Resurvey DPM/100cm2 Removable (Smear)
181.	<250	<250	8 B	0			0
182.	<250	<250	8 C	0			0
183.	<250	<250		9			0
184.	<250	<250		6			45
185.	<250	<250	8 D	0			21
186.	<250	<250		6			0
187.	<250	<250		0			6
188.	<250	<250	8 E	0			0
189.	<250	300		0			0
190.	<250	300		6			0
191.	<250	300	8 F	12			18
192.	<250	500		12			0
193.	<250	500		9			6
194.	<250	500	8 G	12			0
195.	<250	500		12			0
196.	<250	500		3			18
197.	<250	<250	8 H	0			0
198.	<250	<250		3			0
199.	<250	<250		18			0
200.	<250	<250	9 H	3			0
201.	<250	<250		3			0
202.	<250	<250		0			0
203.	<250	500	9 G	3			24
204.	<250	600		30			36
205.	<250	600		3			0
206.	<250	500	9 F	30			0
207.	<250	750		15			24
208.	<250	500		3			39
209.	<250	500	9 E	18			12
210.	<250	500		3			0
211.	<250	500		0			0
212.	<250	<250	9 D	9			0
213.	<250	<250		9			0
214.	<250	<250		3			30
215.	<250	<250	9 C	3			0
216.	<250	<250		15			0
217.	<250	<250		12			3
218.	<250	<250	9 B	12			0
219.	<250	<250		6			30
220.	<250	<250		6			0
221.	<250	<250	9 A	0			6
222.	<250	<250		0			0
223.	<250	<250		12			0
224.	<250	<250	10 A	3			0
225.	<250	<250		3			0

Control No. 7 of 11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

	Initial CPM Removable (Swipe)	Initial CPM Direct		Initial DPM/100cm2 Removable (Smear)		Resurvey CPM Removable (Swipe)	Resurvey CPM Direct	Resurvey DPM/100cm2 Removable (Smear)
226.	< 250	< 250	10 A	6	226.			21
227.	< 250	< 250	10 B	9	227.			6
228.	< 250	< 250		6	228.			0
229.	< 250	< 250		3	229.			0
230.	< 250	< 250	10 C	15	230.			0
231.	< 250	< 250		9	231.			0
232.	< 250	< 250		9	232.			0
233.	< 250	< 250	10 D	21	233.			18
234.	< 250	< 250		6	234.			0
235.	< 250	< 250		3	235.			42
236.	< 250	< 250	10 E	3	236.			0
237.	< 250	< 250		6	237.			0
238.	< 250	< 250		6	238.			6
239.	< 250	1500	10 F	9	239.			21
240.	< 250	500		3	240.			3
241.	< 250	1500		21	241.			0
242.	< 250	800	10 G	15	242.			0
243.	< 250	1500		60	243.			0
244.	< 250	1500		45	244.			0
245.	< 250	< 250	10 H	3	245.			0
246.	< 250	< 250		3	246.			0
247.	< 250	< 250		3	247.			0
248.	< 250	< 250	11 H	3	248.			21
249.	< 250	< 250		3	249.			0
250.	< 250	< 250		0	250.			6
251.	< 250	< 250	11 G	6	251.			6
252.	< 250	< 250		90	252.			0
253.	< 250	< 250		36	253.			36
254.	< 250	< 250	11 F	21	254.			27
255.	< 250	< 250		39	255.			0
256.	< 250	< 250		18	256.			0
257.	< 250	< 250	11 E	12	257.			0
258.	< 250	< 250		12	258.			0
259.	< 250	< 250		6	259.			21
260.	< 250	< 250	11 D	9	260.			9
261.	< 250	< 250		0	261.			0
262.	< 250	< 250		12	262.			18
263.	< 250	< 250	11 C	6	263.			24
264.	< 250	< 250		12	264.			0
265.	< 250	< 250		9	265.			30
266.	< 250	250	11 B	15	266.			18
267.	< 250	250		6	267.			0
268.	< 250	250		3	268.			0
269.	< 250	500	11 A	12	269.			6
270.	< 250	750		6	270.			0

Date Completed: ______

Control No. 8 of 11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial	CPM Removable (Swipe)	CPM Direct		DPM/100cm2 Removable (Smear)	Resurvey	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
271.	< 250	250	11 A	15	271.			0
272.	< 250	500	12	6	272.			42
273.	< 250	500	A	0	273.			6
274.	< 250	750		24	274.			0
275.	< 250	250	12	0	275.			18
276.	< 250	250	B	9	276.			0
277.	< 250	250		3	277.			0
278.	< 250	< 250	12	9	278.			36
279.	< 250	< 250	C	0	279.			6
280.	< 250	< 250		15	280.			0
281.	< 250	< 250	12	6	281.			48
282.	< 250	< 250	D	6	282.			21
[illegible]	< 250	< 250		9	283.			0
[illegible]	< 250	< 250	12	18	284.			45
285.	< 250	< 250	E	6	285.			0
286.	< 250	< 250		24	286.			0
287.	< 250	< 250	12	36	287.			0
288.	< 250	< 250	F	18	288.			0
289.	< 250	< 250		45	289.			12
290.	< 250	< 250	12	99	290.			0
291.	< 250	< 250	G	9	291.			0
292.	< 250	< 250		6	292.			33
293.	< 250	< 250	12	63	293.			0
294.	< 250	< 250	H	0	294.			9
295.	< 250	< 250		3	295.			48
296.	< 250	< 250	13	6	296.			0
297.	< 250	< 250	H	3	297.			0
298.	< 250	< 250		0	298.			3
299.	< 250	~~113 < 250~~ 250	13	3	299.			33
300.	< 250	< 250	G	15	300.			0
301.	< 250	< 250		6	301.			0
302.	< 250	< 250	13	12	302.			33
303.	< 250	< 250	F	39	303.			0
304.	< 250	< 250		54	304.			15
305.	< 250	< 250	13	18	305.			3
306.	< 250	< 250	E	9	306.			57
307.	< 250	< 250		27	307.			3
308.	< 250	< 250	13	36	308.			39
[illegible]	< 250	< 250	D	11	309.			12
[illegible]	< 250	< 250		6	310.			9
311.	< 250	< 250	13	12	311.			9
312.	< 250	< 250	C	3	312.			24
313.	< 250	< 250		66	313.			12
314.	< 250	< 250	13	33	314.			12
315.	< 250	< 250	B	6	315.			0

Date Completed:

Control No. 9-F-11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

	Initial: CPM Removable (Swipe)	Initial: CPM Direct		Initial: DPM/100cm2 Removable (Smear)		Resurvey: CPM Removable (Swipe)	Resurvey: CPM Direct	Resurvey: DPM/100cm2 Removable (Smear)
316.	< 250	< 250	13 B	12	316.			3
317.	< 250	500	13	0	317.			0
318.	< 250	500		3	318.			0
319.	< 250	500	A	0	319.			15
320.	< 250	< 250	14	3	320.			27
321.	< 250	< 250	A	6	321.			0
322.	< 250	< 250		0	322.			0
323.	< 250	< 250	14	3	323.			63
324.	< 250	< 250	B	3	324.			9
325.	< 250	< 250		6	325.			0
326.	< 250	< 250	14	3	326.			15
327.	< 250	< 250	C	15	327.			0
[illegible]	< 250	500		12	328.			3
	< 250	500	14	21	329.			9
330.	< 250	500		30	330.			6
331.	< 250	500	D	6	331.			3
332.	< 250	500	14	15	332.			33
333.	< 250	500	E	42	333.			0
334.	< 250	500		48	334.			9
335.	< 250	300	14	9	335.			9
336.	< 250	< 250	F	33	336.			0
[illegible]	< 250	< 250		9	337.			6
338.	< 250	< 250		6	338.			6
339.	< 250	250	14	48	339.			0
340.	< 250	250	G	9	340.			30
341.	< 250	250		126	341.			0
342.	< 250	< 250	14	3	342.			0
343.	< 250	< 250	H	0	343.			0
344.	< 250	< 250		3	344.			0
345.	< 250	< 250	15	3	345.			0
346.	< 250	2500	H	0	346.			18
347.	< 250	2500		15	347.			45
348.	< 250	2500	15	6	348.			0
349.	< 250	1000	G	3	349.			21
350.	< 250	1500		9	350.			12
351.	< 250	800	15	9	351.			0
352.	< 250	1500	F	12	352.			0
353.	< 250	1500	15	39	353.			0
	< 250	1500	E	42	354.			12
.	< 250	800		24	355.			0
356.	< 250	750		54	356.			0
357.	< 250	250	15	36	357.			0
358.	< 250	< 250	D	21	358.			39
359.	< 250	< 250	15	15	359.			18
360.	< 250	< 250	C	18	360.			3

Date Completed: ______

Control No. 10 [illegible]

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

	Initial: CPM Removable (Swipe)	Initial: CPM Direct		Initial: DPM/100cm2 Removable (Smear)		Resurvey: CPM Removable (Swipe)	Resurvey: CPM Direct	Resurvey: DPM/100cm2 Removable (Smear)
361.	<250	<250	15 C	6	361.			51
362.	<250	<250	15	12	362.			60
363.	<250	<250	B	6	363.			24
364.	<250	<250		9	364.			0
365.	<250	<250	15	3	365.			42
366.	<250	<250	A	3	366.			0
[illegible]	<250	<250		9	367.			21
368.	<250	<250	16	0	368.			21
369.	<250	<250	A	0	369.			0
370.	<250	<250		9	370.			0
371.	<250	<250		9	371.			3
372.	<250	<250	17	0	372.			0
373.	<250	<250	A	6	373.			3
[illegible]4.	<250	<250		0	374.			0
[illegible]	<250	<250	17	6	375.			0
[illegible]	<250	<250	B	0	376.			0
377.	<250	<250	16	6	377.			24
378.	<250	<250		9	378.			0
379.	<250	<250	B	0	379.			12
380.	<250	<250	16	9	380.			9
381.	<250	<250	C	0	381.			3
382.	<250	<250		0	382.			3
[illegible]	<250	<250	17	3	383.			6
[illegible]	<250	<250	C	0	384.			15
385.	<250	<250		3	385.			15
386.	<250	<250	17	6	386.			0
387.	<250	<250	D	3	387.			9
388.	<250	<250		6	388.			0
389.	<250	<250	16	0	389.			57
390.	<250	400	D	0	390.			0
391.	<250	500		3	391.			9
392.	<250	1500		45	392.			0
393.	<250	1000	18	60	393.			24
394.	<250	1000	E	33	394.			0
395.	<250	<250	17	3	395.			3
396.	<250	<250		3	396.			0
397.	<250	<250	E	0	397.			0
398.	<250	<250	17	6	398.			0
399.	<250	<250	F	0	399.			15
[illegible]	<250	<250		0	400.			0
[illegible]	<250	<250	16	9	401.			24
[illegible]	<250	<250		3	402.			0
403.	<250	<250	F	0	403.			15
404.	<250	<250	16	21	404.			12
405.	<250	<250	G	9	405.			12

Date Completed: ____________

Control No. 11 01 11

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

	Initial					Resurvey Date Completed:		
	CPM Removable (Swipe)	CPM Direct		DPM/100cm2 Removable (Smear)		CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
401.	<250	<250	16 F	9	401.			24
402.	<250	<250		3	402.			0
403.	<250	<250		0	403.			15
404.	<250	<250	16 G	21	404.			12
405.	<250	<250		9	405.			12
406.	<250	2500		6	406.			6
407.	<250	<250	17 G	9	407.			0
408.	<250	<250		6	408.			0
409.	<250	<250		0	409.			0
410.	<250	<250	17 H	0	410.			9
411.	<250	<250		0	411.			0
412.	<250	<250		3	412.			12
413.	<250	<250	16 H	6	413.			0
414.	<250	<250		0	414.			0
415.	<250	<250		0	415.			12
416.	<250	<250		0	416.			24
417.	<250	<250		0	417.			0
418.	<250	<250		6	418.			0
419.	<250	<250		12	419.			21
20.					20.			
21.					21.			
22.					22.			
23.					23.			
24.					24.			
25.					25.			
26.					26.			
27.					27.			
28.					28.			
29.					29.			
30.					30.			
31.					31.			
32.					32.			
33.					33.			
34.					34.			
35.					35.			
36.					36.			
37.					37.			
38.					38.			
39.					39.			
40.					40.			
41.					41.			
42.					42.			
43.					43.			
44.					44.			
45.					45.			

1 TO 405 REPEATED FROM PREVIOUS PAGE

COUNTER PERFORMANCE TEST LOG SHEET

SERIAL NO: 773

750 PAds

START DATE: 11-16-92

STOP DATE: 11-23-92

SHIFT	SRC S/N	VALUE	TIME	EMP. NO	FOREMAN	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1	680151	20930	0100	507615		6202	0.3	-3.9
D1	680151	20930	0800	511842		6583	0.0	-5.6
P1	680151	20930	1630	516749		6658	0.3	-4.6
	680151	20930	0020	516371		6678	0.1	-4.3
D2	680151	20930	0800	511842		6653	0.2	-4.6
P2	680151	20930	1730	516749		6738	0.0	-3.4
M3	680151	20930		516371		6611	0.2	-5.3
D3	680151	20930	0840	516765		6676	0.2	-5.0
P3	680151	20930	1630	516749		6771	0.4	-2.9
M4	680151	20930	0100	507615		5890	0.3	-15.6
D4	680151	20930	430	514147		6821	0.3	-2.1
P4	680151	20930	1615	516749		6714	0.2	-3.8
M5	680151	20930	0105	516371		6612	0.0	-5.2
D5	680151	20930	0755	516765		6673	0.3	-4.4
P5								
M6								
D6								
P6								
M7								
D7								
P7								

% Error = $\frac{\text{net (cpm)} \times 0.3?? - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$

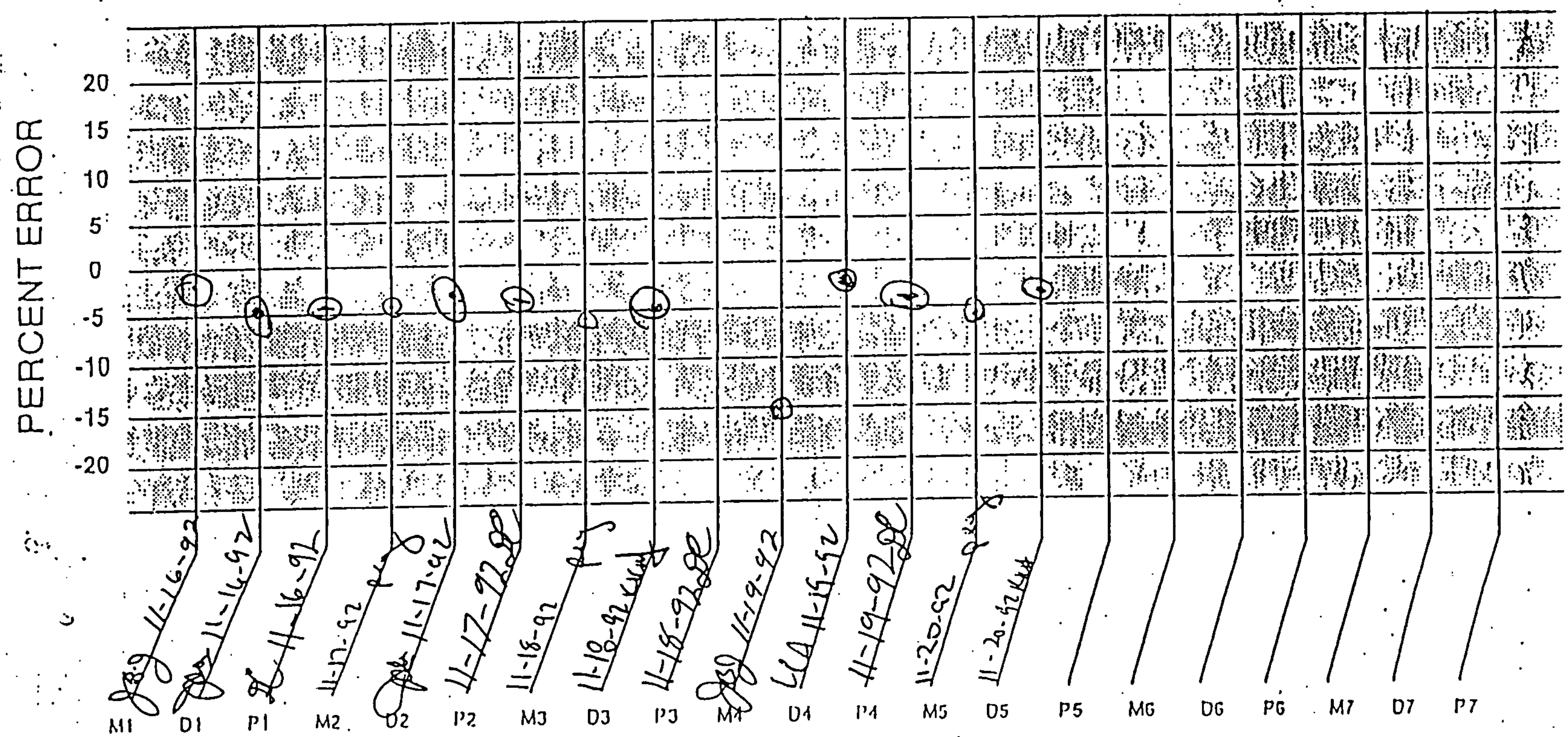
WHERE "CSL VALUE" IS IN DPM UNITS

Final Review

SMEAR COUNTER PERFORMANCE CHART

BUILDING 750 Pads LOCATION TENT #5

DATES FROM: 11/16/92 TO: 11/23/92



SMEAR COUNTER NUMBER: ______________

M = Mids, D = Days, P = PM's

Enter Initial and Date Beside (M, D, P)

DATE FORMAT MM/DD/YR

Acceptable limits are within +/- 20%

RF-4?976 (REV. 4/91)

COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 11-16-92
STOP DATE: 11-23-92

SERIAL NO: 832
750 Pads

Shift entry		Shift entry	
M1 / S/N: 680151 / VALUE: 20930 / TIME: 0100 EMP. NO: 507615 / FOREMAN:	SOURCE: (CPM) 6466 / BKG: (CPM) 0.6 / ERROR: (%) -7.3	SHIFT: P4 / SRC S/N: 680151 / VALUE: 20930 / TIME: 1615 EMP. NO: 516749 / FOREMAN:	SOURCE: (CPM) 6594 / BKG: (CPM) 0.4 / ERROR: (%) -5.5
D1 / S/N: 680151 / VALUE: 20930 / TIME: 0800 EMP. NO: 511842 / FOREMAN:	SOURCE: (CPM) 6537 / BKG: (CPM) 0.5 / ERROR: (%) -6.3	SHIFT: M5 / SRC S/N: 680151 / VALUE: 20930 / TIME: 0105 EMP. NO: 516371 / FOREMAN:	SOURCE: (CPM) 6508 / BKG: (CPM) 0.7 / ERROR: (%) -6.7
P1 / S/N: 680151 / VALUE: 20930 / TIME: 1630 EMP. NO: 516749 / FOREMAN:	SOURCE: (CPM) 6577 / BKG: (CPM) 0.3 / ERROR: (%) -5.7	SHIFT: D5 / SRC S/N: 680151 / VALUE: 20930 / TIME: 0755 EMP. NO: 516765 / FOREMAN:	SOURCE: (CPM) 6464 / BKG: (CPM) 0.6 / ERROR: (%) -7.3
M2 / S/N: 680151 / VALUE: 20930 / TIME: 0120 EMP. NO: 516371 / FOREMAN:	SOURCE: (CPM) 6658 / BKG: (CPM) 0.5 / ERROR: (%) -4.6	SHIFT: P5 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
D2 / S/N: 680151 / VALUE: 20930 / TIME: 0800 EMP. NO: 511842 / FOREMAN:	SOURCE: (CPM) 6613 / BKG: (CPM) 0.5 / ERROR: (%) -5.2	SHIFT: M6 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
P2 / S/N: 680151 / VALUE: 20930 / TIME: 1730 EMP. NO: 516749 / FOREMAN:	SOURCE: (CPM) 6467 / BKG: (CPM) 0.3 / ERROR: (%) -7.3	SHIFT: D6 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
M3 / S/N: 680151 / VALUE: 20930 / TIME: 0010 EMP. NO: 516371 / FOREMAN:	SOURCE: (CPM) 6527 / BKG: (CPM) 0.4 / ERROR: (%) -6.4	SHIFT: P6 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
D3 / S/N: 680151 / VALUE: 20930 / TIME: 0840 EMP. NO: 516765 / FOREMAN:	SOURCE: (CPM) 6540 / BKG: (CPM) 0.5 / ERROR: (%) -6.3	SHIFT: M7 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
P3 / S/N: 680151 / VALUE: 20930 / TIME: 1630 EMP. NO: 516749 / FOREMAN:	SOURCE: (CPM) 6535 / BKG: (CPM) 0.3 / ERROR: (%) -6.3	SHIFT: D7 / SRC S/N: / VALUE: / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
M4 / S/N: 680151 / VALUE: 20930 / TIME: 0100 EMP. NO: 507615 / FOREMAN:	SOURCE: (CPM) 6089 / BKG: (CPM) 0.8 / ERROR: (%) -12.7	SHIFT: P7 / SRC S/N: / VALUE: - / TIME: EMP. NO: / FOREMAN:	SOURCE: (CPM) / BKG: (CPM) / ERROR: (%)
D4 / SRC S/N: 680151 / VALUE: 20930 / TIME: 0430 EMP. NO: 519147 / FOREMAN:	SOURCE: (CPM) 6634 / BKG: (CPM) 0.6 / ERROR: (%) -4.9		

$$\% \text{ Error} = \frac{\text{net (cpm)} \times 0.3?? - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

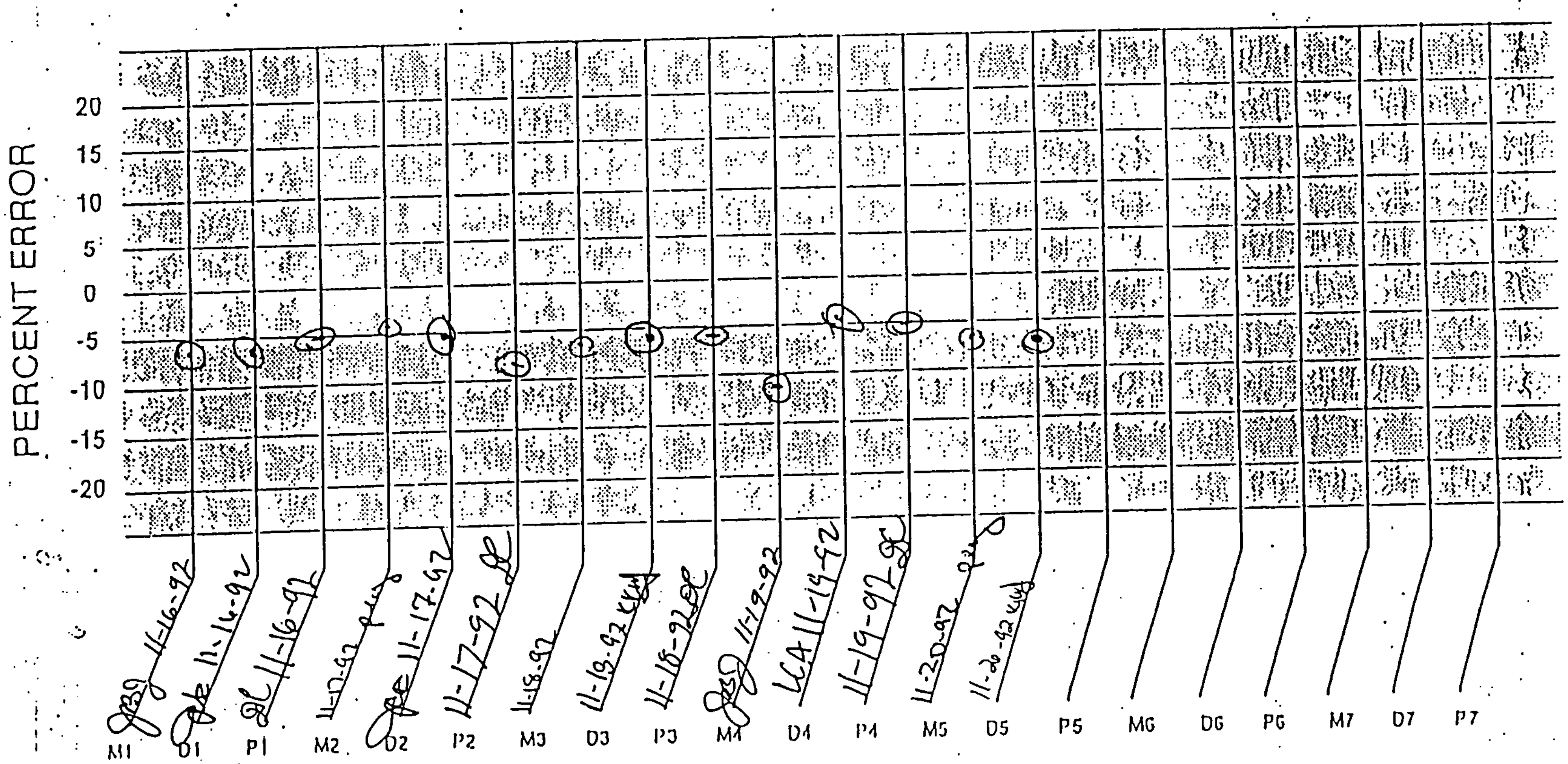
WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ____________

SMEAR COUNTER PERFORMANCE CHART

BUILDING 250 Pads LOCATION Tent #5

DATES FROM: 11/16/92 TO: 11/23/92



SMEAR COUNTER NUMBER: ____________

M = Mids, D = Days, P = PM's

Enter Initial and Date Beside (M, D, P)

RF- (REV. 4/91)

DATE FORMAT MM/DD/YR

Acceptable limits are within +/- 20%

COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 11-16-92

STOP DATE: 11-23-92

SERIAL NO: 960

750 Pad

M1 / 680151 / 20930 / 0100 EMP. NO: 507615 / ...AN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6540 / 0.2 / -6.2	SHIFT: P4 SRC S/N: 680151 VALUE: 20930 TIME: 1615 EMP. NO: 516749 FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6283 / 0.8 / -9.9
D1 / 680151 / 20930 / 0800 EMP. NO: 511842 / ...AN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6328 / 0.3 / -9.2	SHIFT: M5 SRC S/N: 680151 VALUE: 20930 TIME: 0105 EMP. NO: 516371 FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6369 / 0.3 / -8.7
P1 / 680151 / 20930 / 1630 EMP. NO: 516749 / ...AN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6323 / 0.9 / -9.4	SHIFT: D5 SRC S/N: 680151 VALUE: 20930 TIME: 0755 EMP. NO: 516765 FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6,292 / 0.7 / -9.8
M2 / 680151 / 20930 / 0020 EMP. NO: 516371 / ...MAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6376 / 0.8 / -8.6	SHIFT: P5 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
D2 / 680151 / 20930 / 0800 EMP. NO: 511842 SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6457 / 0.3 / -7.4	SHIFT: M6 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
P2 / 680151 / 20930 / 1730 EMP. NO: 516749 / ...MAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6223 / 0.8 / -10.8	SHIFT: D6 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
M3 / 680151 / 20930 / 010 EMP. NO: 516371 / ...MAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6376 / 0.1 / -8.6	SHIFT: P6 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
D3 / 680151 / 20930 / 0840 EMP. NO: 516765 / ...EMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6446 / 0.7 / -7.6	SHIFT: M7 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
P3 / 680151 / 20930 / 1630 EMP. NO: 516749 / ...EMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6393 / 0.8 / -8.4	SHIFT: D7 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
M4 / S/N: 680151 / 20930 / 0100 EMP. NO: 507615 / ...AN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6256 / 0.2 / -10.3	SHIFT: P7 SRC S/N: VALUE: TIME: EMP. NO: FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
D4 / SRC S/N: 680151 / VALUE: 20930 / TIME: 4:30 EMP. NO: 511141 / FOREMAN: SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6219 / 0.6 / -10.8		

$$\% \text{ Error} = \frac{\text{net (cpm)} \div 0.321 - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

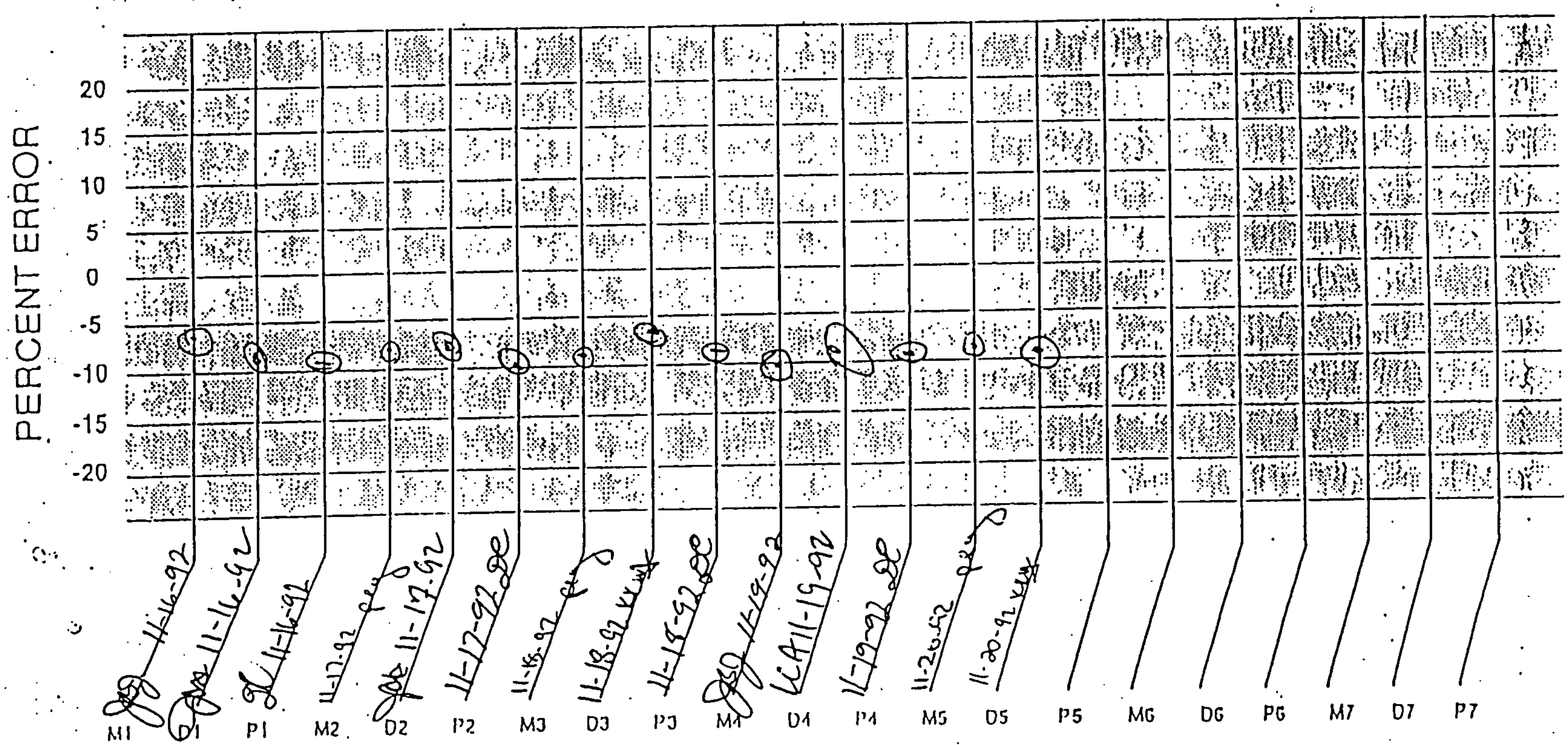
WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ____________

SMEAR COUNTER PERFORMANCE CHART

BUILDING 250 Pads LOCATION Tent #5

DATES FROM: 11 / 16 / 92 TO: 11 / 23 / 92



SMEAR COUNTER NUMBER: ________

M = Mids, D = Days, P = PM's

Enter Initial and Date Beside (M, D, P)

DATE FORMAT MM/DD/YR

Acceptable limits are within +/- 20%

RF-4 (REV. 4/91)

COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 11-16-92

STOP DATE: 11-23-92

SERIAL NO: 992

750 Pad

SHIFT	SRC S/N	VALUE	TIME	EMP. NO	FOREMAN	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1	680151	20930	0030	507615		5951	0.8	-14.7
D1	680151	20930	0800	511842		5900	0.6	-15.4
P1	680151	20930	1630	516749		5855	0.4	-16.1
M2	680151	20930	0020	516371		5928	0.4	-15.0
D2	680151	20930	0800	511842		5901	0.6	-15.4
P2	680151	20930	1230	516749		5862	0.4	-15.9
M3	680151	20930	0010	516371		6078	0.8	-12.9
D3	680151	20930	0840	516765		6027	0.8	-13.6
P3	680151	20930	1630	516749		5967	0.6	-14.5
M4	680151	20930	0100	507615		6815	0.7	-2.3
D4	680151	20930	430	514444		6027	0.9	-13.6
P4	680151	20930	1615	516749		5920	0.5	-15.1
M5	680151	20930	0105	516371		6049	0.5	-13.3
D5	680151	20930	0755	516765		5723	0.4	-17.9
P5								
M6								
D6								
P6								
M7								
D7								
P7								

$$\% \text{ Error} = \frac{\text{net (cpm)} \times 0.331 - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

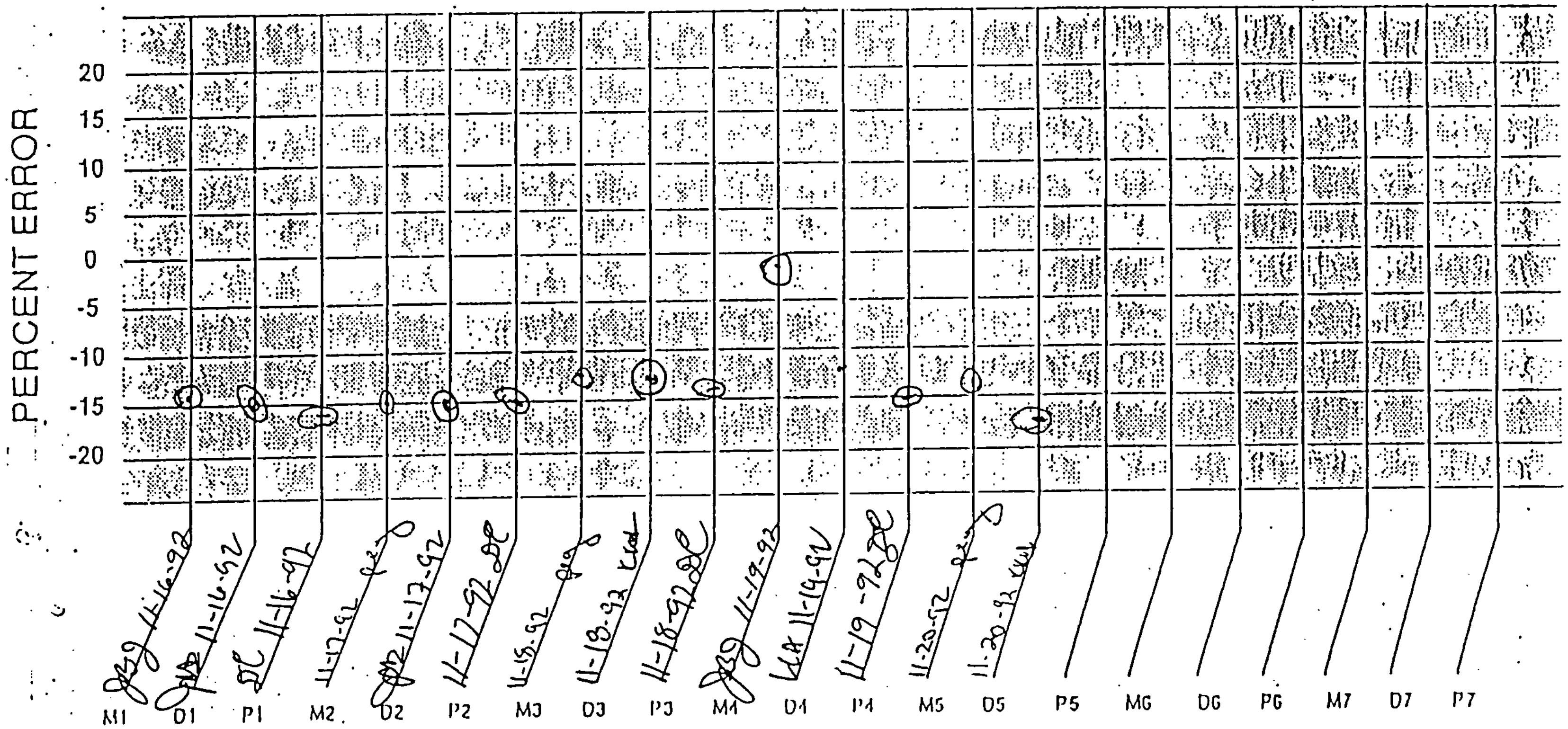
WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ______

SMEAR COUNTER PERFORMANCE CHART

BUILDING 750 Pad LOCATION Tent #5

DATES FROM: 11/16/92 TO: 11/23/92



SMEAR COUNTER NUMBER: ______________

M = Mids, D = Days, P = PM's

Enter Initial and Date Beside (M, D, P)

DATE FORMAT MM/DD/YR

Acceptable limits are within +/- 20%

RF-4??75 (REV. 4/91)

COUNTER PERFORMANCE TEST LOG SHEET

SERIAL NO: 972

750 Pad

START DATE: 11-16-92

STOP DATE: 11-23-92

Shift / Source		Source (CPM) / BKG (CPM) / Error (%)	Shift / Source		Source (CPM) / BKG (CPM) / Error (%)
M... S/N: 680151; VALUE: 20930; TIME: 0030; EMP. NO: 507615; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	6115 / 0.3 / -12.4	SHIFT: P4; SRC S/N: 680151; VALUE: ~~9675~~ 20930; TIME: 1615; EMP. NO: 516749; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5889 / 0.3 / -15.6
...D1; S/N: 680151; VALUE: 20930; TIME: 0800; EMP. NO: 511842; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5967 / 0.1 / -14.4	SHIFT: M5; SRC S/N: 680151; VALUE: 20930; TIME: 0105; EMP. NO: 516371; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5854 / 0.7 / -16.1
...P1; S/N: 680151; VALUE: 20930; TIME: 1630; EMP. NO: 516749; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5814 / 0.2 / -16.7	SHIFT: D5 2nd; SRC S/N: ~~680151~~ 680151; VALUE: 20930; TIME: 0755; EMP. NO: 516765; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5907 / 0.3 / -15.3
...M2; S/N: 680151; VALUE: 20930; TIME: 0020; EMP. NO: 516371; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5945 / 0.4 / -14.8	SHIFT: P5; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...D2; S/N: 680151; VALUE: 20930; TIME: 0800; EMP. NO: 511842; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5884 / 0.2 / -15.6	SHIFT: M6; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
S/N: 680151; VALUE: 20930; TIME: 1730; EMP. NO: 516749; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5832 / 0.2 / -16.4	SHIFT: D6; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...M3; S/N: 680151; VALUE: 20930; TIME: 0010; EMP. NO: 516371; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5807 / 0.5 / -16.8	SHIFT: P6; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...D3; S/N: 680151; VALUE: 20930; TIME: 0840; EMP. NO: 516765; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5900 / 0.2 / -15.4	SHIFT: M7; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...P3; S/N: 680151; VALUE: 20930; TIME: 1630; EMP. NO: 516749; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5832 / 0.4 / -16.1	SHIFT: D7; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...M4; S/N: 680151; VALUE: 20930; TIME: 0100; EMP. NO: 507615; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)		SHIFT: P7; SRC S/N:; VALUE:; TIME:; EMP. NO:; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	
...D4; S/N: 680151; VALUE: 20930; TIME: 8:30; EMP. NO: 514147; FOREMAN:	SOURCE: (CPM) BKG: (CPM) ERROR: (%)	5903 / 0.2 / ~~0.4~~ -15.3			

$$\% \text{ Error} = \frac{\text{net (cpm)} \times 0.3?? - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

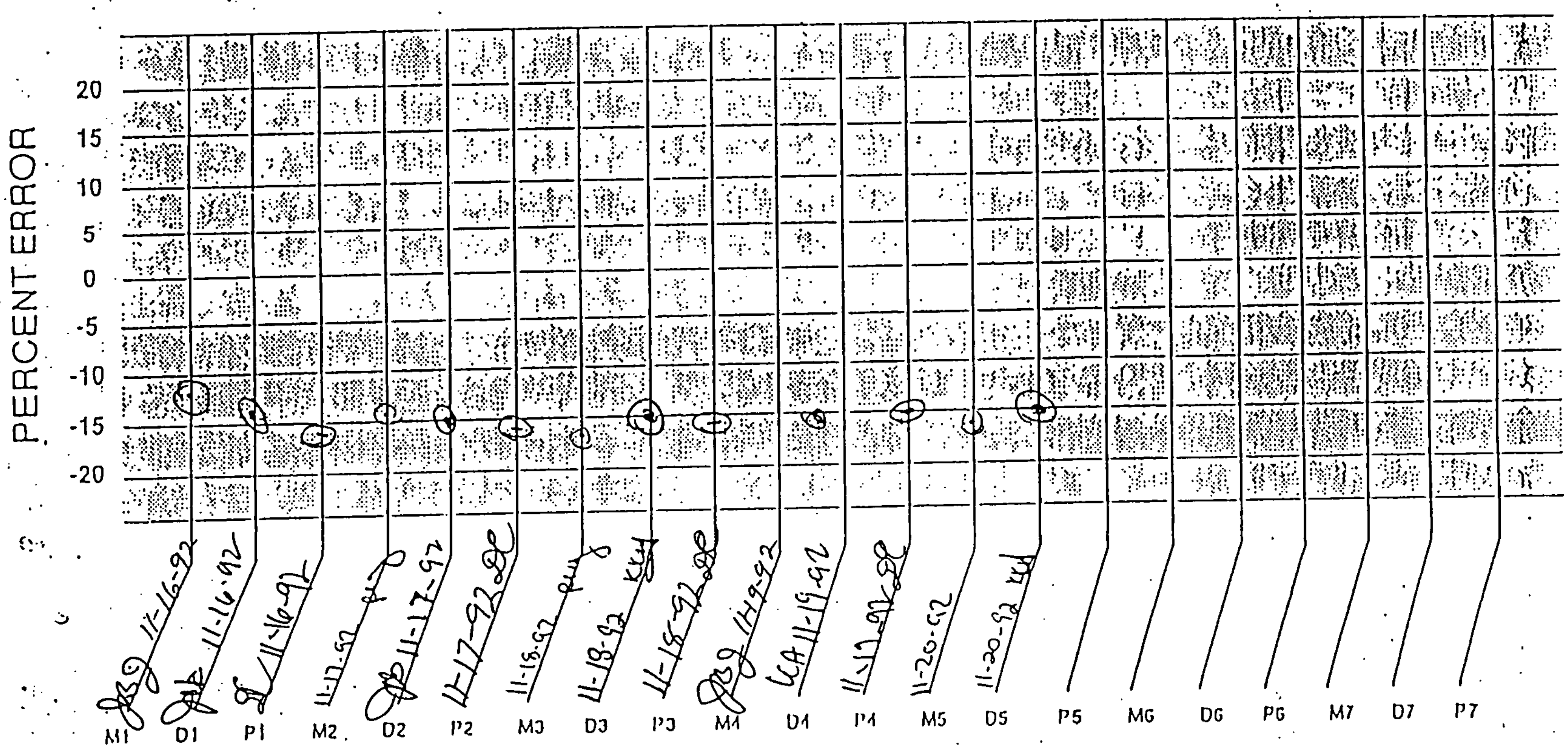
WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ____________

SMEAR COUNTER PERFORMANCE CHART

BUILDING 750 Pad LOCATION Tent #5

DATES FROM: 11/16/92 TO: 11/23/92



SMEAR COUNTER NUMBER: ______

M = Mids, D = Days, P = PM's

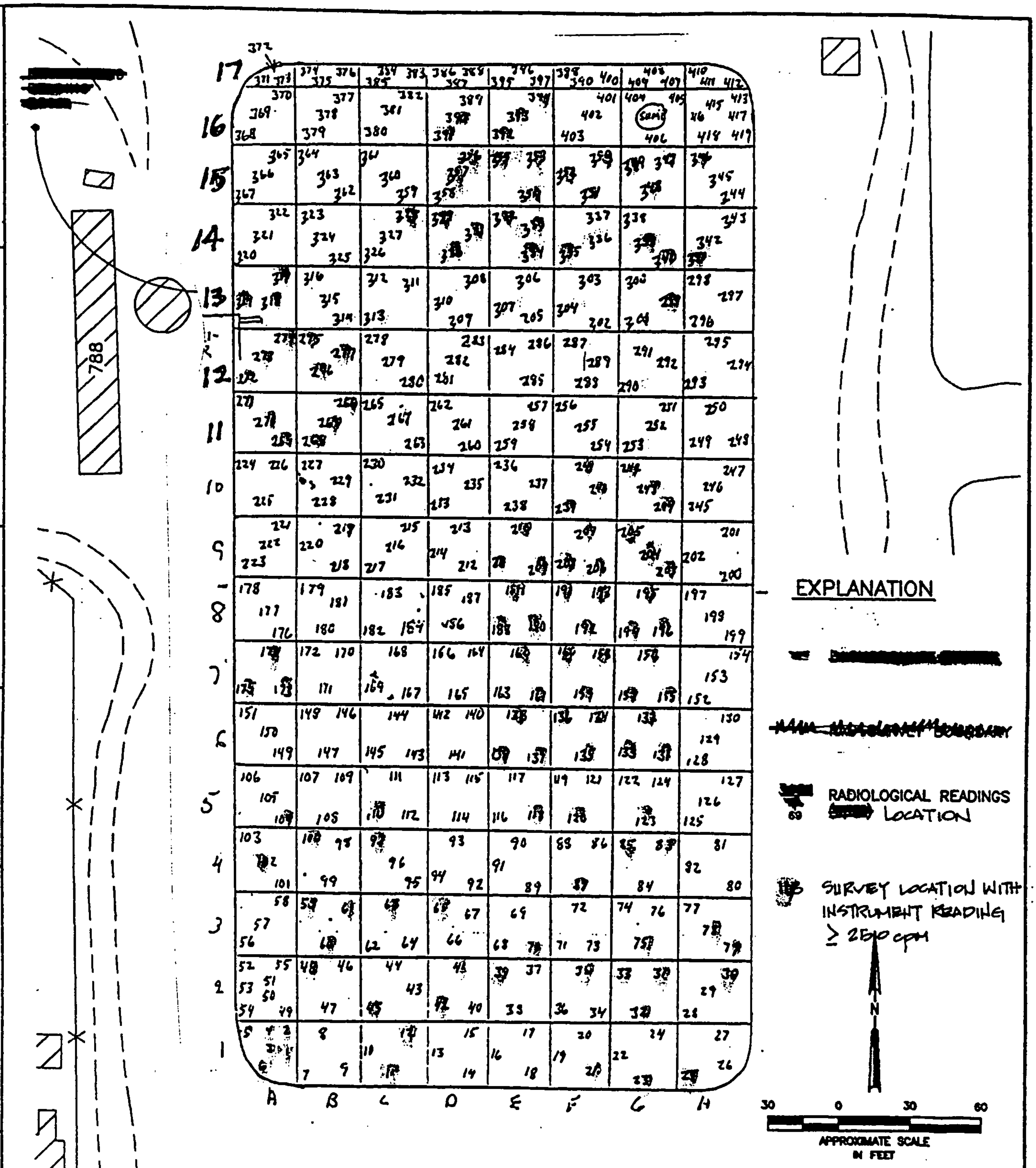
Enter Initial and Date Beside (M, D, P)

DATE FORMAT MM/DD/YR

Acceptable limits are within +/- 20%

R· 76 (REV. 4/91)

REVISION NO. 0	
FILE NAME	C:\OU4\RAD-207A.DWG
DATE	4\27\93
DRAWN BY	NSL dC
APPROVED BY	
CHECKED BY	



PREPARED FOR
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

FIGURE ~~4.1-3~~ 4.1-3

~~RADIOLOGIC SURVEY RESULTS~~
TOTAL ALPHA Radiation SURVEY Results

POND 207A ~~- OU4~~

NOTES:

1) POND 207A SURVEY WAS COMPLETED BY EG&G
2) TOTAL ALPHA SURVEY WAS CONDUCTED USING LUDLUM 12-1A METER AND AIR PROPORTIONAL DETECTOR.
3) ~~LESS THAN~~ INSTRUMENT READINGS < 250 cpm ARE CONSIDERED BELOW ACTION LIMITS PER RFP STANDARD OPERATING PROCEDURES

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: November 5, 1992

TO: D. J. Davidson, Radiological operations, Bldg. 881, X5772

From: R. W. Norton, Radiological Engineering, Bldg T690B, X4075

SUBJECT: RADIOLOGICAL SAMPLING PLAN FOR 207A POND RWN-015-92

Prior to the initiation of Phase one of the RCRA (Resource Conservation & Recovery Act) Facility Investigation/Remedial Investigation of Operable Unit 4, a radiological survey of solar Pond 207A must be conducted. Radiological Engineering (RE) in response to the activities that will occur in the 207 a Pond, has developed a Radiological Sampling Plan (attachment) to determine the radiological protection criteria for activities within the 207A Pond. In order to not divert the Inter Agency Department (IAG) schedule which is to start November 23, 1992, a completion date of November 20, 1992 is necessary.

If you have any questions please contact me at Extension 4075, or Digital Page, 0971.

RWN

Attachment:
As Stated

cc:
K. D. Anderson
B. L. Austin
W. W. Bailey
D. R. Ferrier
E. M. Lee
R. T. Ogg
J. D. Roberts

RADIOLOGICAL PROTECTION SAMPLING PLAN
SOLAR PONDS REMEDIATION PROJECT
207 A POND
NOVEMBER 5, 1992
SUBMITTED BY
R. W. NORTON
RADIOLOGICAL ENGINEERING

Introduction

Prior to the initiation of phase one of the RCRA (Resource Conservation & Recovery Act) Facility Investigation/Remedial Investigation of Operable Unit 4, a radiological survey of Solar Pond 207A must be conducted. Radiological Engineering (RE) has developed and submitted the following sampling plan to determine the radiological protection criteria for activities within the 207A Pond.

Methods and Materials

The 207 A pond will be divided into grids 100 meters squared, RE will supply a map of the pond with the number of grids. A random survey (a minimum of three sampling points in each grid) for alpha removable plus fixed and a gross gamma survey will be required within each grid. If a sample is greater than the allowable limits within the grid a more detailed survey within the grid will be required.

Alpha Survey

A Alpha fixed plus removable will be conducted using a ludlun 12-1A coupled to air proportional detector and SAC 4 for removable. Direct plus removable Alpha survey of the pond will be conduct according to ROI (Radiological Operating Instructions) 3.1, "performance of Surface Contamination Surveys".

Gross Gamma Survey

A gross gamma survey will be conducted using the Bicron Field Instrument for the detection of low energy Radiation (FIDLER). Surveys utilizing the FIDLER will be conducted according to ROI 6.6, "use of the Bicron FIDLER (Field instrument for the Detection of Low energy Radiation)". A walk over survey will be conducted of each grid to identify elevated areas of contamination. Action levels are identified in the procedure.

Documentation

All sample location will be documented and approved by Radiological operations supervision in accordance with ROI 3.01, and submitted to RE for review.

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: July 8, 1993

TO: E. A. Christopher, Radiological Operations, Bldg. 881, X5772

From: R. W. Norton, Radiological Engineering, Bldg. T690B, X4075

SUBJECT: RADIOLOGICAL SAMPLING PLAN FOR THE 207B CENTER SOLAR POND RWN-024-93

This memorandum is a supplement to the memorandum dated July 2, 1993, from R. W. Norton, subject, Radiological Sampling Plan for the 207B center Solar Pond RWN-021-93. Attached is the Sampling Plan with the additions, the additions are underlined. The additions to the plan also change the estimated time of 72 Man Hours to 75 Man Hours, that it will take to complete the Sampling of the 207B center Solar Pond.

If you have any questions please contact me at Extension 4075, or Digital Page 7973.

RWN

Attachment:
As Stated

cc:
G. M. Aldrich
W. W. Bailey
R. W. Boyle
S. W. Dewitt
S. R. Keith
J. B. Mellen
R. V. Morgan
R. T. Ogg
J. D. Roberts

RADIOLOGICAL PROTECTION SAMPLING PLAN
SOLAR PONDS REMEDIATION PROJECT
207B CENTER SOLAR POND
JULY 2, 1993
SUBMITTED BY
R. W. NORTON
RADIOLOGICAL ENGINEERING

Introduction

Prior to the initiation of phase one of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation of Operable Unit (OU) 4, a radiological survey of the 207B center Solar Pond must be conducted. Radiological Engineering has developed and submitted the following sampling plan to determine the radiological protection criteria for the activities within the 207B center Solar Pond.

Methods and Materials

The 207B center Solar Pond will be divided into grids 5 meters squared, Radiological Engineering will supply a map of the pond with the number of grids. One sample will be taken in each grid for Alpha removable plus fixed, Beta removable and a gross Gamma survey will be required at each sampling point. If a sample is greater than the allowable limits a more detailed survey within the grid will be required.

Alpha Survey

An Alpha fixed plus removable survey will be conducted using a Ludlum 12-1A coupled to an air proportional detector and a SAC 4 for removable. Direct plus removable Alpha survey of the pond will be conducted in accordance to Radiological Operation Instructions (ROI) 3.1, "Performance of Surface Contamination Surveys".

Gross Gamma Survey

A gross Gamma survey will be conducted using the Bicron Field Instrument for the Detection of Low Energy Radiation (FIDLER). Surveys utilizing the FIDLER will be conducted according to ROI 6.6, " Use of the Bicron FIDLER (Field Instrument for the Detection of Low Energy Radiation)". The background reading will be taken outside of the 207B center Pond, between the 207A, and 207B series ponds. One sample will be taken in each grid to identify elevated areas of contamination. Action Levels are identified in the procedure.

Beta/Gamma Survey

A Beta/Gamma fixed plus removable will be conducted using the Ludlum 31 with the GM Pancake Probe for direct, and the Eberline BC-4, for removable. Direct plus removable Beta/Gamma survey will be conducted in accordance to Radiological Operation Instructions (ROI) 3.1, " Performance of Surface Contamination Surveys ".

Documentation

All sample results will be documented and approved by Radiological Operations Supervision in accordance with ROI 3.01, and submitted to Radiological Engineering for review.

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: September 8, 1993

TO: R. T. Ogg, Solar Ponds Remediation Program, Bldg. 080, X8608

From: R. W. Norton, Radiological Engineering, Bldg. T690B, X4075

SUBJECT: RADIOLOGICAL SURVEY ~~207A~~ SOLAR POND -RWN-036-93
B-Center

Attached is the Radiological survey of the liner of the 207B Center Solar Pond, for the support of Phase I RCRA Facility Investigation Remedial Investigation of OU4.

The survey information will be used to establish the requirements for the Radiological Work Permits (RWP's) for work to be preformed in the 207B Center Solar pond by the sub contractor. The sub contractor will also use the information in support of the characterization of the 207B Center Solar Pond under the remedial investigation process.

If you have any questions concerning this please contact me at Extension 4075 of Pager D7973.

rwn

Attachment
As stated.

cc:
G. M. Aldrich, w/o Attachment
W. W. Bailey
R. W. Boyle
E. A. Christopher, w/o Attachment
S. M. Paris
J. D. Roberts, w/o Attachment

RADIOLOGICAL
Contamination Survey

Taken by: R.A. Bider Emp. [redacted] Reviewed by:

Taken by: B.M. Hunter Emp. Rad Ops Foreman W. Bailey Emp. # [redacted]

Taken by: ______ Emp. # ______ Name/Organization ______ Emp. # ______

Date: 7/28/93 Building: 207B

Time: 1300 Room #: Center

Shift: Days

Survey Description: 207B Center Pond Direct d/m, Smear d/m α and β Gross Gamma

INSTRUMENTATION USED

Smear Counters

Mfg:	Eberline	Eberline	Eberline	Eberline	Eberline
Model:	Sac-4	Sac-4	Sac-4	Sac-4	Sac-4
Serial #:	773	810	799	984	991
Date Perf. Ck:	7-10-93	7-10-93	7-10-93	7-10-93	7-29-93
Date Calib'd:	2-20-93	5-11-93	6-25-93	7-1-93	8-25-92
Cal. Due Date:	2-94	5-94	6-94	7-94	8-93

Mfg:	Eberline	Eberline	Eberline		
Model:	Sac-4	BC-4	BC-4		
Serial #:	827	706	707		
Date Perf. Ck:	~~7~~-29-93	7-10-93	7-29-93		
Date Calib'd:	5-19-93	10-92	4-29-93		
Cal. Due Date:	5-94	10-93	4-94		

Bk. 45

Survey Instruments

Mfg:	Ludlum	Ludlum	Bicron	Ludlum	
Model:	12-1a	31	FIDLER	31	
Serial #:	75946	61626	A518P	61620	
Date Perf. Ck.	7-10-93	7-10-93	7-23-93	7-20-93	
Date Calib'd:	8-92	9-92	4-1-93	7-92	
Cal. Due Date:	8-93	9-93	4-94	7-93	
Background:	<250	100	1694	150	

COMMENTS

RADIOLOGICAL CONTAMINATION SURVEY

RESULTS

Date: 7/28/93 Time: 1300 Building 207 B Center Room: N/A

	cpm Removable (Swipe)	Initial cpm Direct	dpm/100cm² Removable (Smear)
1		<250	9
2		<250	3
3		<250	12
4		<250	6
5		<250	9
6		<250	12
7		<250	3
8		<250	12
9		<250	6
10		<250	6
11		<250	6
12		<250	3
13		<250	3
14		<250	15
15		<250	3
16		<250	9
17		<250	6
18		<250	3
19		300	3
20		<250	6
21		<250	3
22		<250	3
23		<250	3
24		<250	0
25		<250	3
26		<250	0
27		<250	0
28		<250	0
29		<250	3
30		<250	3
31		<250	0
32		<250	0
33		<250	0
34		<250	0
35		<250	6
36		<250	3
37		<250	0
38		<250	3
39		<250	0
40		<250	3
41		<250	0
42		<250	12
43		<250	0
44		<250	3
45		<250	3

	cpm Removable (Swipe)	Beta cpm Direct	dpm/100cm² Removable (Smear)
1		6000	48
2		150	46
3		150	61
4		140	70
5		120	50
6		150	54
7		150	60
8		150	100
9		100	40
10		250	43
11		350	45
12		100	111
13		100	66
14		150	43
15		180	46
16		160	69
17		300	44
18		150	34
19		180	40
20		160	42
21		200	28
22		150	48
23		180	64
24		200	50
25		200	38
26		180	51
27		200	37
28		200	36
29		220	47
30		350	80
31		150	36
32		250	26
33		180	60
34		200	55
35		250	64
36		200	72
37		150	48
38		250	70
39		350	36
40		300	50
41		200	44
42		150	36
43		100	33
44		200	69
45		150	50

Control No.________

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial

~~[illegible]~~ Beta

Date Completed:______________

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
46.		250	0
47.		<250	3
48.		<250	3
49.		300	0
50.		<250	0
51.		<250	0
52.		<250	3
53.		250	0
54.		<250	9
55.		<250	0
56.		<250	9
57.		<250	12
58.		<250	3
59.		<250	3
60.		<250	3
61.		<250	12
62.		250	6
63.		250	18
64.		<250	9
65.		<250	3
66.		<250	18
67.		250	6
68.		250	12
69.		<250	3
70.		250	21
71.		<250	18
72.		<250	24
73.		<250	3
74.		500	3
75.		<250	6
76.		<250	9
77.		<250	12
78.		<250	6
79.		<250	0
80.		250	0
81.		250	3
82.		<250	0
83.		250	3
84.		<250	9
85.		300	3
86.		500	9
87.		<250	3
88.		300	0
89.		<250	0

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
46.		300	48
47.		300	24
48.		250	60
49.		250	21
50.		250	33
51.		200	27
52.		250	15
53.		200	90
54.		300	15
55.		450	6
56.		<BG	39
57.		<BG	21
58.		100	24
59.		<BG	0
60.		<BG	45
61.		150	36
62.		<BG	18
63.		250	~~60~~ ~~100~~ 75
64.		100	0
65.		100	48
66.		150	6
67.		<BG	18
68.		250	90
69.		150	60
70.		<BG	0
71.		<BG	0
72.		150	39
73.		<BG	12
74.		<BG	15
75.		150	81
76.		<BG	30
77.		<BG	18
78.		<BG	54
79.		150	15
80.		350	12
81.		300	30
82.		150	0
83.		<BG	27
84.		250	30
85.		150	21
86.		200	9
87.		200	15
88.		<BG	3
89.		<BG	3

Control No.________

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial

~~Recovery~~ Beta

Date Completed:________

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
91.		<250	6
92.		<250	3
93.		250	0
94.		750	0
95.		300	6
96.		<250	3
97.		<250	3
98.		300	0
99.		250	6
100.		<250	3
101.		<250	0
102.		<250	3
103.		<250	0
104.		<250	3
105.		<250	0
106.		250	3
107.		300	0
108.		400	15
109.		300	6
110.		<250	0
111.		<250	9
112.		<250	3
113.		<250	3
114.		300	0
115.		<250	6
116.		<250	3
117.		250	12
118.		500	3
119.		<250	0
120.		<250	0
121.		<250	0
122.		<250	15
123.		<250	3
124.		<250	0
125.		<250	3
126.		<250	0
127.		<250	6
128.		<250	0
129.		<250	0
130.		800	0
131.		<250	0
132.		300	12
133.		<250	6
134.		350	6
135.		<250	0

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
91.		<BG	15
92.		<BG	0
93.		<BG	0
94.		<BG	0
95.		<BG	0
96.		<BG	12
97.		<BG	0
98.		150	0
99.		100	18
100.		100	0
101.		200	9
102.		<BG	0
103.		<BG	0
104.		100	0
105.		250	0
106.		<BG	0
107.		100	0
108.		<BG	15
109.		<BG	0
110.		150	21
111.		<BG	12
112.		400	6
113.		300	21
114.		<BG	36
115.		150	0
116.		150	15
117.		100	0
118.		<BG	0
119.		<BG	18
120.		400	0
121.		300	0
122.		300	0
123.		150	18
124.		500	24
125.		<BG	12
126.		200	0
127.		200	0
128.		<BG	0
129.		150	12
130.		<BG	6
131.		<BG	15
132.		<BG	0
133.		200	0
134.		<BG	0
135.		350	0

Control No. ______

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial

[redacted] Beta

Date Completed: ______________

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
136.		250	3
137.		<250	0
138.		500	0
139.		<250	0
140.		800	0
141.		<250	0
142.		<250	3
143.		250	9
144.		<250	0
145.		<250	3
146.		<250	0
147.		<250	0
148.		<250	0
149.		250	3
150.		500	15
151.		600	3
152.		<250	15
153.		<250	0
154.		<250	6
155.		300	6
156.		<250	6
157.		<250	3
158.		<250	0
159.		<250	0
160.		<250	3
161.		<250	3
162.		<250	0
163.		<250	0
164.		<250	0
165.		<250	3
166.		<250	3
167.			
168.			
169.			
170.			
171.			
172.			
173.			
174.			
175.			
176.			
177.			
178.			

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
136.		100	0
137.		<BG	0
138.		200	0
139.		<BG	39
140.		200	0
141.		<BG	0
142.		<BG	15
143.		<BG	0
144.		150	6
145.		250	30
146.		<BG	6
147.		<BG	0
148.		150	9
149.		<BG	0
150.		<BG	0
151.		<BG	21
152.		200	0
153.		150	0
154.		<BG	3
155.		<BG	12
156.		<BG	6
157.		150	0
158.		<BG	3
159.		<BG	0
160.		<BG	0
161.		<BG	6
162.		<BG	9
163.		<BG	0
164.		<BG	0
165.		400	0
166.		<BG	3
167.			
168.			
169.			
170.			
171.			
172.			
173.			
174.			
175.			
176.			
177.			
178.			

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. SPECIAL

Taken by: R. A. Badler Emp. [redacted]eviewed by:
Taken by: B B Hunter Emp. [redacted]ad Ops Foreman ________ Emp. # ______
Taken by: ________ Emp. # ______ Name/Organization ________ Emp. # ______

Date: 7/93 Building: 207B
Time: —
Room #: Center
Shift: All

Survey Description: 207 B Center Solar Pond — Gross Gamma

BICRON FIDLER

Mfg:	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	Bicron				
Serial #:	A518P				
Date Perf. Ck:	7-23+29-93				
Date Calib'd:	4-1-93				
Cal. Due Date:	4-94				

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
1.	1694	5000	4674	Y	12.	1694	2500	2389	Y
2.	1694	3000	3566	Y	13.	1694	2000	2121	Y
3.	1694	3000	2607	Y	14.	1694	3000	2847	Y
4.	1694	2500	2323	Y	15.	1694	2500	2518	Y
5.	1694	3000	2727	Y	16.	1694	3000	3045	Y
6.	1694	2500	2462	Y	17.	1694	3000	2689	Y
7.	1694	2000	2200	Y	18.	1694	2500	2159	Y
8.	1694	3000	2540	Y	19.	1694	2500	2420	Y
9.	1694	3000	2563	Y	20.	1694	3000	2647	Y
10.	1694	3000	2625	Y	21.	1694	2500	2479	Y
11.	1694	3000	2921	Y	22.	1694	2500	2315	Y

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. SPECIAL

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
23.	1694	2500	2404	Y
24.	1694	2500	2340	Y
25.	1694	2500	2331	Y
26.	1694	2500	2365	Y
27.	1694	3000	2616	Y
28.	1694	2500	2294	Y
29.	1694	2500	2399	Y
30.	1694	2500	2436	Y
31.	1694	3000	2577	Y
32.	1694	2000	2181	Y
33.	1694	3000	2811	Y
34.	1694	2500	2251	Y
35.	1694	2500	2403	Y
36.	1694	2500	2443	Y
37.	1694	3000	2152	Y
38.	1694	3000	2657	Y
39.	1694	2000	2094	Y
40.	1694	2500	2391	Y
41.	1694	3000	2794	Y
42.	1694	2500	2311	Y
43.	1694	2500	2278	Y
44.	1694	3000	2758	Y
45.	1694	2500	2258	Y
46.	1694	2500	2282	Y
47.	1694	2000	2029	Y
48.	1694	3000	2446	Y
49.	1694	2500	2294	Y

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
50.	1694	2000	2067	Y
51.	1694	2500	2377	Y
52.	1694	2500	2298	Y
53.	1694	3000	2927	Y
54.	1694	3000	2492	Y
55.	1694	3000	2859	Y
56.	1694	2000	1937	Y
57.	1694	2000	1902	Y
58.	1694	2000	2117	Y
59.	1694	2000	2014	Y
60.	1694	2000	2033	Y
61.	1694	2000	1919	Y
62.	1694	2500	2379	Y
63.	1694	3000	2827	Y
64.	1694	3000	2683	Y
65.	1694	2500	2348	Y
66.	1694	3000	2995	Y
67.	1694	2500	2424	Y
68.	1694	2000	2162	Y
69.	1694	3000	2966	Y
70.	1694	2500	2486	Y
71.	1694	2500	2446	Y
72.	1694	2000	2289	Y
73.	1694	4000	3551	Y
74.	1694	3500	3429	Y
75.	1694	2500	2533	Y
76.	1694	2000	2208	Y
77.	1694	3000	2646	Y
78.	1694	2500	2255	Y
79.	1694	3500	3536	Y
		4500	4245	Y
80.	1694	2500	2525	Y
81.	1694	2000	2153	Y
82.	1694	3000	2804	Y
83.	1694	2500	2286	Y
84.	1694	2500	2391	Y
85.	1694	3000	2895	Y
86.	1694	[illegible]	[illegible]	Y

BKG	c/m Meter	Scaler	Area Posted Y/N
8.1694	2500	2349	Y
[illegible]1694	3000	2592	Y
[illegible]	3000	2877	Y
1.1677	4000	4046	Y
2.1694	3000	2743	Y
3.1694	2500	2306	Y
4.1694	2500	2316	Y
5.1694	2500	2177	Y
6.1694	2000	2189	Y
7.1694	2500	2467	Y
8.1694	2000	2034	Y
9.1694	2500	2242	Y
0.1694	2500	2415	Y
1.1694	3000	3135	Y
2.1694	4000	3659	Y
3.1694	3000	2969	Y
4.1694	2500	2343	Y
5.1694	2000	2170	Y
[illegible]	2500	2497	Y
7.1694	2500	2209	Y
8.1694	2500	2229	Y
9.1694	2000	2083	Y
.1694	2500	2143	Y
.1694	3000	2647	Y
.1694	2500	2451	Y
.1694	3000	2519	Y
.1694	3000	2446	Y
.1694	3000	2775	Y
.1694	2500	2390	Y
.1694	2000	2010	Y
.1694	2500	2316	Y
[illegible]	2500	2521	Y
0.1694	2500	2511	Y
1.1694	2500	2410	Y
2.1694	3000	2588	Y
.1694	[illegible]	2442	Y

BKG	c/m Meter	Scaler	Area Posted Y/N
124.1694	2500	2359	Y
125.1694	2500	2502	Y
126.1694	3000	2611	Y
127.1694	2500	2410	Y
128.1694	3000	2416	Y
129.1694	2500	2452	Y
130.1694	2500	2216	Y
131.1694	3000	2760	Y
132.1694	2000	2160	Y
133.1694	2500	2450	Y
134.1694	3000	2988	Y
135.1694	3000	2968	Y
136.1694	2500	2241	Y
137.1694	2500	2356	Y
138.1694	3000	2496	Y
139.1694	3000	2612	Y
140.1694	3000	2550	Y
141.1694	3000	2961	Y
142.1694	2500	2344	Y
143.1694	2500	2282	Y
144.1694	2000	2190	Y
145.1694	3000	2860	Y
146.1694	3000	3011	Y
147.1694	3000	2570	Y
148.1694	3000	2894	Y
149.1694	3000	2750	Y
150.1694	2000	2014	Y
151.1694	2500	2364	Y
152.1694	2500	2305	Y
153.1694	3000	2852	Y
[illegible]	[illegible]	[illegible]	Y

DKG	Meter	[illegible]	Posted Y/N
5.1694	2500	2221	Y
194	3000	2754	Y
7.1694	3500	3210	Y
8.1694	2500	2240	Y
9.1694	2500	2327	Y
0.1694	2500	2544	Y
1.1694	2500	2210	Y
2 194	3000	2840	Y
3.1694	2500	2509	Y
4.1694	2000	2071	Y
5.1694	2500	2231	Y

Radiation Protection
Solar Ponds - B Series

	1	2	3	4	5	6	7	8	9	10	11
A	1	2	3	4	5	6	7	8	9	10	11
B	12	13	14	15	16	17	18	19	20	21	22
C	23	24	25	26	27	28	29	30	31	32	33
D	34	35	36	37	38	39	40	41	42	43	44
E	45	46	47	48	49	50	51	52	53	54	55
F	56	57	58	59	60	61	62	63	64	65	66
G	67	68	69	70	71	72	73	74	75	76	77
H	78	79	80	81	82	83	84	85	86	87	88
I	89	90	91	92	93	94	95	96	97	98	99
J	100	101	102	103	104	105	106	107	108	109	110
K	111	112	113	114	115	116	117	118	119	120	121
L	122	123	124	125	126	127	128	129	130	131	132
M	133	134	135	136	137	138	139	140	141	142	143
N	144	145	146	147	148	149	150	151	152	153	154
O	155	156	157	158	159	160	161	162	163	164	165

North →

BICRON FIDLER PERFORMANCE TEST LOG

Instrument Serial # A518P Detector Serial # A066Q Probe Efficiency 19.86 Date Due Calibration 4/94

DATE	USER EMPLOYEE NUMBER	BACKGND CPM	SOURCE RESPONSE SCALER	RATEMETER	RANGE	[redacted]	REMARKS	IN TOL? Y	N
6/18/93	RPT	1618	131389	130K	1K		Change Battery	✓	
6-21-93	RPT	1873	135503	130K	1K		[signature]	✓	
6/22/93	RPT	1941	130382	135K	1K		[signature]	✓	
6/23/93	RPT	2288	139233	140K	1K		[signature]	X	
6/24/93	RPT	2749	137108	140K	1K		[signature]	✓	
6/25/93	RPT	2171	138071	140K	1K		[signature]	✓	
6/28/93	RPT	3153	138999	140K	1K		[signature]	X	
6/29/93	RPT	2775	140454	140K	1K		[signature]	✓	
6/30/93	RPT	2646	141006	140K	1K		[signature]	✓	
7/1/93	RPT	2262	141735	140K	1K		[signature]	✓	
7/2/93	RPT	3394	141620	140K	1K		[signature]	✓	
7/6/93	RPT	2219	144672	140K	1K		[signature]	X ✓	
7/7/93	RPT	2327	144931	145K	1K		[signature]		
7/8/93	RPT	1888	140747	140K	1K		[signature]	✓	
7/9/93	RPT	1788	135949	135K	1K		[signature]	X	
7/21/93	RPT	1856	138464	135K	1K		[signature]	✓	
7/22/93	RPT	2192	140016	135K	1K		[signature]	✓	

CSL Source # 603475

Date Due Cal. 7/93

Activity (DPM alpha) 1843940

Equivalent Rdg. = [Source DPM x 0.38 x Calibrated % efficiency]: 139158 CPM-photon

Tolerance (+/-) 20 %: 166990 to 111326 CPM-photon

This form will be initiated as required, information from the instrument will be placed at the top of the form. The information in the center section is recorded from Performance Test. The information in the lower section is from the sources. The Equivalent reading is calculated by taking the DPM of the source and multiply by the fix value of 0.38 and then multiply by the percent of efficiency listed on the probe from the last time the instrument was calibrated. Equivalent Reading is calculated and recorded when the form is initiated. One source is calculated per Test Log sheet.

EQUIPMENT Fidley
SERIAL # A518P
CAL. DUE 4/94

1993

JULY

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 815 518865	2 810 516300	3
4	5	6 0803 517940	7 0755 512332	8 0808 517971	9 1525 518556	10
11	12	13	14	15	16	17
18	19	20	21 0745 516300	22 0750 512332	23 0825 516300	24
25	26	27 0815 518865	28 0809 517940	29 0816 517940	30 0859 519333	31

PERFORMANCE TEST VALID FOR 24 HOURS
AFTER LAST DATE AND TIME MARKED

BICRON FIDLER PERFORMANCE TEST LOG

Instrument Serial # A51PP Detector Serial # A066Q Probe Efficiency 19.86 Date Due Calibration 4/94

DATE	USER EMPLOYEE NUMBER	BACKGND CPM	SOURCE RESPONSE SCALER	SOURCE RESPONSE RATEMETER	SOURCE RESPONSE RANGE	[redacted]	REMARKS	IN TOL? Y	IN TOL? N
7/23/93	RPT	2667	138355	140K	1K		N/A	✓	
7/27/93	RPT	1886	137027	140K	1K		N/A	✓	
7/28/93	RPT	2654	138733	140K	1K		N/A	X	
7/29/93	RPT	1990	137719	140K	1K		N/A	X	
7-30-93	"	2557	132909	135K	1K		N/A	✓	
8/2/93	RPT	3099	142370	140K	1K		N/A	✓	
8/3/93	RPT	1890	140083	140K	1K		Na	✓	
8/4/93	RPT	2216	139244	140K	1K		N/A	✓	
8/5/93	RPT	2104	138503	140K	1K		N/A	X	
8/6/93	RPT	1749	136918	135K	1K		Na	✓	
8/9/93	"	2666	138018	140K	1K		N/A	✓	
8/10/93	RPT	2838	138575	140K	1K		N/A	✓	
8/11/93	RPT	2190	139583	140K	1K		N/A	✓	
8/12/93	"	1732	138694	140K	1K		N/A	✓	
~~8-12-93~~	~~RP~~				8/13/93		~~N/A~~		
8/13/93	RPT	1985	138984	135K	1K		N/A	✓	

CSL Source # 603475

Date Due Cal. 7/93

Activity (DPM alpha) 1843940

Equivalent Rdg. = [Source DPM x 0.38 x Calibrated % efficiency]: 139158 CPM-photon

Tolerance (+/-) 20 %: 166990 to 111326 CPM-photon

This form will be initiated as required, information from the instrument will be placed at the top of the form. The information in the center section is recorded from Performance Test. The information in the lower section is from the sources. The Equivalent reading is calculated by taking the DPM of the source and multiply by the fix value of 0.38 and then multiply by the percent of efficiency listed on the probe from the last time the instrument was calibrated. Equivalent Reading is calculated and recorded when the form is initiated. One source is calculated per Test Log sheet.

LUDLUM MODEL 12-1A PERFORMANCE TEST LOG

ALPHA SOURCE CHECK

INSTRUMENT SERIAL #: 75946   DATE DUE CALIB: 8-93   BUILDING: 788

These forms will be used to record parameters noted during daily performance checks. If any instrument requires additional repair or service, return to Radiation Instrumentation

DATE/TIME	RPT NAME/EMP #	INSTRUMENT READINGS (CPM) X1 PRE	X1 POST	X10 PRE	X10 POST	X100 PRE	X100 POST	X1K PRE	X1K POST	CHECK SOURCE VALUE (CPM)	PROBE S/N	IN TOL (Initials) PRE	IN TOL POST	FOREMAN'S SIGNATURE
5-13-93/0900	[redacted]	650		5500		55K		600K			8415446	jm		N. Bailey
5-14-93/0800	[redacted]	600		5000		60K		650K			8415446	jm		N. Bailey
5-18-93/0000	[redacted]	650		5500		60K		600K			8415446	jm		N. Bailey
5-24-93 0900	[redacted]	550		5000		55K		575K			84111882	[illegible]		N. Bailey
5-25-93 1600	[redacted]	550		5000		55K		575			84111882	MA		N. Bailey
5-27-93 0900	[redacted]	600		5000		55K		600K			84111882	[illegible]		N. Bailey
6/1/93 1600	[redacted]	600	600	5K	5K	55K	55K	500K	500K		84111882	RJ	RJ	N. Bailey
6/2/93/0900	[redacted]	600	600	5K	5K	55K	55K	500K	500K		84111882	[illegible]		N. Bailey
6/13/93/0800	[redacted]	600		5K		55K		500K			84111882	[illegible]		N. Bailey
7/10/93 1030	[redacted]	600		5K		55K		500K			84111882	[illegible]		N. Bailey

SOURCE BOARD S/N		STANDARD VALUE (dpm)
X1/CSL	602004	1250 ± 120
X10/CSL	602005	12390 ± 960
X100/CSL	602006	131000 ± 9800
X1K/CSL	602007	1380000 ± 104000

$$\% \text{ Error} = \frac{(\text{CPM} \times 2) - \text{Standard Value}}{\text{Standard Value}} \times 100$$

THIS FORM SHALL BE SUBMITTED TO RADIOLOGICAL ENGINEERING FOR PERMANENT RETENTION WHEN COMPLETE.

SMEAR COUNTER PERFORMANCE TEST LOG SHEET
START DATE: 7-5-93
COUNTER SERIAL NO: 706
STOP DATE: 7-11-93
BUILDING: 750 PAD
LOCATION: TENT 5

SHIFT: M1 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D1 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P1 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M2 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D2 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P2 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M3 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D3 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P3 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____
TIME: ____ EMP NO: ____

SHIFT: P4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M6 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D6 SOURCE: (CPM) 6376
SRC S/N: 602911 BKG: (CPM) 48.6
VALUE: 20100 ERROR: (%) -4.3
TIME: 0830 EMP NO: 513480

SHIFT: P6 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

$$\% \text{ ERROR} = \frac{(\text{CPM}) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

BUILDING: 123 DATE: 8-2-72

BC-4

SHIFT	SRC S/N	VALUE	TIME	EMP. NO	FOREMAN	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1								
D1	603471	18168	6:30	[redacted]	[redacted]	6088	40	1.3
P1								
M2								
D2								
P2								
M3								
D3	603471	18168	0900	[redacted]	[redacted]	6365	43	5.4
P3								
M4								
D4	603471	18168	0850	[redacted]	[redacted]	6313	44	4.5
P4								
M5								
D5	603471	18168	0930	[redacted]	[redacted]	6448	42	6.8
P5								
M6								
D6								
P6								
M7								
D7								
P7								

.33

$$\% \text{ Error} = \left(\frac{\text{net (cpm)} \cancel{x\,3.33} - \text{CSL (dpm)}}{\text{CSL (dpm)}}\right) \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

Final Review

LUDLUM MODEL 31 PERFORMANCE TEST LOG

BETA SOURCE CHECK

SERIAL #: 61626 DUE DATE CALIB: 9 - 93 BUILDING: TENT 5

DATE/TIME	RPT NAME/#	PROBE S/N	BACKGROUND CPM	SOURCE CPM X 1K	X100	X10	X1	FOREMAN SIGNATURE	IN TOL. YES	NO
7-10-93 0800	[redacted]	014277	40	700K	55K	600	500	N. Bailey	✓	
7/22/93		014277	50	700K	55000	6200	550	N. Bailey	✓	

SOURCE BOARD	SERIAL NUMBER	STANDARD VALUE
X 1 K	602913	2,000,926
X 100	602912	184,093
X 10	602911	17,540
X 1	60210	1558

COMMENTS:
X 1000 range not calibrated

% Error = $\frac{(CPM \times 3) - \text{Standard Value}}{\text{Standard Value}} \times 100$

RF-47374

LUDLUM 31

~~BETA SMEAR COUNTER~~ PERFORMANCE TEST LOG

9-1-93

SERIAL #: 61620 DATE DUE CALIB: 7-93 BUILDING: 750 Pad SHIFT: Days

These forms will be used to record parameters noted during daily performance checks. If any instrument requires additional repair or service, return to the E.T. Shop.

DATE/TIME	RPT NAME/#	SOURCE READINGS (CPM) X1	X10	X100	BKG-CPM	FOREMAN SIGNATURE	IN TOL. YES	IN TOL. NO	
4-6-93 10:00	[redacted]	600	6000	50,000		W. Bailey	✓		
7/20/93 1500		600	6200	55,000		W. Bailey	✓		
7/21/93 1430		600	6200	50,000		W. Bailey	✓		
~~8-23-93~~									
8-17-93 1000		550	6300	55000		W. Bailey	✓		

SOURCE BOARD S/N		STANDARD VALUE (dpm)
X1K/CSL	602913	
X100/CSL	602912	184088
X10/CSL	602911	17540
X1/CSL	602910	1558

THIS FORM WILL BE SUBMITTED TO RADIOLOGICAL ENGINEERING FOR PERMANENT RETENTION WHEN COMPLETE.

RF-47417

cpm x 3 − std. value ÷ std. value = %

SMEAR COUNTER PERFORMANCE TEST LOG SHEET
COUNTER SERIAL NO: 984
BUILDING: 750

START DATE: 7-6-93
STOP DATE: 7-11-93
LOCATION:

SHIFT	SRC S/N	VALUE	TIME	EMP NO	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1							
D1							
P1							
M2							
D2	603571	20000	0840	516767	6451	.0	-3.2
P2	603571	20 K	1630	16144	6298	.2	-5.5
M3							
D3	603571	20000	0815	516767	6442	.0	-3.37
P3	603571	20000	1600	518853	6578	0.0	-1.3
M4							
D4	603571	20000 ±100	0810	517394	6413	0.3	-3.80
P4	603571	20000	1630	318864	6506	0.1	-2.41
M5							
D5	603571	20000 ±100	0815	517394	6392	0.2	-4.12
P5	603571	20 K	1615	16144	6486	0	-2.7
M6							
D6	603571	20 K	1000		6390	0.1	-4.15
P6							
M7							
D7							
P7							

$$\% \text{ ERROR} = \frac{(\text{CPM}) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

COUNTER SERIAL NO: 799

BUILDING: 750

START DATE: 7-6-93

STOP DATE: 7-11-93

LOCATION:

SHIFT	SRC S/N	VALUE	TIME	EMP NO	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1							
D1							
P1							
M2							
D2	603571	20000	0840	516767	6606	.2	-0.9
P2	603571	20K	1630	16144	6781	.1	1.7
M3							
D3	603571	20000	0815	516761	6555	.3	-1.67
P3	603571	20000	1600	518853	6497	0.5	-2.5
M4							
D4	603571	20000 ± 1000	0810	517394	6639	0.5	-4.15
P4	603571	20000	1630	518884	6606	0.4	-.91
M5							
D5	603571	20000 ± 1000	0815	517394	6608	0.2	-0.88
P5	603571	20K	1615	16144	6612	.2	-0.82
M6							
D6	603571	20K	1000	517394	6841	0.2	2.61
P6							
M7							
D7							
P7							

$$\% \text{ ERROR} = \frac{(\text{CPM}) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 7-6-93

COUNTER SERIAL NO: 810

STOP DATE: 7-11-93

BUILDING: 750

LOCATION:

SHIFT	SRC S/N	VALUE	TIME	EMP NO	SOURCE (CPM)	BKG (CPM)	ERROR (%)
M1							
D1							
P1							
M2							
D2	603571	20000	0840	516767	6369	.0	-4.5
P2	603571	20 K	1630	16144	6482	.1	-2.7
M3							
D3	603571	20000	0815	516767	6280	.0	-5.8
P3	603571	20000	1600	518853	6508	0.6	-2.38
M4							
D4	603571	20000 ± 1000	0810	517394	6393	0.0	-4.1
P4	603571	20000	1630	318884	6532	0.1	-2.02
M5							
D5	603571	20000 ± 1000	0815	517394	6486	0.2	-2.71
P5	603571	20 K	1615	16144	6478	.1	-2.8
M6							
D6	603571	20000 + 1000	1000	517394	6531	0.2	-2.04
P6							
M7							
D7							
P7							

$$\% \text{ ERROR} = \frac{(\text{CPM}) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

RF-47376 (8/90)

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

COUNTER SERIAL NO: 773

BUILDING: 750

START DATE: 7-6-93

STOP DATE: 7-11-93

LOCATION:

SHIFT: M1 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: P4 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ERROR: (%) TIME: 1630 EMP NO: 518884	6464 0.4 -3.0
SHIFT: D1 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: M5 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: P1 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: D5 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20 000 ± 1000 ERROR: (%) TIME: 0815 EMP NO: 517394	6447 0.5 -3.3
SHIFT: M2 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: P5 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20K ERROR: (%) TIME: 1615 EMP NO: 16144	6423 .9 -3.6
SHIFT: D2 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ERROR: (%) TIME: 0340 EMP NO: 516767	6379 .5 -4.3	SHIFT: M6 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: P2 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20K ERROR: (%) TIME: 1630 EMP NO: 16144	6183 .2 -7.2	SHIFT: D6 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ± 1000 ERROR: (%) TIME: 1000 EMP NO: 517394	6440 0.7 -3.4
SHIFT: M3 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: P6 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: D3 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ERROR: (%) TIME: 0315 EMP NO: 516767	6414 .5 -3.8	SHIFT: M7 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: P3 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ERROR: (%) TIME: 1600 EMP NO: 518853	6674 0.5 0.1	SHIFT: D7 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: M4 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:		SHIFT: P7 SOURCE: (CPM) SRC S/N: BKG: (CPM) VALUE: ERROR: (%) TIME: EMP NO:	
SHIFT: D4 SOURCE: (CPM) SRC S/N: 603571 BKG: (CPM) VALUE: 20000 ± 1000 ERROR: (%) TIME: 0810 EMP NO: 517394 TIME: EMP NO:	6490 0.4 -2.65	% ERROR = (CPM) x 3 - CSL VALUE x 100 / CSL VALUE WHERE "CSL VALUE" IS IN DPM UNITS	

SMEAR COUNTER PERFORMANCE TEST LOG SHEET
COUNTER SERIAL NO: 827
BUILDING: 904

START DATE: 2-26-93
STOP DATE: 8-1-93

SHIFT: M1 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D1 — SRC S/N: 680147 VALUE: 20274 TIME: 0720 EMP. NO: 508194 FOREMAN: [redacted] — SOURCE: (CPM) 6702 BKG: (CPM) 0.3 ERROR: (%) -8.28

SHIFT: P1 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M2 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D2 — SRC S/N: 680147 VALUE: 20274 TIME: 075 [redacted] 8194 FOREMAN: [redacted] — SOURCE: (CPM) 6652 BKG: (CPM) 0.4 ERROR: (%) -1.56

SHIFT: P2 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M3 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D3 — SRC S/N: 680147 VALUE: 20270 TIME: 0836 EMP. NO: 513699 FOREMAN: [redacted] — SOURCE: (CPM) 6567 BKG: (CPM) 0.0 ERROR: (%) -2.8

SHIFT: P3 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M4 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D4 — SRC S/N: 680147 VALUE: 20270 TIME: 0837 EMP. NO: 513699 FOREMAN: [redacted] — SOURCE: (CPM) 6587 BKG: (CPM) 0.2 ERROR: (%) -2.5

SHIFT: P4 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M5 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D5 — SRC S/N: 680147 VALUE: 20270 TIME: 0815 EMP. NO: 513699 FOREMAN: [redacted] — SOURCE: (CPM) 6630 BKG: (CPM) 0.1 ERROR: (%) -1.9

SHIFT: P5 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M6 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D6 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: P6 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: M7 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: D7 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

SHIFT: P7 — SRC S/N: ___ VALUE: ___ TIME: ___ EMP. NO: ___ FOREMAN: ___ — SOURCE: (CPM) ___ BKG: (CPM) ___ ERROR: (%) ___

$$\% \text{ Error} = \frac{\text{net (cpm)} \div 0.331 - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ___

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

COUNTER SERIAL NO: 991

BUILDING: 90

START DATE: 7-26-93

STOP DATE: 8-1-93

Shift	SRC S/N	Value	Time	Emp. No	Foreman	Source (CPM)	BKG (CPM)	Error (%)
M1								
D1	680147	20270	07[redacted] 508194		[redacted]	6360	0.4	-5.8
P1								
M2								
D2	680147	20270	07[redacted] 508194		[redacted]	6411	0.5	-5.13
P2								
M3								
D3	680147	20270	0830	513699	[redacted]	6307	0.2	-6.7
P3								
M4								
D4	680147	20270	0830	513699	[redacted]	6197	0.1	-8.3
P4	680147							
M5								
D5	680147	20270	0815 [redacted] 513699		[redacted]	6319	0.4	-6.5
P5								
M6								
D6								
P6								
M7								
D7								
P7								

$$\% \text{ Error} = \frac{(\text{net (cpm)} + 0.33) - \text{CSL (dpm)}}{\text{CSL (dpm)}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

Final Review ______

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: August 17, 1993

TO: E. A. Christopher, Radiological Operations, Bldg. 881, X5772

From: R. W. Norton, Radiological Engineering Bldg. T690B, X4075

SUBJECT: RADIOLOGICAL SAMPLING PLAN FOR THE 207B NORTH SOLAR POND RWN-033-93

When the 207B North Solar Pond water and sludge have been removed, and prior to the initiation of Phase one of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation of Operable Unit (OU) 4, a radiological survey of the 207B North Solar Pond must be conducted. Radiological Engineering in response to the activities that will occur in the 207B North Solar Pond, has developed a Radiological Sampling Plan (attachment).

Using 15 minutes per sample location, plus 8 hours for setting up the grid and 20 hours for instrument calibrations, it is estimated that it will take a total of 72 Man Hours to complete the sampling of 207B North Solar Pond.

Radiological Engineering, Radiological Operations, and the Health and Safety Officer for Rust Environmental, will use the data complied from the sampling plan, to determine the radiological protection criteria, for the activities that will occur under the phase one of the RCRA Facility Investigation/Remedial Investigation OU4 within the 207B North Solar Pond.

If you have any questions please contact me at Extension 4075, or Digital Page 7973.

RWN

Attachment:
As Stated

cc:
G. M. Aldrich
W. W. Bailey
R. W. Boyle
S. W. Dewitt
J. B. Mellen
R. V. Morgan
R. T. Ogg
S. M. Paris
J. D. Roberts

Attachment
August 17, 1993
RWN-033-93
Page 1 of 2

RADIOLOGICAL PROTECTION SAMPLING PLAN
SOLAR PONDS REMEDIATION PROJECT
207B NORTH SOLAR POND
AUGUST 17, 1993
SUBMITTED BY
R. W. NORTON
RADIOLOGICAL ENGINEERING

Introduction

Prior to the initiation of phase one of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation of Operable Unit (OU) 4, a radiological survey of the 207B North Solar Pond must be conducted. Radiological Engineering has developed and submitted the following sampling plan to determine the radiological protection criteria for the activities within the 207B North Solar Pond.

Methods and Materials

The 207B North Solar Pond will be divided into grids 5 meters squared, Radiological Engineering will supply a map of the pond with the number of grids. One sample will be taken in each grid for Alpha removable plus fixed, Beta removable and a gross Gamma survey will be required at each sampling point. If a sample is greater than the allowable limits, Radiological Engineering will determine if a more detailed survey within the grid will be required.

Alpha Survey

An Alpha fixed plus removable survey will be conducted using a Ludlum 12-1A coupled to an air proportional detector and a SAC 4 for removable. Direct plus removable Alpha survey of the pond will be conducted in accordance to Radiological Operation Instructions (ROI) 3.1, "Performance of Surface Contamination Surveys".

Gross Gamma Survey

A gross Gamma survey will be conducted using the Bicron Field Instrument for the Detection of Low Energy Radiation (FIDLER). Surveys utilizing the FIDLER will be conducted according to ROI 6.6, " Use of the Bicron FIDLER (Field Instrument for the Detection of Low Energy Radiation)". The background reading will be taken outside of the 207B North Pond, between the 207A, and 207B series ponds. One sample will be taken in each grid to identify elevated areas of contamination. Action Levels are identified in the procedure.

Beta/Gamma Survey

A Beta/Gamma Fixed plus removable will be conducted using the Ludlum 31 with the GM Pancake Probe for direct, and the Eberline BC-4, for removable. Direct plus removable Beta/Gamma survey will be conducted in accordance to the Radiological Operation Instructions (ROI) 3.1 "Performance of Surface Contamination Surveys".

Documentation

All sample results will be documented and approved by Radiological Operations Supervision in accordance with ROI 3.01, and submitted to Radiological Engineering for review.

EG&G ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE: September 16, 1993

TO: R. T. Ogg, Solar Ponds Remediation Program, Bldg. 080, X8608

From: R. W. Norton, Radiological Engineering, Bldg. T690B, X4075

SUBJECT: RADIOLOGICAL SURVEY 207B NORTH SOLAR POND - RWN-037-93

Attached is the Radiological survey of the liner of the 207B North Solar Pond, for the support of Phase I RCRA Facility Investigation Remedial Investigation of OU4.

The survey information will be used to establish the requirements for the Radiological Work Permits (RWP's) for work to be preformed in the 207B North Solar pond by the sub contractor. The sub contractor will also use the information in support of the characterization of the 207B North Solar Pond under the remedial investigation process.

If you have any questions concerning this please contact me at Extension 4075 of Pager D7973.

rwn

Attachment
As stated

cc:
G. M. Aldrich, w/o Attachment
W. W. Bailey
R. W. Boyle
E. A. Christopher, w/o Attachment
S. M. Paris
J. D. Roberts, w/o Attachment

RADIOLOGICAL
Contamination Survey

Taken by: R. A. Bader Emp. # [redacted]
Signature
Taken by: Lorain P McClure Emp. #
Signature
Taken by: B M Hunter Emp. #
Signature

Date: 8/31/93 Building: N/A
Time: Ongoing Room #: N/A
Shift: Days

Survey Description: Solar Series "B" Ponds — North Pond & B. 8 Direct + Smear — c/m + d/m
Diagram/Sketch Attached: ✓ Yes ___ No

INSTRUMENTATION USED

Smear Counters

Mfg:	Eberline	Eberline			
Model:	SAC-4	SAC-4			
Serial #:	799	984			
Date Calib'd:	6-25-93	7-1-93			
Cal. Due Date:	6-94	7-94			
Performance Tested	9-1-93	9-1-93			

Mfg:	Eberline				
Model:	BC-4				
Serial #:	706				
Date Calib'd:	10-23-92				
Cal. Due Date:	10-93				
Background	41				
Performance Tested	9-1-93				

Survey Instruments

Mfg:	Ludlum	Ludlum	Bicron *	REFER TO ADDITIONAL	SURVEYS W.Baily
Model:	12-1a	31	FIDLER		
Serial #:	75994	61626			
Date Calib'd:	11-2-92	9-24-92			
Cal. Due Date:	11-93	9-93			
Background:	<250	100			
Performance Tested	8-31-93	8-31-93			

COMMENTS

SURVEY COMMENCED ON 8-31-93 RAIN DELAYED COMPLETION ON 9-2-93 AND 9-4-93 THROUGH 9-8-93. SURVEY COMPLETED ~~ON~~ 9-9-93

W. Baily

Status:
✓ Within Limits
__ Limits Exceeded
__ Posted
__ Deposted

Radiological Operations Foreman:

W. Baily — Signature
9-9-93 — Date

RADIOLOGICAL
Contamination Survey

RESULTS

: 8/31/93 Time: Ongoing Building: N/A Room: N/A

Beta Survey

cpm Removable (Swipe)	cpm Direct	dpm/100cm² Removable (Smear)		cpm Removable (Swipe)	cpm Direct	dpm/100cm² Removable (Smear)
	<250	0	1.		<100	0
	<250	0	2.		<100	12
	<250	0	3.		<100	0
	<250	3	4.		<100	15
	<250	3	5.		<100	15
	<250	0	6.		<100	12
	<250	0	7.		<100	33
	<250	0	8.		<100	39
	<250	9	9.		<100	0
	<250	0	10.		<100	0
	<250	0	11.		<100	12
	<250	3	12.		<100	3
	<250	3	13.		<100	0
	<250	6	14.		<100	33
	<250	12	15.		<100	18
	300	12	16.		<100	36
	250	3	17.		<100	0
	<250	0	18.		<100	15
	300	6	19.		<100	0
	250	0	20.		<100	15
	<250	0	21.		<100	0
	250	0	22.		<100	6
	<250	3	23.		<100	0
	<250	6	24.		<100	64
	<250	3	25.		<100	12
	<250	0	26.		<100	30
	<250	0	27.		<100	30
	<250	0	28.		600	15
	<250	3	29.		<100	24
	250	3	30.		<100	0
	<250	3	31.		<100	18
	<250	0	32.		<100	0
	300	0	33.		<100	30
	250	0	34.		500	9
	<250	9	35.		<100	54
	<250	0	36.		<100	12
	<250	0	37.		<100	0
	<250	0	38.		<100	21
	250	3	39.		<100	0
	300	3	40.		<100	3
	<250	3	41.		<100	9
	250	0	42.		<100	45
	250	0	43.		<100	0
	300	0	44.		<100	12
	<250	3	45.		<100	24

RADIOLOGICAL MONITORING
Contamination Survey

RESULTS

Initial

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
46.		250	6
47.		<250	6
48.		<250	0
49.		<250	6
50.		<250	3
51.		250	3
52.		300	3
53.		300	0
54.		<250	0
55.		<250	0
56.		<250	3
57.		250	0
58.		<250	0
59.		<250	6
60.		<250	0
61.		<250	6
62.		<250	0
63.		<250	6
64.		<250	0
65.		<250	6
66.		<250	0
67.		<250	0
68.		<250	3
69.		250	0
70.		300	0
71.		<250	0
72.		<250	0
73.		<250	0
74.		<250	3
75.		<250	0
76.		<250	0
77.		250	6
78.		<250	0
79.		300	3
80.		<250	0
81.		250	0
82.		250	3
83.		<250	0
84.		<250	0
85.		<250	6
86.		<250	0
87.		<250	3
88.		<250	0
89.		<250	0
90.		<250	0

Beta Survey

~~Resurvey~~

Date Completed: ________

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
46.		<100	0
47.		<100	33
48.		<100	3
49.		<100	6
50.		<100	36
51.		<100	48
52.		<100	30
53.		500	0
54.		<100	21
55.		400	0
56.		<100	12
57.		<100	30
58.		<100	24
59.		<100	0
60.		<100	0
61.		<100	12
62.		<100	15
63.		<100	30
64.		<100	6
65.		<100	3
66.		<100	0
67.		<100	33
68.		<100	30
69.		<100	6
70.		<100	18
71.		<100	54
72.		<100	12
73.		<100	0
74.		<100	0
75.		<100	9
76.		<100	12
77.		<100	24
78.		<100	48
79.		<100	15
80.		700	3
81.		<100	0
82.		<100	3
83.		<100	7
84.		<100	33
85.		<100	12
86.		<100	0
87.		<100	57
88.		<100	7
89.		<100	0
90.		<100	18

Control No. ______

RADIOLOGICAL MONITORING
Contamination Survey

Beta Survey

RESULTS

Date Completed: ______

	Initial CPM Removable (Swipe)	Initial CPM Direct	Initial DPM/100cm2 Removable (Smear)	Resurvey CPM Removable (Swipe)	Resurvey CPM Direct	Resurvey DPM/100cm2 Removable (Smear)
91.		250	0		<100	12
92.		<250	0		<100	9
93.		<250	3		<100	33
94.		<250	0		<100	30
95.		<250	0		<100	21
96.		<250	0		<100	0
97.		<250	6		<100	0
98.		<250	0		<100	6
99.		<250	3		<100	15
100.		<250	0		<100	24
101.		<250	0		<100	0
102.		<250	0		<100	27
103.		<250	6		<100	6
104.		<250	0		<100	3
105.		250	3		<100	0
106.		<250	0		<100	15
107.		<250	0		500	0
108.		<250	3		<100	36
109.		<250	0		<100	12
110.		<250	3		<100	9
111.		<250	6		<100	54
112.		<250	0		<100	0
113.		<250	0		<100	0
114.		250	0		<100	39
115.		<250	3		<100	12
116.		250	3		<100	21
117.		<250	0		<100	6
118.		<250	0		<100	0
119.		<250	3		<100	60
120.		<250	3		<100	33
121.		<250	3		<100	9
122.		<250	0		<100	21
123.		<250	3		<100	12
124.		250	0		<100	27
125.		<250	0		<100	0
126.		300	0		<100	9
127.		250	0		<100	12
128.		<250	3		<100	30
129.		<250	0		<100	18
130.		<250	0		<100	24
131.		<250	0		<100	21
132.		<250	0		<100	0
133.		<250	9		<100	15
134.		<250	3		<100	0
135.		<250	3		<100	0

Control No. ______

RADIOLOGICAL MONITORING
Contamination Survey

Beta Survey

RESULTS

Initial

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
136.		250	6
137.		<250	0
138.		<250	0
139.		<250	3
140.		<250	3
141.		<250	0
142.		<250	6
143.		250	3
144.		<250	3
145.		<250	0
146.		<250	3
147.		<250	3
148.		<250	3
149.		300	0
150.		<250	0
151.		250	0
152.		250	6
153.		<250	0
154.		<250	0
155.		<250	3
156.		<250	0
157.		<250	0
158.		<250	0
159.		<250	0
160.		<250	9
161.		<250	3
162.		<250	3
163.		<250	0
164.		250	0
165.		<250	6
166.			
167.			
168.			
169.			
170.			
171.			
172.			
173.			
174.			
175.			
176.			
177.			
178.			
179.			
180.			

Resurvey

Date Completed: ______

	CPM Removable (Swipe)	CPM Direct	DPM/100cm2 Removable (Smear)
136.		<100	18
137.		<100	12
138.		<100	3
139.		500	0
140.		<100	36
141.		<100	15
142.		<100	30
143.		<100	12
144.		<100	27
145.		<100	15
146.		<100	0
147.		<100	9
148.		<100	30
149.		<100	18
150.		<100	48
151.		<100	0
152.		<100	15
153.		<100	18
154.		<100	18
155.		<100	21
156.		<100	18
157.		<100	12
158.		<100	30
159.		<100	0
160.		<100	12
161.		<100	9
162.		<100	3
163.		<100	24
164.		<100	15
165.		<100	0
166.			
167.			
168.			
169.			
170.			
171.			
172.			
173.			
174.			
175.			
176.			
177.			
178.			
179.			
180.			

RADIOLOGICAL OPERATIONS GAMMA SURVEY

CONTROL NO. ______________

Taken by: Dave [illegible]	Emp. # [redacted]	Reviewed by:	
Taken by: [illegible signature]	Emp. # [redacted]	Rad Ops Forman W. Bailey	Emp. # [redacted]
Taken by: ______	Emp. # ______	Name/Organization ______	Emp. # ______

Date: 9-3-93 Building: 788

Time: 1200 Room #: "B" North Pond

Shift: Days

Survey Description: Survey of "B" North Pond

BICRON FILDER

Mfg:	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	Bicron				
#:	A515?				
Date Perf. Ck:	9-3-93				
Date Calib'd:	4-1-93				
Cal. Due Date:	4-94 [initials]				

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
1.	1699		2335	Y	12.	1699		2906	Y
2.	1699		2349	Y	13.	1699		2730	Y
3.	1699		2238	Y	14.	1699		2357	Y
4.	1699		2256	Y	15.	1699		2706	Y
5.	[illegible]		2275	Y	16.	1699		2663	Y
6.	[illegible]		2414	Y	17.	1699		2741	Y
7.	[illegible]		2439	Y	18.	[illegible]		2793	Y
8.	[illegible]		2487	Y	19.	[illegible]		2337	Y
9.	[illegible]		2453	Y	20.	[illegible]		2781	Y
10.	[illegible]		2396	Y	21.	1699		2495	Y
11.	1699		2093	Y	22.	1699		2375	Y

COMMENTS: NUMBERED AREAS WHICH CONTAIN "*" FOR READINGS ~~WERE~~ WERE COVERED WITH STANDING WATER DUE TO RAIN ON PREVIOUS DAYS. REFER TO FIDLER SURVEY DATED 9-9-93 FOR READINGS FOR THESE LOCATIONS.

W. Bailey

RF-47414 (11/90)

RADIOLOGICAL OPERATIONS GAMMA SURVEY

CONTROL NO. ____________

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
23.	1699		2266	Y
24.	1699		2770	Y
25.	1699		2583	Y
26.	1699		2406	Y
27.	1699		2153	Y
28.	1699		2837	Y
29.	*			
30.	*			
31.	*			
32.	1699		2399	Y
33.	1699		2550	Y
34.	1699		2422	Y
3[illegible]	1699		2639	Y
35.	1699		2475	Y
37.	1699		2688	Y
38.	1699		2275	Y
39.	1699		2236	Y
40.	1699		2290	Y
41.	1699		2716	Y
42.	1699		2676	Y
[illegible]	[illegible]99		2617	Y
[illegible]	[illegible]99		2476	Y
45.	1699		2299	Y
46.	1699		2371	Y
47.	1699		2609	Y
48.	1699		2473	Y
49.	1699		2902	Y
50	1699		2651	Y

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
51 ~~50.~~	1699		2441	Y
52 ~~51.~~	1699		2861	Y
53 ~~52.~~	1699		2679	Y
54 53.	1699		2578	Y
55 54.	1699		2551	Y
56 55.	1699		2340	Y
57 56.	1699		2152	Y
58 57.	1699		2265	Y
59 58.	1699		2446	Y
60 59.	1699		2396	Y
61 60.	1699		2387	Y
62 ~~61.~~	1699		2168	Y
63 62.	1699		2224	Y
64 63.	1699		2656	Y
65 64.	1699		5559	Y
66 65.	1699		2317	Y
67 66.	1699		2366	Y
68 67.	1699		2334	Y
69 68.	1699		2596	Y
70 69.	1699		2760	Y
~~70.~~	REFER	TO	FOLLOWING	SURVEY
~~71.~~	SHEET	FOR	AREAS 71 - 165	
72.				
73.				
74.				
75.				
76.				

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ______

Taken by: Dave [illegible] Emp. # [redacted] Reviewed by:

Taken by: [illegible] Emp. # [redacted] Rad Ops Forman [illegible] Emp. # [redacted]

Taken by: ______ Emp. # ______ Name/Organization ______ Emp. # ______

Date: 9-3-93 Building: 788

Time: 1200 Room #: B Drive

Shift: Day

Survey Description: Survey of "B" North Drive

BICRON FILDER

Mfg:	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	Bicron				
Serial #:	A 518P				
Perf. Ck:	9-3-93				
Date Calib'd:	4-1-93				
Cal. Due Date:	4-94				

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
71.	1699		2451	Y	52 ~~12~~.	1699		2453	Y
72.	1699		2335	Y	53 ~~13~~.	1699		2346	Y
73.	1699		2332	Y	54 ~~14~~.	1699		2511	Y
74.	1699		2454	Y	55 ~~15~~.	1699		2137	Y
75.	1699		2453	Y	56 ~~16~~.	1699		2496	Y
76.	1699		2130	Y	57 ~~17~~.	1699		2513	Y
77.	1699		2646	Y	58 ~~18~~.	1699		2452	Y
78.	1699		2357	Y	59 ~~19~~.	1699		2402	Y
79.	1699		2655	Y	90 ~~20~~.	1699		2450	Y
80.	1699		2114	Y	91 ~~21~~.	*			
81.	1699		2150	Y	92 ~~22~~.	1699		2332	Y

RF-47414 (11/90)

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ______________

No.	BKG	c/m METER	SCALER	AREA POSTED (Y/N)
93 23.	1699		2321	Y
94 24.	*			
95 25.	1699		2492	Y
96 26.	*			
97 27.	1699		2516	Y
98 28.	1699		2481	Y
99 29.	1699		2115	Y
100 30.	1699		2493	Y
101.	*			
102.	1699		2550	Y
103.	1697		2342	Y
104.	1699		2580	Y
[illegible]	*			
106.	*			
107.	*			
108.	*			
109.	1699		2330	Y
110.	1699		2346	Y
111.	1699		2354	Y
112.	1699		2360	Y
	*			
	*			
115.	1699		2464	Y
46.	1699		2013	Y
47.	*			
48.	*			
49.	*			
120 ~~50~~.	*			
121 ~~51~~.	1699		2505	Y
122 ~~52~~.	1699		2496	Y
123 ~~53~~.	1699		2451	Y
124 ~~54~~.	*			
125 ~~55~~.	*			
126 ~~56~~.	*			
127 ~~57~~.	1699		2301	Y
128 ~~58~~.	1699		2426	Y
129 ~~59~~.	1699		2216	Y
130 ~~60~~.	*			
131 ~~61~~.	1699		2418	Y
132 ~~62~~.	1699		2250	Y
133 ~~63~~.	1699		2503	Y
134 ~~64~~.	1699		2719	Y
135 ~~65~~.	1699		2539	Y
136 ~~66~~.	*			
137 ~~67~~.	*			
138 ~~68~~.	1699		2330	Y
139 ~~69~~.	1699		2611	Y
140 ~~70~~.	1699		2111	Y
141 ~~71~~.	*			
142 ~~72~~.	*			
143 ~~73~~.	1699		2115	Y
144 ~~74~~.	1699		2962	Y
145 ~~75~~.	1699		2755	Y
146 ~~76~~.	1699		2703	Y

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ____________

Taken by: Dave Ar... Emp. [redacted] Reviewed by:
Taken by: [illegible signature] Emp. Rad Ops Forman W. Bailey Emp. # [redacted]
Taken by: ____________ Emp. # ____________ Name/Organization ____________ Emp. # ____________

Date: 9-3-93 Building: 788
Time: 1300 Room #: "B" North
Shift: Day

Survey Description: ____________

BICRON FIDLER

Mfg:	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	BICRON				
Serial #:	A515F				
Perf. Ck:	9-3-93				
Date Calib'd:	4-1-93				
Cal. Due Date:	4-94				

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
47 1.	1699				153 ~~12.~~	1699		2758	Y
48 2.	*				154 ~~13.~~	1699		2743	Y
49 3.	*				160 ~~14.~~	1699		2650	Y
50 4.	1699		2505	Y	161 ~~15.~~	1699		2653	Y
51 5.	1699		2441	Y	162 ~~16.~~	1699		2452	Y
52 6.	1699		2156	Y	163 ~~17.~~	1699		2573	Y
53 7.	1699		2365	Y	164 ~~18.~~	1699		2735	Y
54 8.	1699		2253	Y	165 ~~19.~~	1699		2753	Y
55 9.	1699		2306	Y	20.				
56 10.	1699		2445	Y	21.				
57 11.	1699		2611	Y	22.				

Y = recall

RF-47414 (11/90)

Radiation Protection
Solar Ponds - B Series

	1	2	3	4	5	6	7	8	9	10	11
A	1	2	3	4	5	6	7	8	9	10	11
B	12	13	14	15	16	17	18	19	20	21	22
C	23	24	25	26	27	28	29	30	31	32	33
D	34	35	36	37	38	39	40	41	42	43	44
E	45	46	47	48	49	50	51	52	53	54	55
F	56	57	58	59	60	61	62	63	64	65	66
G	67	68	69	70	71	72	73	74	75	76	77
H	78	79	80	81	82	83	84	85	86	87	88
I	89	90	91	92	93	94	95	96	97	98	99
J	100	101	102	103	104	105	106	107	108	109	110
K	111	112	113	114	115	116	117	118	119	120	121
L	122	123	124	125	126	127	128	129	130	131	132
M	133	134	135	136	137	138	139	140	141	142	143
N	144	145	146	147	148	149	150	151	152	153	154
O	155	156	157	158	159	160	161	162	163	164	165

North →

EQUIPMENT Bicron Fidler

SERIAL # A518P

CAL. DUE 4/94

1993

SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 0820 512332	2 0830 518865	3 0820 576700	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

PERFORMANCE TEST VALID FOR 24 HOURS
AFTER LAST DATE AND TIME MARKED

RADIOLOGICAL OPERATIONS
GAMMA SURVEY

CONTROL NO. ____________

Taken by: Nichelle Aragon Emp. # [redacted] Reviewed by:
Taken by: B. M. Hunter Emp. # Rad Ops Forman W. Bailey Emp. # [redacted]
Taken by: ____________ Emp. # ____________ Name/Organization ____________ Emp. # ____________

Date: 9-9-93 Building: 788
Time: 0900 Room #: "B" North Pond
Shift: Days

Survey Description: (Do to WATER) Survey Spots on "B" North Pond

BICRON FILDER

Mfg:	FIDLER	FIDLER	FIDLER	FIDLER	FIDLER
Model:	Bicron				
#:	A518P				
Date Perf. Ck:	9-9-93				
Date Calib'd:	4-1-93				
Cal. Due Date:	4-94				

North Hill of Pond

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
~~1.~~	1911	2000	1903	Y	113 ~~12.~~	1911	2200	2436	Y
~~2.~~	1911	1700	1943	Y	114 ~~13.~~	1911	2000	2149	Y
~~3.~~	1911	2800	2473	Y	117 ~~14.~~	1911	2100	2007	Y
~~4.~~	1911	2100	2038	Y	118 ~~15.~~	1911	2000	2020	Y
~~5.~~	1911	2200	2055	Y	120 ~~16.~~	1911	2300	2210	Y
~~6.~~	1911	2100	2159	Y	124 ~~17.~~	1911	2100	2176	Y
~~7.~~	1911	2400	2203	Y	125 ~~18.~~	1911	2400	2324	Y
~~8.~~	1911	2100	2149	Y	126 ~~19.~~	1911	2000	2075	Y
~~9.~~	1911	2200	2233	Y	130 ~~20.~~	1911	2300	2218	Y
7 ~~10.~~	1911	2000	2117	Y	136 ~~21.~~	1911	2400	2470	Y
8 ~~11.~~	1911	2200	2083	Y	137 ~~22.~~	1911	2600	2670	Y

RADIOLOGICAL OPERATIONS GAMMA SURVEY

CONTROL NO. ______________

	BKG	c/m METER	SCALER	AREA POSTED (Y/N)		BKG	c/m METER	SCALER	AREA POSTED (Y/N)
141 ~~23.~~	1911	2300	2230	Y	50.				
142 ~~24.~~	1911	2200	2184	Y	51.				
148 ~~25.~~	1911	2200	2054	Y	52.				
149 ~~26.~~	1911	2100	2113	Y	53.				
119 ~~27.~~	1911	2000	1980	Y	54.				
28.					55.				
29.					56.				
30.					57.				
31.					58.				
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48.					75.				
49.					76.				

EQUIPMENT Bicron Fidler 1993
SERIAL # A518P
CAL. DUE 4/94

SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 0820 512332	2 0830 518865	3 0820 576700	4
5	6	7 0757 519333	8	9 0820 517940	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

PERFORMANCE TEST VALID FOR 24 HOURS
AFTER LAST DATE AND TIME MARKED

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

COUNTER SERIAL NO: 799

BUILDING: 730 PAD

START DATE: 8-30-93

STOP DATE: 9-5-93

LOCATION: TENT #3

SHIFT: M1 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D1 SOURCE: (CPM) 6453
SRC S/N: 680151 BKG: (CPM) .3
VALUE: 19610 ERROR: (%) -1.3
TIME: 0830 EMP NO: 16767

SHIFT: P1 SOURCE: (CPM) 6374
SRC S/N: 680151 BKG: (CPM) 0.1
VALUE: 19610 ERROR: (%) -2.5
TIME: 1630 EMP NO: 516982

SHIFT: M2 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D2 SOURCE: (CPM) 6469
SRC S/N: 680151 BKG: (CPM) 0.3
VALUE: 19610 ERROR: (%) -1.0
TIME: 0820 EMP NO: 518884

SHIFT: P2 SOURCE: (CPM) 6458
SRC S/N: 680151 BKG: (CPM) 0.5
VALUE: 19610 ERROR: (%) -1.2
TIME: 1600 EMP NO: 516982

SHIFT: M3 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D3 SOURCE: (CPM) 6452
SRC S/N: 680151 BKG: (CPM) 0.7
VALUE: 19610 ERROR: (%) -1.3
TIME: 0910 EMP NO: 515699

SHIFT: P3 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____
TIME: ____ EMP NO: ____

SHIFT: P4 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P5 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M6 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D6 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P6 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: M7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: D7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

SHIFT: P7 SOURCE: (CPM) ____
SRC S/N: ____ BKG: (CPM) ____
VALUE: ____ ERROR: (%) ____
TIME: ____ EMP NO: ____

$$\% \text{ ERROR} = \frac{(\text{CPM}) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

SHEAR COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 3-30-93
STOP DATE: 6-5-93

COUNTER SERIAL NO: 954

BUILDING: 750 DPD

LOCATION: Tent #5

SHIFT	SRC S/N	VALUE	TIME	EMP NO	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1							
P4							
D1	680151	19610	0830	16767	6427	.2	-1.7
M5							
P1	680151	19610	1630		6301	0.0	-3.6
D5							
M2							
P5							
D2	680151	19610	0830	518884	6204	0	-5.0
M6							
P2	680151	19610	1600	516952	6264	0.0	-4.2
D6							
M3							
P6							
D3	680151	19610	0910	513809	6252	0.0	-4.4
M7							
P3							
D7							
M4							
P7							
D4							

% ERROR = $\frac{(CPM) \times 3 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$

WHERE "CSL VALUE" IS IN DPM UNITS

5C-4

SMEAR COUNTER PERFORMANCE TEST LOG SHEET

START DATE: 8-30-93

COUNTER SERIAL NO: 706

STOP DATE: 9-5-93

BUILDING: 750 pad

LOCATION:

SHIFT	SRC S/N	VALUE	TIME	EMP NO	SOURCE: (CPM)	BKG: (CPM)	ERROR: (%)
M1							
D1							
P1							
M2							
D2	602911	17366	1030	513699	6451	45.8	12.5
P2							
M3							
D3	602911	17366	0910	516783	6240	41.4	+8.8
P3							
M4							
D4							
P4							
M5							
D5							
P5							
M6							
D6							
P6							
M7							
D7							
P7							

D4 block has an additional line: TIME: ____ EMP NO: ____

$$\% \text{ ERROR} = \frac{(\text{CPM}) \div .33 - \text{CSL VALUE}}{\text{CSL VALUE}} \times 100$$

WHERE "CSL VALUE" IS IN DPM UNITS

LUDLUM MODEL 12-1A PERFORMANCE TEST LOG
ALPHA SOURCE CHECK

INSTRUMENT SERIAL #: 75998 DATE DUE CALIB: 11/93 BUILDING: 904 pad

These forms will be used to record parameters noted during daily performance checks. If any instrument requires additional repair or service, return to Radiation Instrumentation

DATE/TIME	RPT NAME/EMP #	INSTRUMENT READINGS (CPM) X1 PRE	X1 POST	X10 PRE	X10 POST	X100 PRE	X100 POST	X1K PRE	X1K POST	CHECK SOURCE VALUE (CPM)	PROBE S/N	IN TOL (Initials) PRE	IN TOL POST	FOREMAN'S SIGNATURE
8-31-93 0800	[redacted]	575		6000		62k		625k			84/5525	[illegible]		

SOURCE BOARD S/N		STANDARD VALUE (dpm)
X1/CSL	601971	1430 ± 130
X10/CSL	601972	12040 ± 920
X100/CSL	601973	133600 ± 10000
X1K/CSL	601974	1222000 ± 92000

$$\% \text{ Error} = \frac{(\text{CPM} \times 2) - \text{Standard Value}}{\text{Standard Value}} \times 100$$

THIS FORM SHALL BE SUBMITTED TO RADIOLOGICAL E EERING FOR PERMANENT RETENTION WHEN COMPLETE

BETA SMEAR COUNTER PERFORMANCE TEST LOG

SERIAL #: 6626 DATE DUE CALIB: 9-93 BUILDING: 750 SHIFT: Days

These forms will be used to record parameters noted during daily performance checks. If any instrument requires additional repair or service, return to the E.T. Shop.

DATE/TIME	RPT NAME/#	SOURCE READINGS (CPM)				FOREMAN SIGNATURE	IN TOL.		
		X1	X10	X100	BKG-CPM		YES	NO	
8-13-93 0805	[redacted]	500	7000	50K	150		✓		
8-16-93 1900		550	750	50K	100		✓		
8-31-93/1030		600	6000	50K	100		✓		

SOURCE BOARD S/N		STANDARD VALUE (dpm)
X1K/CSL	602910	1800 dpm
X100/CSL	602 911	20,100 dpm
X10/CSL	602912	209 000
X1/CSL		

THIS FORM WILL BE SUBMITTED TO RADIOLOGICAL ENGINEERING FOR PERMANENT RETENTION WHEN COMPLETE.

RF-47417 (...)

EQUIPMENT Bicron Fidler

SERIAL # A518P

CAL. DUE 4/94

1993

SEPTEMBER

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 0820 512332	2 0830 518865	3 0820 576700	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

PERFORMANCE TEST VALID FOR 24 HOURS
AFTER LAST DATE AND TIME MARKED

APPENDIX II.F

OU4-WIDE RADIOLOGICAL SURVEY RESULTS

A

CONTAMINATION SURVEY

FORM 1.1B

Site Number: Interceptor Trench System
Technician: Anne-Marie Edwards / Chris Sherry
Meter Model No.- S/N: 6388A
Detector Model No.- S/N: 80930
Cal. Due Date: 9/93

Date/Time: 11/13/92 ~~11:00~~ 9:00-11:00
Scaler Background (cpm): 1947
Meter Background (cpm): 1947
Survey Type: ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 2
Technician:
Scaler Model No.: AME
Scaler S/N:
Cal. Due Date:

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Release Yes/No
Not applicable	Interceptor Trench Area Soil Survey	B26		2020		73									
		B28		1997		50									
		B30		1852		-95									
		B32		1667		-28									
		B34		1956		9									
		B36		2031		84									
		A30		1974		27									
		A28		1997		50									
AME	AME	A26	AME	2116	AME	169									
		A24		2252		305									
		E28		2056		109									
		E30		1924		-23									
		E32		1892		-55									
		E34		2006		59									
		E36		2012		65									
		E38		1826		-121									
		G32		1789		-158									

Anne-Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY FORM 1.1B

Site Number: Interceptor Trench System
Technician: Anne-Marie Edwards / Chris Sherry
Meter Model No.- S/N: 8388A
Detector Model No.- S/N: 80930
Cal. Due Date: 9/93

Date/Time: 11/13/92 9:00-11:00
Scaler Background (cpm): 1947
Meter Background (cpm): 1947
Survey Type: ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 2
Technician:
Scaler Model No.:
Scaler S/N:
Cal. Due Date:

Anne

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	Interceptor Trench System Soil Survey	G 34		2081		134									
		G 36		1983		36									
		I 36		1780		-167									
		I 38		1837		-11									
		G 38		2394		447									

Anne Anne Anne Anne Anne Anne Anne

Anne-Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area of Equipment Drawing Showing Survey Points ...

CONTAMINATION SURVEY

FORM 1.1B

e Number Ets Rad Survey
chnician V. Rothman
ter Model No.- S/N A521P
tector Model No.- S/N A521P
l. Due Date 1293

Date/Time 123092 1000
Scaler Background (cpm) 1954
Meter Background (cpm) 2000
Survey Type ☐ Alpha α ☒ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 1
Technician —
Scaler Model No. —
Scaler S/N —
Cal. Due Date —

mear mber	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Smear Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Release
			α	β/γ	α	β/γ	α	β/γ	α	β/γ	α	β/γ	α	β/γ	Yes/No
—	rad points	G 40	NA	1803	NA	151	NA	NA	NA	NA	NA	NA	NA	NA	
—	rad Points	I 40		1562		392									
—	rad Points	K 40		1839		115									
—	rad Points	E 40		1752		202									
—	rad Points	D 40		1743		211									
—	rad Points	D 42		1721		233									
—	rad Points	E 42		1759		195									
—	rad Points	G 42		1671		283									
—	rad Points	I 42		2206		-252									
—	rad Points	K 42		1701		253									

YR 12-9?

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area of Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

Site Number: Interceptor Trench System
Technician: Anne-Marie Edwards / Clark Grose
Meter Model No.- S/N: Fidler: 8988A Frisk: 8773A
Detector Model No.- S/N: FIDLER: 8093D Frisk: A0462
Cal. Due Date: FIDLER: 9/93 Frisk: 10/93

Date/Time: 1300-4:00 11/12/92
Scaler Background (cpm): FIDLER: 2311 Frisk: 7
Meter Background (cpm): FIDLER: 2311 Frisk: 7
Survey Type: ☒ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 3 FORM 1.1E
Technician
Scaler Model No.
Scaler S/N
Cal. Due Date
AME

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) ~~β/γ~~ X-ray	Net Count Rate (cpm) α	Net Count Rate (cpm) ~~β/γ~~ X-ray	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Release Yes/No
NOT	Possible Soil	B8	0	2344	-7	33	—	—							
Applicable	Sampling	B10	0	2360	-7	49									
	Points	B12	0	2359	-7	48									
		B14	0	2169	-7	-142									
		B16	0	2286	-7	-25									
		B18	0	2827	-7	516									
		B20	0	1966	-7	-345									
AME		B22	0	2308	-7	-3	AME								
	AME	B24	0	2367	-7	56		AME							
		C24	0	2113	-7	-198									
		C22	1	2483	-6	172									
		C20	* 0	2340	-7	29			Anne-Marie Edwards						
		C18	0	2423	-7	112									
		C16	0	2388	-7	77									
		C14	0	2320	-7	9									
		C12	0	2350	-7	39									
		C10	0	2263	-7	-48									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

* Unable to get ...

Area or Equipment Drawing ...

CONTAMINATION SURVEY

FORM 1.1B

Site Number Interceptor Trench System
Technician Anne Marie Edwards / Clark Grose
Meter Model No.- S/N Fidler: 8388A Frisk: 5773A
Detector Model No.- S/N Fidler: B093D Frisk: A0462
Cal. Due Date Fidler: 9/93 Frisk: 10/93

Date/Time 1:00-4:00 11/12/92
Scaler Background (cpm) FIDLER: 2311 Frisk: 7
Meter Background (cpm) FIDLER: 2311 Frisk: 7
Survey Type ☒ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 3
Technician
Scaler Model No.
Scaler S/N
Cal. Due Date

Anne

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-ray	Direct Survey: Net Count Rate* (cpm) α	Direct Survey: Net Count Rate* (cpm) ~~β/γ~~ X-ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
NOT Applicable	Possible Soil Sampling Points	C8	0*	2325	-7	14	—	—							
		D8	0	2204	-7	-107									
		D10	0	2146	-7	-165									
		D12	**	2100	—	-211									
		D14		2182		-129									
		D16		2153		-158									
		D18		2095		-216									
		D20		2157		-154									
Anne	Anne	D22		2511	Anne	200	Anne	Anne							
		D24		2222		-89									
		D26		2281		-30									
		D28		2284		-27									
		D30		2122		-189									
		D32		2056		-255									
		D34		2129		-182									
		D36		2084		-227									
		D38		2144		-167									

Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.1B

Site Number: Interceptor Trench System
Technician: Anne Marie Edwards / Clark Grose
Meter Model No.- S/N: FIDLER: B388A Frisk: 8723A
Detector Model No.- S/N: FIDLER: 6093D Frisk: A0462
Cal. Due Date: FIDLER: 9/93 Frisk: 10/93

Date/Time: 1100-4100 11/12/92
Scaler Background (cpm): FIDLER: 2311 Frisk 7
Meter Background (cpm): FIDLER: 2311 Frisk 7
Survey Type: ☒ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 3 of 3
Technician
Scaler Model No.
Scaler S/N
Cal. Due Date

Anne

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) β/γ	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) β/γ	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
Not Applicable	Possible Soil Sampling Points	C38	[illegible]	1996	—	-315	—	—							
		C36		2171		-140									
		C34		2018		-293									
		C32		2118		-193									
		C30		2285		-26									
		C28		2264		-47									
		C26		2005		-306									
Anne	Anne	Anne	Anne	Anne	Anne		Anne	Anne							

Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.18

Site Number PA
Technician D Hyder
Meter Model No.- S/N Fidler B 0896
Detector Model No.- S/N 6-5 B 6016
Cal. Due Date 11/93

Date/Time 12/30/92 0920
Scaler Background (cpm) 1929 } PAVED
Meter Background (cpm) 2000 } ROAD
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 3
Technician
Scaler Model No. NA
Scaler S/N
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	RAD Survey	E-21		1529		-400									
		E-19		1547		-382									
		E-17		1494		-435									
		E-15		1665		-264									
		E-13		1456		-473									
		E-11		1505		-424									
		E-9		1661		-268									
		E-7		1596		-333				NA					
NA		E-5	NA	1534	NA	-395									
		E-3		1527		-402									
		E-1		1296		-633									
		F-2		1493		-436									
		F-4		1807		-122									
		G-5		1821		-108									
		F-6		1458		-471									
		F-8		1436		-493									
	RAD Survey	G-9		1449		-480									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.1B

Site Number PA

Technician D Hunter

Meter Model No.- S/N Eblei B089C

Detector Model No.- S/N 6-5 B6016

Cal. Due Date 11/93

Date/Time 12/30/92 0920

Scaler Background (cpm) 1925 } Raised Road

Meter Background (cpm) ~2000

Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 5

Technician

~~Scaler Model No.~~

Scaler S/N NA

Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-RAY	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-RAY	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	RAD SURVEY	F-10		1541		-388									
		F-12		1664		-265									
		F-14		1434		-495									
		F-16		1491		-438									
		F-18		1936		7									
		F-20		1550		-379									
		F-22		1636		-293									
		F-24	NA	1517	NA	-412				NA					
		G-23		1679		-250									
NA		G-21		1566		-363									
		G-19		1497		-432									
		G-17		1637		-292									
		G-15		1560		-369									
		G-13		1487		-442									
		G-11		1437		-492									
		H-10		1666		-263									
	RAD SURVEY	H-12		1394		-535									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

DEC-17-93 FRI 9:52

CONTAMINATION SURVEY

FORM 1.1B

Site Number 9A
Technician D Hunter
Meter Model No.- S/N Fidler 3085 6
Detector Model No.- S/N G-5 B6016
Cal. Due Date 11/93

Date/Time 12/30/92 0920
Scaler Background (cpm) 1929
Meter Background (cpm) 2000
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 3 of 5
Technician
Scaler Model No.
Scaler S/N N/A
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	LAD Survey	H-14		1395		-534									
		H-16		1562		-367									
		H-18		1479		-450									
		H-20		1382		-547									
		H-22		1394		-535									
		H-24		1293		-636									
		H-26		1852		-77									
N/A		I-29		1402		-527									
		I-27	N/A	1584	N/A	-345					N/A				
		I-25		1411		-518									
		I-23		1582		-347									
		I-21		1715		-214									
		I-19		1517		-412									
		I-17		1580		-349									
		I-15		1280		-649									
		I-13		1508		-421									
	LAD Survey	I-11		1427		-502									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.1B

Site Number "PA"
Technician D Hroch
Meter Model No.- S/N Fidles B0896
Detector Model No.- S/N 6-5 B6016
Cal. Due Date 11/93

Date/Time 12/10/92 0520
Scaler Background (cpm) 1929
Meter Background (cpm) 2000
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 4 of 5
~~Technician~~
~~Scaler Model No.~~
~~Scaler S/N~~
~~Cal. Due Date~~

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
NA	Rad Survey	I-9	NA	1754	NA	-175	NA								
		K-9		1752		-173									
		M-9		1461		-468									
		O-9		1410		-519									
		P-10		1590		-339									
		J-10		1643		-286									
		K-11		1535		-394									
		J-12		1296		-633									
		K-13		1453		-476									
		J-14		1457		-472									
		K-15		1446		-483									
		J-16		1693		-236									
		K-17		2023		94									
		J-18		1453		-476									
		K-19		1918		-11									
		J-~~18~~ 20		1770		-159									
	End Survey	K-21		1748		-181									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.1B

Site Number "PA"
Technician D Hyder
Meter Model No.- S/N Fidler 80896
Detector Model No.- S/N G-5 B6076
Cal. Due Date 11/93

Date/Time 12/25/92 0920
Scaler Background (cpm) 1929
Meter Background (cpm) 2000
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☑ X-Ray

Page 5 of 5
Technician
Scaler Model No. N/A
Scaler S/N
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ X-RAY	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ X-RAY	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) α	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	RAD SURVEY	J-22		1750		-179									
		K-23		1663		-266									
		J-24		1421		-508									
		K-25		1610		-319									
		J-26		1572		-357									
		K-27	NA	1499		-430			N/A						
		J-28		1546	NA	-383									
		K-29		1548		-381									
		J-30		1434		-495									
NA		K-31		1544		-385									
	RAD SURVEY	K-33		1531		-398									
					NA										

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

F

CONTAMINATION SURVEY

FORM 1.1B

Site Number PA
Technician D Hyder
Meter Model No.- S/N Fidler B0896
Detector Model No.- S/N G-5 B6016
Cal. Due Date 11/93

Date/Time 12/31/92 @ 0940
Scaler Background (cpm) 1855
Meter Background (cpm) 1800
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 3
~~Technician~~
~~Scaler Model No.~~
~~Scaler S/N~~ NA
~~Cal. Due Date~~

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-Ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
	RAD Survey	H-2		1799		-56									
		H-4		2010		155									
		H-6		1886		31									
		H-8		1582		-273									
		I-7		1956		101									
		J-8		1964		109									
		K-7		1576		-279									
		M-7		1739		-116									
		L-8	N/A	1552		-303			NA						
NA		L-6		1483		-372									
		M-5		1563		292									
		K-5		1852		-3									
		K-3		1722		-133									
		L-4		1772		-83									
		M-3		1501		-354									
		N-4		1409		-446									
	RAD Survey	O-3		1587		-268									

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY **FORM 1.1B**

Site Number PA
Technician D Hyder
Meter Model No.- S/N Fidler B0896
Detector Model No.- S/N 6-5 B6016
Cal. Due Date 11/93

Date/Time 12/31/92 0940
Scaler Background (cpm) 1850
Meter Background (cpm) 1900
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 3
~~Technician~~
~~Scaler Model No.~~ N/A
~~Scaler S/N~~
~~Cal. Due Date~~

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Smear Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Release
			α	~~β/γ~~ X-RAY	α	~~β/γ~~ X-RAY	α	β/γ	α	β/γ	α	β/γ	α	β/γ	Yes/No
	RAD Survey	P-2		1826		-29									
		R-2		1779		-76									
		Q-3		1980		125									
		P-4		1353		-502									
		~~R-4~~ N-6		1501		-354									
		N-8		1638		-217									
		O-7		2074		219									
N/A		Q-7	N/A	2017		162									
		R-6		1756	N/A	-99				N/A					
		R-4		1831		-24									
		R-8 *		2556		701									
		P-8		1668		-187									
		Q-9		1748		-107									
		R-10*		2572		717 ~~712~~									
		Q-11		1448		-407									
		R-12		1979		124									
	RAD Survey	Q-13		1514		-341									

* Bldg 779 close by on asphalt

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

FORM 1.1B

CONTAMINATION SURVEY

Site Number 7A
Technician D Hyder
Meter Model No.- S/N Fidler B0856
Detector Model No.- S/N 6-5 ~~B060~~ #6016
Cal. Due Date 11/93

Date/Time 12/31/92 0940
Scaler Background (cpm) 1855
Meter Background (cpm) 1900
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 3 of 3
Technician
Scaler Model No.
Scaler S/N N/A
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-ray	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-ray	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
N/A	RAD Survey	R-14	N/A	1383	N/A	-472	N/A								
		Q-15		1636		-219									
		S-15		1576		-279									
		S-13		1960		105									
		T-12		1852		-3									
		T-14		1814		-41									
		X-14		1647		-208									
		X-12		1723		-132									
		X-10		2023		168									
		Y-9		1802		-53									
	RAD Survey	Y-7		2045		190									
	N/A														
	~~RAD #~~ Survey #														

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

H

CONTAMINATION SURVEY

FORM 1.1B

Site Number PA
Technician Y. Rothman
Meter Model No.- S/N Fidler B 0886
Detector Model No.- S/N
Cal. Due Date 11/93

Date/Time 011893 0730
Scaler Background (cpm) 1429
Meter Background (cpm) 1500
Survey Type ☒ Alpha α ☐ Beta-Gamma β/γ
☒ X-Ray

Page 1 of 5
Technician —
Scaler Model No. —
Scaler S/N —
Cal. Due Date —

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) ~~α~~ X-Ray	Direct Survey: Gross Count Rate (cpm) β/γ	Direct Survey: Net Count Rate (cpm) ~~α~~ X-Ray	Direct Survey: Net Count Rate (cpm) β/γ	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
—	rad survey	R16	2156		727										
		T16	3364		1935										
		V16	1713		284										
		X16	1893		464										
		Y15	1614		185										
		Y17	1923		494										
NA		W17	2079		650										
		B18	2812	NA	1383		NA								
		X18	1844		415										
		W19	1609		180										
		V20	1463		34										
		X20	1563		134										
		W21	1683		254										
		V22	1384		45										
		X22	1246		183										
		W23	1557		128										
	RAD survey	Y23	1495		66										

YR 01a3

Checked by Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side

FORM 1.1B

CONTAMINATION SURVEY

Site Number PA
Technician Y. Rothman
Meter Model No.- S/N Fidler B0886
Detector Model No.- S/N G-5 B6Ua
Cal. Due Date 1193

Date/Time 011893 0730
Scaler Background (cpm) 1429
Meter Background (cpm) 1360
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 5
Technician —
Scaler Model No. —
Scaler S/N —
Cal. Due Date —

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Smear Survey: Gross Count Rate (cpm)		Net Count Rate (cpm)		Total Activity (dpm 100 cm²)		Release
			~~α~~ X-Ray	β/γ	~~α~~ X-Ray	β/γ	α	β/γ	α	β/γ	α	β/γ	α	β/γ	Yes/No
NA	RAD Survey	X24	1368	NA	61										
		W25	1254		175										
		X26	1225		204										
		W27	1177		252										
		Y27	1958		529										
		X28	1219		210										
		V28	1230		199										
		T28	1253		176					NA					
		R28	1319		110										
		P28	1760		331										
		O29	1460		31										
		N30	1544		115										
		N28	1253		176										
		L28	1264		165										
		M29	1307		122										
		L30	1580		151										
		L32	1239		190										

Checked by Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side

ne 01/9

CONTAMINATION SURVEY

FORM 1.1B

Site Number PA
Technician V. Rothman
Meter Model No.- S/N Fidler B088G
Detector Model No.- S/N G-5 B1016
Cal. Due Date 1193

Date/Time 011893 0730
Scaler Background (cpm) 1429
Meter Background (cpm) 1500
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 3 of 5
Technician —
Scaler Model No. —
Scaler S/N —
Cal. Due Date —

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) ~~α~~ X-ray	Direct Survey: Gross Count Rate (cpm) β/γ	Direct Survey: Net Count Rate (cpm) ~~α~~ X-ray	Direct Survey: Net Count Rate (cpm) β/γ	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
NA	RadSurvey	L34	1403	NA	26	NA									
		L36	1529		100										
		M37	1542		113										
		M35	1415		14										
		M33	1282		147										
		M31	1517		88										
		N32	1808		379										
		N34	1443		14										
		N36	1304		125					NA					
		N38	1303		126										
		N40	1586		157										
		O39	1272		157										
		O37	1473		~~419~~ 44										
		O35	1848		419										
		O33	1652		223										
		P32	2106		677										
		P34	2265		836										

Checked By Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area of Equipment Drawing Showing Survey Points on Reverse Side

019

CONTAMINAT SURVEY — FORM 1.1B

Number

Technician Y. Rothman

Meter Model No.- S/N Eidler B0886

Detector Model No.- S/N G-5 B6016

Cal. Due Date 1193

Date/Time 011893 0430

Scaler Background (cpm) 1429

Meter Background (cpm) 1500

Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Technician —

Scaler Model No. —

Scaler S/N —

Cal. Due Date —

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) ~~α~~ X-ray	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) ~~α~~ X-ray	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate β/γ	Net Count Rate (cpm) α	Net Count Rate β/γ	Total Activity (dpm 100 cm²) α	Total Activity β/γ	Release Yes/No
NA	RAD Survey	P36	1721	NA	292	NA									
		P38	1247		182										
		P40	1346		83										
		Q39	1592		163										
		Q37	1399		30										
		Q35	1603		174										
		Q33	2053		624										
		R30	2125		696										
		R32	1859		430										
		R34	1828		399										
		R36	1347		82										
		R38	1300		129										
		S37	1492		63										
		S35	1632		203										
		S33	1799		370										
		S31	1339		90										
		T30	1151		278										

Checked by Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

CONTAMINATION SURVEY

FORM 1.1B

Number: PA
Technician: Y. Rothman
Meter Model No.- S/N: Eidler 8088G
Detector Model No.- S/N: ~~[illegible]~~
Cal. Due Date: 1193

Date/Time: 011893 0730
Scaler Background (cpm): 1429
Meter Background (cpm): 1500
Survey Type: ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 5 of 5
Technician: —
Scaler Model No.: —
Scaler S/N: —
Cal. Due Date: —

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) ~~α~~ X-ray	Direct Survey: Gross Count Rate (cpm) β/γ	Direct Survey: Net Count Rate (cpm) ~~α~~ X-ray	Direct Survey: Net Count Rate (cpm) β/γ	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
NA	RAD Survey	T32	1453	NA	24 ~~[illegible]~~	NA									
		T34	1870 ~~[illegible]~~		441										
		T36	1825		396										
		U35 ~~U37~~	1617		188										
		U33 ~~U32~~	1673		244										
		U31	1594		165										
		B30	1427		2										
		Y32	1598		169										
		Y34	1614		185										
		W33	1752		323										
		W31	1063		366										
		X32	1577		148										
		Y31	1485		56										
		X30	1974		545										
		Y29	1893		464										

Checked by Anne Marie Edwards

*Net Count Rate = Gross Count Rate Minus Background Count Rate

Area or Equipment Drawing Showing Survey Points on Reverse Side.

GT

CONTAMINATION SURVEY

FORM 1.11

Site Number 207 PONDS
Technician DBURGESS
Meter Model No.- S/N Bicron Analyst A525P
Detector Model No.- S/N G-5A270P
Cal. Due Date 9/93

Date/Time 5/12/93 1330
Scaler Background (cpm) 1547
Meter Background (cpm) 1500
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 1
~~Technician~~
Scaler Model No.
Scaler S/N
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) ~~β/γ~~ X-RAY	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) ~~β/γ~~ X-RAY	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
N/A	GROUND SURFACE	P14	N/A	1650	N/A	103									
		P12		1555		8									
		N10		1653		106									
		L10		1284		-263									
		L12		1350		-197									
		L14	DWB	1131	DWB	-416						DWB			
		L16		1470		-77									
		L18		1944		397									
		L20		4805		3258									
N/A	GROUND SURFACE	L22	N/A	1650	N/A	103									

DWB

H

CONTAMINATION SURVEY

FORM 1.1B

Site Number 207 PONDS
Technician D. BURGESS
Meter Model No.- S/N BICRON ANALYST A518P
Detector Model No.- S/N G-5 A0660
Cal. Due Date 8/93

Date/Time 3/24/93
Scaler Background (cpm) 1834
Meter Background (cpm) 1800
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 1 of 2
Technician
Scaler Model No. N/A
Scaler S/N
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) X-RAY	Gross Count Rate (cpm) β/γ	Net Count Rate (cpm) X-RAY	Net Count Rate (cpm) β/γ	Total Activity (dpm 100 cm²) α	Total Activity β/γ	Smear Survey: Gross Count Rate (cpm) α	Gross Count Rate β/γ	Net Count Rate (cpm) α	Net Count Rate β/γ	Total Activity (dpm 100 cm²) α	Total Activity β/γ	Release Yes/No
N/A	SOIL/ASPHALT SURFACE	M-11	2172	N/A	338	N/A									
		M-13	2220		386										
		M-15	2186		352										
		N-16	1507		-327										
		O-15	2187		353										
		P-16	2449		615										
		V-18	2324		490										
		V-20	2448		614										
		V-22	1343		-491										
		V-21	2348		514										
		T-22	2331		497										
		S-27	2390		556										
		S-25	2011		177										
		S-23	2419		585										
		S-21	2270		436										
		R-22	1474		-360										
N/A	SOIL/ASPHALT SURFACE	Q-21	2349	N/A	515	N/A									

CONTAMINATION SURVEY

FORM 1.1[illegible]

Site Number 207 PONDS
Technician D. BURGESS
Meter Model No.- S/N DICRON ANALYST AS18P
Detector Model No.- S/N G-5 A0660
Cal. Due Date 8/93

Date/Time 3/26/93
Scaler Background (cpm) 1834
Meter Background (cpm) 1800
Survey Type ☐ Alpha α ☐ Beta-Gamma β/γ ☒ X-Ray

Page 2 of 2
Technician D
Scaler Model No. N/A WP
Scaler S/N
Cal. Due Date

Smear Number	Item Surveyed	Location Surveyed	Direct Survey: Gross Count Rate (cpm) α	Direct Survey: Gross Count Rate (cpm) β/γ	Direct Survey: Net Count Rate (cpm) α	Direct Survey: Net Count Rate (cpm) β/γ	Direct Survey: Total Activity (dpm 100 cm²) α	Direct Survey: Total Activity (dpm 100 cm²) β/γ	Smear Survey: Gross Count Rate (cpm) α	Smear Survey: Gross Count Rate (cpm) β/γ	Smear Survey: Net Count Rate (cpm) α	Smear Survey: Net Count Rate (cpm) β/γ	Smear Survey: Total Activity (dpm 100 cm²) α	Smear Survey: Total Activity (dpm 100 cm²) β/γ	Release Yes/No
N/A	SOIL/ASPHALT SURFACE	P-22	1584	N/A	-250	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		P-24	2148		314										
WP	WP	P-26	2126		292				WP						
		O-21	2200		366										
		N-22	1591		-243										
N/A	SOIL/ASPHALT SURFACE	M-21	2443	N/A	609	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DWP

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
A	A 24	2252	1947	2473	305
A	A 26	2116	1947	2473	169
A	A 28	1997	1947	2473	50
A	A 30	1974	1947	2473	27
B	B 8	2344	2311	2473	33
B	B 10	2360	2311	2473	49
B	B 12	2359	2311	2473	48
B	B 14	2169	2311	2473	-142
B	B 16	2286	2311	2473	-25
B	B 18	2827	2311	2473	516
B	B 20	1966	2311	2473	-345
B	B 22	2308	2311	2473	-3
B	B 24	2367	2311	2473	56
A	B 26	2020	1947	2473	73
A	B 28	1997	1947	2473	50
A	B 30	1852	1947	2473	-95
A	B 32	1667	1947	2473	-280
A	B 34	1956	1947	2473	9
A	B 36	2031	1947	2473	84
B	C 8	2325	2311	2473	14
B	C 10	2263	2311	2473	-48
B	C 12	2350	2311	2473	39
B	C 14	2320	2311	2473	9
B	C 16	2388	2311	2473	77
B	C 18	2423	2311	2473	112
B	C 20	2340	2311	2473	29
B	C 22	2483	2311	2473	172
B	C 24	2113	2311	2473	-198
B	C 26	2005	2311	2473	-306
B	C 28	2264	2311	2473	-47
B	C 30	2285	2311	2473	-26
B	C 32	2118	2311	2473	-193
B	C 34	2018	2311	2473	-293
B	C 36	2171	2311	2473	-140
B	C 38	1996	2311	2473	-315
B	D 8	2204	2311	2473	-107
B	D 10	2146	2311	2473	-165
B	D 12	2100	2311	2473	-211
B	D 14	2182	2311	2473	-129
B	D 16	2153	2311	2473	-158
B	D 18	2095	2311	2473	-216
B	D 20	2157	2311	2473	-154
B	D 22	2511	2311	2473	200
B	D 24	2222	2311	2473	-89
B	D 26	2281	2311	2473	-30
B	D 28	2284	2311	2473	-27
B	D 30	2122	2311	2473	-189
B	D 32	2056	2311	2473	-255

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
B	D 34	2129	2311	2473	-182
B	D 36	2084	2311	2473	-227
B	D 38	2144	2311	2473	-167
E	D 40	1743	1954	2473	-211
E	D 42	1721	1954	2473	-233
C	E 1	1296	1929	2473	-633
C	E 3	1527	1929	2473	-402
C	E 5	1534	1929	2473	-395
C	E 7	1596	1929	2473	-333
C	E 9	1661	1929	2473	-268
C	E 11	1505	1929	2473	-424
C	E 13	1456	1929	2473	-473
C	E 15	1665	1929	2473	-264
C	E 17	1494	1929	2473	-435
C	E 19	1547	1929	2473	-382
C	E 21	1529	1929	2473	-400
D	E 28	2056	1947	2473	109
D	E 30	1924	1947	2473	-23
D	E 32	1892	1947	2473	-55
D	E 34	2006	1947	2473	59
D	E 36	2012	1947	2473	65
D	E 38	1826	1947	2473	-121
E	E 40	1752	1954	2473	-202
E	E 42	1759	1954	2473	-195
C	F 2	1493	1929	2473	-436
C	F 4	1807	1929	2473	-122
C	F 6	1458	1929	2473	-471
C	F 8	1436	1929	2473	-493
C	F 10	1541	1929	2473	-388
C	F 12	1664	1929	2473	-265
C	F 14	1434	1929	2473	-495
C	F 16	1491	1929	2473	-438
C	F 18	1936	1929	2473	7
C	F 20	1550	1929	2473	-379
C	F 22	1636	1929	2473	-293
C	F 24	1517	1929	2473	-412
C	G 5	1821	1929	2473	-108
C	G 9	1449	1929	2473	-480
C	G 11	1437	1929	2473	-492
C	G 13	1487	1929	2473	-442
C	G 15	1560	1929	2473	-369
C	G 17	1637	1929	2473	-292
C	G 19	1497	1929	2473	-432
C	G 21	1566	1929	2473	-363
C	G 23	1679	1929	2473	-250
D	G 32	1789	1947	2473	-158
D	G 34	2081	1947	2473	134
D	G 36	1983	1947	2473	36

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
D	G 38	2394	1947	2473	447
E	G 40	1803	1954	2473	-151
E	G 42	1671	1954	2473	-283
F	H 2	1799	1855	2473	-56
F	H 4	2010	1855	2473	155
F	H 6	1886	1855	2473	31
F	H 8	1582	1855	2473	-273
C	H 10	1666	1929	2473	-263
C	H 12	1394	1929	2473	-535
C	H 14	1395	1929	2473	-534
C	H 16	1562	1929	2473	-367
C	H 18	1479	1929	2473	-450
C	H 20	1382	1929	2473	-547
C	H 22	1394	1929	2473	-535
C	H 24	1293	1929	2473	-636
C	H 26	1852	1929	2473	-77
F	I 7	1956	1855	2473	101
C	I 9	1754	1929	2473	-175
C	I 11	1427	1929	2473	-502
C	I 13	1508	1929	2473	-421
C	I 15	1280	1929	2473	-649
C	I 17	1580	1929	2473	-349
C	I 19	1517	1929	2473	-412
C	I 21	1715	1929	2473	-214
C	I 23	1582	1929	2473	-347
C	I 25	1411	1929	2473	-518
C	I 27	1584	1929	2473	-345
C	I 29	1402	1929	2473	-527
D	I 36	1780	1947	2473	-167
D	I 38	1837	1947	2473	-110
E	I 40	1562	1954	2473	-392
E	I 42	2206	1954	2473	252
F	J 8	1964	1855	2473	109
C	J 10	1643	1929	2473	-286
C	J 12	1296	1929	2473	-633
C	J 14	1457	1929	2473	-472
C	J 16	1693	1929	2473	-236
C	J 18	1453	1929	2473	-476
C	J 20	1770	1929	2473	-159
C	J 22	1750	1929	2473	-179
C	J 24	1421	1929	2473	-508
C	J 26	1572	1929	2473	-357
C	J 28	1546	1929	2473	-383
C	J 30	1434	1929	2473	-495
F	K 3	1722	1855	2473	-133
F	K 5	1852	1855	2473	-3
F	K 7	1576	1855	2473	-279
C	K 9	1756	1929	2473	-173

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
C	K 11	1535	1929	2473	-394
C	K 13	1453	1929	2473	-476
C	K 15	1446	1929	2473	-483
C	K 17	2023	1929	2473	94
C	K 19	1918	1929	2473	-11
C	K 21	1748	1929	2473	-181
C	K 23	1663	1929	2473	-266
C	K 25	1610	1929	2473	-319
C	K 27	1499	1929	2473	-430
C	K 29	1548	1929	2473	-381
C	K 31	1544	1929	2473	-385
C	K 33	1531	1929	2473	-398
E	K 40	1839	1954	2473	-115
E	K 42	1701	1954	2473	-253
F	L 4	1772	1855	2473	-83
F	L 6	1483	1855	2473	-372
F	L 8	1552	1855	2473	-303
J	L 28	1264	1429	2473	-165
J	L 30	1580	1429	2473	151
J	L 32	1239	1429	2473	-190
J	L 34	1403	1429	2473	-26
J	L 36	1529	1429	2473	100
F	M 3	1501	1855	2473	-354
F	M 5	1563	1855	2473	-292
F	M 7	1739	1855	2473	-116
C	M 9	1461	1929	2473	-468
H	M 11	2172	1834	2473	338
H	M 13	2220	1834	2473	386
H	M 15	2186	1834	2473	352
H	M 21	2443	1834	2473	609
J	M 29	1307	1429	2473	-122
J	M 31	1517	1429	2473	88
J	M 33	1282	1429	2473	-147
J	M 35	1415	1429	2473	-14
J	M 37	1542	1429	2473	113
F	N 4	1409	1855	2473	-446
F	N 6	1501	1855	2473	-354
F	N 8	1638	1855	2473	-217
H	N 16	1507	1834	2473	-327
H	N 22	1591	1834	2473	-243
J	N 28	1253	1429	2473	-176
J	N 30	1544	1429	2473	115
J	N 32	1808	1429	2473	379
J	N 34	1443	1429	2473	14
J	N 36	1304	1429	2473	-125
J	N 38	1303	1429	2473	-126
J	N 40	1586	1429	2473	157
F	O 3	1587	1855	2473	-268

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
F	O 7	2074	1855	2473	219
C	O 9	1410	1929	2473	-519
H	O 15	2187	1834	2473	353
H	O 21	2200	1834	2473	366
J	O 29	1460	1429	2473	31
J	O 33	1652	1429	2473	223
J	O 35	1848	1429	2473	419
J	O 37	1473	1429	2473	44
J	O 39	1272	1429	2473	-157
F	P 2	1826	1855	2473	-29
F	P 4	1353	1855	2473	-502
F	P 8	1668	1855	2473	-187
C	P 10	1590	1929	2473	-339
H	P 16	2449	1834	2473	615
H	P 22	1584	1834	2473	-250
H	P 24	2148	1834	2473	314
H	P 26	2126	1834	2473	292
J	P 28	1760	1429	2473	331
J	P 32	2106	1429	2473	677
J	P 34	2265	1429	2473	836
J	P 36	1721	1429	2473	292
J	P 38	1247	1429	2473	-182
J	P 40	1346	1429	2473	-83
F	Q 3	1980	1855	2473	125
F	Q 7	2017	1855	2473	162
F	Q 9	1748	1855	2473	-107
F	Q 11	1448	1855	2473	-407
F	Q 13	1514	1855	2473	-341
F	Q 15	1636	1855	2473	-219
H	Q 21	2349	1834	2473	515
J	Q 33	2053	1429	2473	624
J	Q 35	1603	1429	2473	174
J	Q 37	1399	1429	2473	-30
J	Q 39	1592	1429	2473	163
F	R 2	1779	1855	2473	-76
F	R 4	1831	1855	2473	-24
F	R 6	1756	1855	2473	-99
F	R 8	2556	1855	2473	701
F	R 10	2572	1855	2473	717
F	R 12	1979	1855	2473	124
F	R 14	1383	1855	2473	-472
J	R 16	2156	1429	2473	727
H	R 22	1474	1834	2473	-360
J	R 28	1319	1429	2473	-110
J	R 30	2125	1429	2473	696
J	R 32	1859	1429	2473	430
J	R 34	1828	1429	2473	399
J	R 36	1347	1429	2473	-82

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
J	R 38	1300	1429	2473	-129
F	S 13	1960	1855	2473	105
F	S 15	1576	1855	2473	-279
H	S 21	2270	1834	2473	436
H	S 23	2419	1834	2473	585
H	S 25	2011	1834	2473	177
H	S 27	2390	1834	2473	556
J	S 31	1339	1429	2473	-90
J	S 33	1799	1429	2473	370
J	S 35	1632	1429	2473	203
J	S 37	1492	1429	2473	63
F	T 12	1852	1855	2473	-3
F	T 14	1814	1855	2473	-41
J	T 16	3364	1429	2473	1935
H	T 22	2331	1834	2473	497
J	T 28	1253	1429	2473	-176
J	T 30	1151	1429	2473	-278
J	T 32	1453	1429	2473	24
J	T 34	1870	1429	2473	441
J	T 36	1825	1429	2473	396
H	U 21	2348	1834	2473	514
J	U 31	1594	1429	2473	165
J	U 33	1673	1429	2473	244
J	U 35	1617	1429	2473	188
J	V 16	1713	1429	2473	284
H	V 18	2324	1834	2473	490
H	V 20	2448	1834	2473	614
H	V 22	1343	1834	2473	-491
J	V 28	1230	1429	2473	-199
J	V 20	1463	1429	2473	34
J	V 30	1457	1429	2473	28
J	V 32	1598	1429	2473	169
J	V 34	1614	1429	2473	185
J	W 17	2079	1429	2473	650
J	W 19	1609	1429	2473	180
J	W 21	1683	1429	2473	254
J	W 23	1557	1429	2473	128
J	W 25	1254	1429	2473	-175
J	W 27	1177	1429	2473	-252
J	W 31	1063	1429	2473	-366
J	W 33	1752	1429	2473	323
F	X 10	2023	1855	2473	168
F	X 12	1723	1855	2473	-132
F	X 14	1647	1855	2473	-208
J	X 16	1893	1429	2473	464
J	X 18	1844	1429	2473	415
J	X 20	1563	1429	2473	134
J	X 22	1246	1429	2473	-183

Operable Unit 4 Sitewide Gamma (FIDLER) Radiation Survey Results

Survey Region	Grid Location	FIDLER Reading (cpm)	FIDLER Checkpoint (cpm)	Upper Tolerance Limit (cpm)	Adjusted FIDLER Measurement (cpm)
J	X 24	1368	1429	2473	-61
J	X 26	1225	1429	2473	-204
J	X 28	1219	1429	2473	-210
J	X 30	1974	1429	2473	545
J	X 32	1577	1429	2473	148
F	Y 7	2045	1855	2473	190
F	Y 9	1802	1855	2473	-53
J	Y 15	1614	1429	2473	185
J	Y 17	1923	1429	2473	494
J	Y 23	1495	1429	2473	66
J	Y 27	1958	1429	2473	529
J	Y 29	1893	1429	2473	464
J	Y 31	1485	1429	2473	56

Background Action Level Calculation

The calcuated mean was obtained from a population of 301 FIDLER readings.

The counts selected are gross cpm. The value of background represents a 95% confidence level.

B = FIDLER Background

X = Mean

s= Standard Deviation

$B = X \pm 2.00s$

$B = 1769 \pm 2.00(352)$

B= 2473

APPENDIX II.G

SURFICIAL SOIL DATA COLLECTION FORMS

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40018AE
Collection Date 12/29/92
Collection Time 14:00
Location Code SS400293
Chain of Custody No. AE100051, AE100052, AE000024, AE200034

Coordinates North or Y ______ East or X ______

Sample Location ______

Composite (Y/N) Y NO PG
Composite Description WELL MIXED; 1 METER GRID; 1 SAMPLE EA. CORNER, 1 FROM CENTER

Collection Method RFP METHOD
Sample Team Leader J.C. EVANS
Sample Team Member C. MURRAY
Sample Team Member C. SHERRY
Sample Team Member D. HYDER
Container Size (Oz) ______ % Full ______
1 16OZ GLASS; 1-8OZ NITRATE, 1-8OZ BCN, PCB, PEST, 1-100ML RADSCREEN, 1-8OZ METALS

Comments ______

Completed By: CHRISTIAN R. SHERRY (Print Name) [signature] (Signature) 12/29/92 (Date)

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40018AE Type : SS
Contractor : A. E.
Station Code : SS400293

Collection Date : 12-29-92 Quarter: Disposition:
Collection Time : 14:00 Purpose:
Sample Location : SS400293
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type : Partner:
Collection Method : RFP method

Sample Team Leader : ~~John C. Evans~~ ~~Chris~~ Claude Murray
Member : ~~Dave Hyder~~ Chris Sherry
Member :
Volume Collected : 43.4 Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40019AE   Type : SS
Contractor : AE
Station Code : SS 400343

Collection Date : 5/27/93   Quarter: –   Disposition: Sampled
Collection Time : 1500   Purpose: –
Sample Location : SS400343
Composite : (Y/N)
Composite Desc : —
QC Type : Real   Partner: —
Collection Method : RFP Modified

Sample Team Leader : J. C. Evans
Member : K. Kravieda
Member : —
Volume Collected : 47.4   Units: OZ
Prepared By : J. C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2
		~~in~~	n/c
		~~in~~	
		in	

Headspace Reading Ø
Comments —

NK 6/1

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40020 AE
Collection Date 12-30-92
Collection Time 1040
Location Code SS400493
Chain of Custody No. AE-200030, AE000022, AE-100049, AE-100050

Coordinates North or Y ______ East or X ______

Sample Location N.W. of Pond 207 C

Composite (Y/N) Y NO PC
Composite Description 1 meter square grid, 1 sample at each corner, 1 at center

Collection Method RFP modified
Sample Team Leader John C. Evans
Sample Team Member Chris Sherry
Sample Team Member
Sample Team Member
Container Size (Oz) ______ % Full ______
1-16oz rad nukes, 1-8oz metals, 1-8oz BNA, PCB, Pest, 1-8oz nitrate
1-100 ml rad screen

Comments

Completed By: John C. Evans (Print Name) John C. Evans (Signature) 12-30-92 (Date)

Subcontractor: Applied Environmental

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40020AE
Type : SS
Contractor : AE
Station Code : SS400493

Collection Date : 12-30-92
Quarter:
Disposition:
Collection Time : 1040
Purpose:
Sample Location : SS400493
Composite : (Y/N)
Composite Desc : ~~RFP~~ 1 meter grid
QC Type :
Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Chris Sherry
Member :
Volume Collected : 43.4
Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40021AE Type : SS
Contractor : AE
Station Code : SS 400593

Collection Date : 5/27/93 Quarter: - Disposition: Sampled
Collection Time : 1306 Purpose: -
Sample Location : SS400593
Composite : (Y/N)
Composite Desc : —
QC Type : Real Partner: —
Collection Method : RFP Modified

Sample Team Leader : T. C. Evans
Member : K. Krumviede
Member : —
Volume Collected : 43.4 Units: oz
Prepared By : T. C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2
		~~in~~	
		~~in~~	nc
		in	

Headspace Reading Ø
Comments —

JK 6/1

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS400224E
Type : SS
Contractor : AE
Station Code : SS400693

Collection Date : 5/27/93 Quarter: - Disposition: Sampled
Collection Time : 1443 Purpose: -
Sample Location : SS400693
Composite : (Y/N)
Composite Desc : -
QC Type : Real Partner: -
Collection Method : RFP Modified

Sample Team Leader : J.-C. Evans
Member : K. Krumviedq
Member : -
Volume Collected : 43-4 Units: OZ
Prepared By : J.-C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2
		in	
		in	
		in	

n/c

Headspace Reading Ø
Comments -

MK 6/1

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number ~~SS4007 AE~~ SS40023 AE
Collection Date 12/29/92
Collection Time 10:20 am
Location Code OU4 SS400793
Chain of Custody No. AE100051, AE100052, AE000024, AE200034

Coordinates North or Y ____ East or X ____
To be surveyed.

Sample Location OU4 PA SOUTH OF POND 207 B south

Composite (Y/N) N PG
Composite Description Well mixed

Collection Method RF Method
Sample Team Leader J. Evans
Sample Team Member C. Murray, C. Sherry, D. Hyder
Sample Team Member ____
Sample Team Member ____
Container Size (Oz) 100 % Full
1 16oz glass, 1 100 ml plastic, 1 8 oz Nitrate, 1 8oz BcN, PCB, & Pest, 1 8oz Met.

Comments Cool Temp. 55°F

Completed By: Claude D. Murray (Print Name) Claude D. Murray (Signature) Dec. 29, 92 (Date)

Subcontractor: ____

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40023AE
Type : SS
Contractor : A.E.
Station Code : SS400793

Collection Date : 12-29-92 Quarter: Disposition:
Collection Time : 10:20AM Purpose:
Sample Location : SS400793
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type : Partner:
Collection Method : RFP modified

Sample Team Leader : ~~John C. Evans~~ Claude Murray
Member : ~~Dave Hyder~~ Chris Sherry
Member :
Volume Collected : 43.4 Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS40024AE
Collection Date: 01-04-93
Collection Time: 15:30
Location Code: ~~SS40024A~~ SS400893
Chain of Custody No.: AE200029, AE100044, AE100043, AE000033

Coordinates North or Y ______ East or X ______

Sample Location: I.T.S. Buffer Zone

Composite (Y/N): YES
Composite Description: Dark Brwn. Sandy Loam Soil

Collection Method: R/F Method
Sample Team Leader: C. Murray
Sample Team Member: A.M. Edwards
Sample Team Member: ______
Sample Team Member: ______
Container Size (Oz) ______ % Full 100
16 oz Rad Nukes, 8 oz metals, 8 oz nitrate, 8 oz PCB/Pest, 100 ml R.S.

Comments ______

Completed By: Claude Murray (Print Name) Claude D Murray (Signature) 1-4-93 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40024AE   Type : SS
Contractor : A.E.
Station Code : SS400893

Collection Date : 1-4-93 Quarter: 1 Disposition:
Collection Time : 15:30 Purpose:
Sample Location : I.T.S. Buffer zone
Composite : (Y/N)
Composite Desc : Sandy Loam
QC Type : Partner: AM Edwards
Collection Method : R/F Method

Sample Team Leader : C. Murray
Member : AM Edwards
Member : —
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

✓ /1/6/93

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
		in	
	—	in	—
	—	in	—

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS 40125 AE
Collection Date 12-31-92
Collection Time 1118
Location Code SS 400993
Chain of Custody No. AE 200027, AE 100042, AE 100041, AE 000013

Coordinates North or Y ______ East or X ______

Sample Location South of bldg ~~744~~ 774

Composite (Y/N) Yes/N PG
Composite Description 1 meter square grid, 1 at each corner + 1 at center.

Collection Method RFP modified
Sample Team Leader John C. Evans
Sample Team Member Clark Grose
Sample Team Member ______
Sample Team Member ______
Container Size (Oz) ______ % Full ______
1-16 oz rad nukes, 1-8 oz metals, 1-8 oz nitrate, 1-8 oz BNA, PCB, Pest
1-100 ml rad screen.

Comments ______

Completed By: John C Evans (Print Name) John C. Evans (Signature) 12-31-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 46104
Sample Number : SS40025AE
Type : SS
Contractor : AE
Station Code : SS400993

Collection Date : 12-31-92
Quarter:
Disposition:
Collection Time : 1118
Purpose:
Sample Location : SS400993
Composite : (Y/N)
Composite Desc : 1 meter square
QC Type :
Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Clark Grose
Member :
Volume Collected : 47.4 Units: OZ
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading

Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40026AE
Collection Date 12/29/92
Collection Time 12:30
Location Code SS401093
Chain of Custody No. AE100051, AE100052, AE000024, AE200034

Coordinates North or Y ______ East or X ______

Sample Location PA, OU4, In junkyard

Composite (Y/N) N PE
Composite Description Soil

Collection Method RF Method 1 mtr sqd, 5 sample pts.
Sample Team Leader J. Evans
Sample Team Member C. Murray
Sample Team Member C. Sherry
Sample Team Member D. Hyder
Container Size (Oz) ______ % Full ______
16 oz Rad Nukes, 100 ml. Rad Screen, 8 oz nitrate, 8 oz PCB, Pest, 8 oz Metals

Comments ______

Completed By: Claude D. Murray Claude D. Murray 12/29/92
Print Name Signature Date

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40026AE Type : SS
Contractor : A.E.
Station Code : SS401093

Collection Date : 12-24-92 Quarter: Disposition:
Collection Time : 12:30 Purpose:
Sample Location : SS401093
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type : Partner:
Collection Method : RFP modified

Sample Team Leader : Claude Murray
Member : Chris Sherry
Member :
Volume Collected : 43.4 Units: 0z
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40027 AE
Collection Date 12/30/92
Collection Time 1345
Location Code SS401193 (BZ ITS)
Chain of Custody No. AE100037, AE100036, AE000019, AE200004

Coordinates North or Y ______ East or X ______

Sample Location BZ I.T.S.

Composite (Y/N) N PG
Composite Description Soil

Collection Method RF METHOD
Sample Team Leader C. Murray
Sample Team Member V. Rothman
Sample Team Member ______
Sample Team Member ______
Container Size (Oz) ______ % Full ______
16 oz Rad nukes, 8 oz PCB, PEST, 8 oz nitrate, 100 ml Rad screen
8 oz metals

Comments ______

Completed By: Claude D. Murray Claude D. Murray 12/30/92
Print Name Signature Date

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40027AE Type : SS
Contractor : Applied Environmental
Station Code : SS401193

Collection Date : 12/30/92 Quarter: 4 Disposition:
Collection Time : 13:45 Purpose:
Sample Location : SS401193 Buffer Zone
Composite : (Y/N)
Composite Desc :
QC Type : Partner: V. Rothman
Collection Method : R.F. Method

Sample Team Leader : C. Murray
Member : V. Rothman
Member :
Volume Collected : 43.4 Units: oz
Prepared By :

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2
		in	
		in	
		in	

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL DATA COLLECTION FORM

Sample Number ~~SS12AE~~ ~~SS40012AE~~ SS40028AE
Collection Date 12-29-92
Collection Time 10:00
Location Code SS401293
Chain of Custody No. AE100051, AE100052, AE000024, AE200034

Coordinates North or Y ______ East or X ______

Sample Location South of Pond 207B

Composite (Y/N) Y/N PE
Composite Description 1 Meter Grid: 1 Sample Each Corner, 1 From Center

Collection Method RFP Method
Sample Team Leader J. Evans
Sample Team Member C. Murray
Sample Team Member D. Hyder
Sample Team Member ______
Container Size (Oz) ______ % Full ______
1 16oz, 1-8oz Nitrate, 1-8oz. BCN, PCB, Pest, 1-100ml Radscreen, 1-8oz Metals

Comments ______

Completed By: Christian R. Shoray [signature] 12/29/92
Print Name Signature Date

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40028AE   Type : SS
Contractor : A.E.
Station Code : SS401293

Collection Date : 12-29-92   Quarter: Disposition:
Collection Time : 10:00   Purpose:
Sample Location : SS401293
Composite : (Y/N)
Composite Desc : 1 meter square grid.
QC Type :   Partner:
Collection Method : RFP modified

Sample Team Leader : Claude Murray
Member : Chris Sherry
Member :
Volume Collected : 47.4   Units: 0Z
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS40029 AE
Collection Date: 12/29/92
Collection Time: 14:20
Location Code: SS401393
Chain of Custody No.: AE100051, AE100052, AE000024, AE200034

Coordinates: North or Y ______ East or X ______

Sample Location: North of Pond 207B north in PA.

Composite (Y/N): N PG
Composite Description: Very clayey and sticky

Collection Method: RF Method
Sample Team Leader: John Evans
Sample Team Member: C. Murray
Sample Team Member: C. Sherry
Sample Team Member: D. Hyder
Container Size (Oz): 100 % Full ✓
16 oz glass, 100 ml Rad Screen, 8 oz Metals, 8 oz Nitrate, 8 oz BCN, PCB, PEST.

Comments ______

Completed By: Claude D. Murray (Print Name) Claude D. Murray (Signature) 12/29/92 (Date)

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS 40029AE
Type : SS
Contractor : A.E.
Station Code : SS 401393

Collection Date : 12-24-92
Quarter:
Disposition:
Collection Time : 14:20
Purpose:
Sample Location : SS401393
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type :
Partner:
Collection Method : RFP modified

Sample Team Leader : Claude Murray
Member : Chris Sherry
Member :
Volume Collected : 43.4
Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40030AE
Collection Date 12/29/92
Collection Time 12:45
Location Code SS401493
Chain of Custody No. AE10005, AE100052, AE 000024, AE 200034

Coordinates North or Y ______ East or X ______

Sample Location EASTERN EDGE OF CONTRACTORS JUNKYARD

Composite (Y/N) Y N PE
Composite Description 1 METER GRID; 1 SAMPLE AT EACH CORNER & 1 IN CENTER

Collection Method RFP METHOD
Sample Team Leader JOHN C. EVANS
Sample Team Member DAVE HYDER
Sample Team Member CLAUDE MURRAY
Sample Team Member CHRIS SHERRY
Container Size (Oz) 100 % Full
1-16 OZ, 1-8 OZ NITRATE, 1-8OZ METALS, 1-8 OZ BCN, PCB, PEST; 1-100ML RAD SCREEN

Comments ______

Completed By: CHRISTIAN R. SHERRY (Print Name) [signature] (Signature) 12/29/92 (Date)

Subcontractor: ______

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number	: 40104		
Sample Number	: SS40030AE	Type : SS	
Contractor	: AE		
Station Code	: SS401443		

Collection Date	: 12-29-92	Quarter:	Disposition:
Collection Time	: 12:45	Purpose:	
Sample Location	: SS401443		
Composite	: (Y/N)		
Composite Desc	: 1 meter square grid		
QC Type	:	Partner:	
Collection Method	: RFP method		

Sample Team Leader	: Claude Murray	
Member	: Chris Shorry	
Member	:	
Volume Collected	: 47.4	Units: oz
Prepared By	: John C. Evans	

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2
Headspace Reading	–		
Comments	–		

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40031AE
Collection Date 12-29-92
Collection Time 14:25
Location Code SS401593
Chain of Custody No. AE100051, AE100062, AE000024, AE200034

Coordinates North or Y ______ East or X ______

Sample Location Approx 240 ft north of N.E-corner of Pond 207C

Composite (Y/N) Y N PG
Composite Description ~~1 meter~~ square grid, 1 at each corner & 1 at center

Collection Method RFP Method modified
Sample Team Leader John Evans
Sample Team Member Dave Hyder
Sample Team Member Claude Murray
Sample Team Member Chris Sherry
Container Size (Oz) ______ % Full ______
1-16 oz, 1-8 oz nitrate, 1-8 oz metals, 1-8 oz BNA, PCB, Pest, 1-100 ml radscreen

Comments ______

Completed By: John C. Evans (Print Name) [signature] (Signature) 12-29-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS 40031AE   Type : SS
Contractor : A.E
Station Code : SS 401593

Collection Date : 12-29-92   Quarter: Disposition:
Collection Time : 14:25   Purpose:
Sample Location : SS 401593
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type :   Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Dave Hyder
Member :
Volume Collected : 43.4   Units: OZ
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	Ø		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL DATA COLLECTION FORM

Sample Number SS40032AF
Collection Date 12-30-92
Collection Time 1250
Location Code SS401693
Chain of Custody No. AE200030, AE000022, AE100049, AE100050

Coordinates North or Y ______ East or X ______

Sample Location South of Pond 207C

Composite (Y/N) Y N PE
Composite Description 1 meter square grid, 1 at each corner, 1 in center

Collection Method RFP modified
Sample Team Leader John C Evans
Sample Team Member Chris Sherry
Sample Team Member ______
Sample Team Member ______
Container Size (Oz) ______ % Full ______
1-16 oz rad nukes, 1-8 oz nitrate, 1-8 oz BCN, PCB, Pest, 1-8 oz metals
1-100 ml rad screen

Comments ______

Completed By: John C. Evans (Print Name) [signature] (Signature) 12-30-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40032AE   Type : SS
Contractor : AE
Station Code : SS401693

Collection Date : 12-31-92   Quarter: Disposition:
Collection Time : 1250   Purpose:
Sample Location : SS401693
Composite : (Y/N)
Composite Desc : 1 meter grid
QC Type :   Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Chris Sherry
Member :
Volume Collected : 47.4   Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take   Start   End
0 in 2 inches
0 in 2
0 in 2
0 in 2
0 2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40033AE
Collection Date 12-31-92
Collection Time 1029
Location Code SS401793
Chain of Custody No. AE200027 AE100042, AE 100041, AE 000013

Coordinates North or Y ______ East or X ______

Sample Location N- side bldg 774
Composite (Y/N) Y NO PG
Composite Description 1 meter square grid, 1 at each corner, 1 at center
Collection Method RFP modified
Sample Team Leader John C. Evans
Sample Team Member Clark Grose
Sample Team Member
Sample Team Member
Container Size (Oz) ______ % Full ______
1-16oz rad nuke, 1-8oz metals, 1-8oz BNA, PCB Pest, 1-8oz nitrate
1-100ml. rad screen

Comments

Completed By: John C. Evans (Print Name) [signature] (Signature) 12-31-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS400033AE
Type : SS
Contractor : AE
Station Code : SS401793

Collection Date : 12-31-92
Quarter:
Disposition:
Collection Time : 1029
Purpose:
Sample Location : SS401793
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type :
Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Clark Grose
Member :
Volume Collected : 43.4
Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading -
Comments -

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS40034AE
Collection Date: 12-30-92
Collection Time: 0945
Location Code: SS401893
Chain of Custody No.: AE-200030, AE-000022, AE-100049, AE-100050

Coordinates North or Y ________ East or X ________

Sample Location: South of Pond 207A, SS401893

Composite (Y/N): Y N PG
Composite Description: 1 meter square grid, 1 sample at each corner, 1 at center

Collection Method: RFP Method Modified
Sample Team Leader: John C. Evans
Sample Team Member: Chris Shorry
Sample Team Member: ________
Sample Team Member: ________
Container Size (Oz) ________ % Full ________
1-16 oz rads, 1-8 oz metals, 1-8 oz BNA, PCB, Pest, 1-8 oz nitrate
1-100 ml rad screen

Comments ________

Completed By: John C. Evans (Print Name) John C. Evans (Signature) 12-30-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40034AE   Type : SS
Contractor : A.E.
Station Code : SS401893

Collection Date : 12-30-92   Quarter: Disposition:
Collection Time : 0945   Purpose:
Sample Location : SS401893
Composite : (Y/N)
Composite Desc : 1 meter square grid
QC Type :   Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Chris Sherry
Member :
Volume Collected : 43.4   Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS

FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS 40035 AE
Collection Date: 12-29-92
Collection Time: 10:35
Location Code: SS 401993
Chain of Custody No.: AE 100051, AE 100062, AE 000024, AE 200034

Coordinates North or Y ______ East or X ______

Sample Location: approx. 100 ft east of S.E. corner of pond 207B, south

Composite (Y/N): Y N PC
Composite Description: 1 meter grid, 1 sample each corner, 1 from center

Collection Method: RFP modified
Sample Team Leader: John Evans
Sample Team Member: Dave Hydor
Sample Team Member: Claude Murray
Sample Team Member: Chris Sherry
Container Size (Oz) ______ % Full ______
1-16 oz, 1-8 oz metals, 1-8 oz nitrate, 1-8 oz BCN, PCB, Pest, 1-100 ml rad screen

Comments ______

Completed By: John C. Evans (Print Name) John C. Evans (Signature) 12-29-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40035AE Type : SS
Contractor : AE
Station Code : SS401993

Collection Date : 12-29-92 Quarter: Disposition:
Collection Time : 10:35 Purpose:
Sample Location : SS401993
Composite : (Y/N) Y
Composite Desc : 1 meter square grid
QC Type : Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Dave Hyder
Member :
Volume Collected : 43.4 Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40036 AE
Collection Date 12/30/92
Collection Time 15:45
Location Code SS402093
Chain of Custody No. AE 100037, AE 100036, AE 000019, AE 200004

Coordinates North or Y ____ East or X ____

Sample Location ITS BZ.

Composite (Y/N) N PG
Composite Description Soil

Collection Method RF Method
Sample Team Leader C. Murray
Sample Team Member V. Rothman
Sample Team Member C. Sherry
Sample Team Member ____
Container Size (Oz) ____ % Full 100%
16 oz Rad nukes, 8 oz Metals, 8 oz Nitrate, 8 oz PCB BCN Pest

Comments ____

Completed By: Claude D. Murray Claude D. Murray 12/30/92
Print Name Signature Date

Subcontractor: ____

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40036 AE Type : SS
Contractor : Applied Environmental
Station Code : SS402093

Collection Date : 12-30-92 Quarter: 4 Disposition:
Collection Time : 15:45 Purpose:
Sample Location : SS402093 (OU4 Buffer Zone)
Composite : (Y/N)
Composite Desc :
QC Type : Partner:
Collection Method : R.F. Method

Sample Team Leader : C. Murray
Member : V. Rothman
Member : C. Sherry
Volume Collected : 43.4 Units: OZ.
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take Start End
0 in 2"
in
in
in

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS40037 AE
Collection Date: 01-04-93
Collection Time: 11:45 a
Location Code: SS402193
Chain of Custody No.: AE200029, AE100044, AE100043, ~~AE100084~~, AE000033

Coordinates North or Y ______ East or X ______

Sample Location: SS402193, North of Bldg 776, East of Bldg 701

Composite (Y/N): YES
Composite Description: ~~F~~ Frozen Sandy Gravel Soil

Collection Method: R.F. METHOD
Sample Team Leader: C. Murray
Sample Team Member: A.M. Edwards
Sample Team Member: —
Sample Team Member: —
Container Size (Oz) ______ % Full 100%
16 oz Rad. nukes, 8 oz metals, 8 oz nitrate, 8 oz PCB, Pest, 100 ml RS.

Comments: Ground frozen

Completed By: Claude D. Murray (Print Name) Claude D. Murray (Signature) 1-5-93 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : OU-4 40104
Sample Number : SS40037 AE   Type : SS
Contractor : A.E.
Station Code : SS402193

Collection Date : 01-04-93 Quarter: 1st Disposition:
Collection Time : 11:45 Purpose:
Sample Location : SS402193
Composite : (Y/N)
Composite Desc : Frozen, Sandy gravel
QC Type : Partner: AM Edwards
Collection Method : R/F

Sample Team Leader : C. Murray
Member : AM Edwards
Member : —
Volume Collected : 43.4 Units: OZ
Prepared By : C. Murray

pH 1/6/93

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	—	in	—
	—	in	—
	—	in	—

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS — FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number: SS40016AE
Collection Date: 12-29-92
Collection Time: 12:23
Location Code: SS402293 (duplicate)
Chain of Custody No.: AE100051, AE100062, AE000024, AE200034

Coordinates: North or Y ______ East or X ______

Sample Location: Same as SS402293,
Composite (Y/N): Yes No PE
Composite Description: 1 meter square grid, 1 sample at each corner, 1 at center

Collection Method: RFP method, modified
Sample Team Leader: John Evans
Sample Team Member: Dave Hyder
Sample Team Member: Claude Murray
Sample Team Member: Chris Sherry
Container Size (Oz) ______ % Full ______
1-16 oz, 1-8 oz nitrate, 1-8 oz metals, 1-8 oz BCN, PCB, Pest
1-100 ml rad screen

Comments ______

Completed By: John C. Evans (Print Name) [signature] (Signature) 12-29-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS

FORM GT.8A (REV. 2)

SURFACE SOIL DATA COLLECTION FORM

Sample Number: SS40038 AE
Collection Date: 12-29-92
Collection Time: 12:23
Location Code: SS402293
Chain of Custody No.: AE100051, AE100062, AE 000024, AE 200034

Coordinates North or Y ____ East or X ____

Sample Location: ≈ 200' S.E. off 964 Bldg

Composite (Y/N): Y N PG
Composite Description: 1 meter grid, 1 sample at each corner + 1 in center

Collection Method: RFP modified
Sample Team Leader: John C. Evans
Sample Team Member: Dave Hyder
Sample Team Member: Claude Murray
Sample Team Member: Chris Sherry
Container Size (Oz) ____ % Full ____
1-16 oz, 1-8oz nitrate, 1-8oz metals, 1-8oz BCN, PCB, Pest, 1-100ml rad. screen

Comments ____

Completed By: John C. Evans (Print Name) [signature] (Signature) 12-29-92 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40038AE Type : SS
Contractor : A.E.
Station Code : SS402293

Collection Date : 12-29-93 Quarter: Disposition:
Collection Time : 12:23 Purpose:
Sample Location : SS402293
Composite : (Y/N) Y
Composite Desc : 1 meter square grid
QC Type : Partner:
Collection Method : RFP modified

Sample Team Leader : John C-Evans
Member : Dave Hyder
Member :
Volume Collected : 43.4 Units: oz
Prepared By : John C-Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL DATA COLLECTION FORM

Sample Number: SS40039AE
Collection Date: 12/30/92
Collection Time: 13:25
Location Code: SS402393
Chain of Custody No.: AE200030, AE000022, AE100049, AE100050

Coordinates North or Y ______ East or X ______

Sample Location: 50 YDS NORTH OF POND 207C

Composite (Y/N): Y N PG
Composite Description: MIXED-ROAD BASE 1 METER GRID, SAMPLE FROM EA. CORNER & CENTER OF GRID

Collection Method: RFP METHOD
Sample Team Leader: J. C. EVANS
Sample Team Member: C. R. SHERRY
Sample Team Member:
Sample Team Member:
Container Size (Oz) ______ % Full ______
1-16 OZ - GLASS, 1 8OZ NITRATE, 1-8OZ BNA, PCB, PEST, 1-8OZ METAL, 100ML RADSCREEN

Comments

Completed By: CHRISTIAN R. SHERRY (Print Name) [signature] (Signature) 12/30/92 (Date)

Subcontractor:

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40039AE. Type : SS
Contractor : AE
Station Code : SS402393

Collection Date : 12-30-92 Quarter: Disposition:
Collection Time : 13:25 Purpose:
Sample Location : SS402393
Composite : (Y/N)
Composite Desc : 1 meter grid.
QC Type : Partner:
Collection Method : RFP modified

Sample Team Leader : John C. Evans
Member : Chris Sherry
Member :
Volume Collected : 43.4 Units: oz
Prepared By : John C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	0	in	2
	0	in	2
	0	in	2
	0		2

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL DATA COLLECTION FORM

Sample Number SS40040AE
Collection Date 12/30/92
Collection Time 15:30
Location Code SS402493
Chain of Custody No. AE-100037, AE-100036, AE-000019, AE-200004

Coordinates North or Y ______ East or X ______

Sample Location ITS / B.E.
Composite (Y/N) N PG
Composite Description Soil

Collection Method R.F. method
Sample Team Leader C. Murray
Sample Team Member V. Rothman
Sample Team Member C. Sherry
Sample Team Member
Container Size (Oz) 100 % Full
16 oz Rad nukes, 8 oz Metals, 8oz Nitrate, 8oz PCB BCN Pest, 100 ml R.S

Comments

Completed By: Claude D. Murray (Print Name) Claude D. Murray (Signature) 12/30/92 (Date)

Subcontractor:

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40040AE Type : SS
Contractor : Applied Environmental
Station Code : SS402493

Collection Date : 12-30-92 Quarter: 4 Disposition:
Collection Time : 15:30 Purpose:
Sample Location : SS402493
Composite : (Y/N)
Composite Desc :
QC Type : Partner: V. Rothman, C. Sherry
Collection Method : R.F. Method

Sample Team Leader : C. Murray
Member : V. Rothman
Member : C. Sherry
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0"	in	2
		in	
		in	
		in	

Headspace Reading
Comments

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS40041AE
Collection Date 12/30/92
Collection Time 14:20
Location Code SS402593
Chain of Custody No. AE100037, AE100036, AE000019, AE200004

Coordinates North or Y ______ East or X ______

Sample Location BZ ITS
Composite (Y/N) N PE
Composite Description SOIL

Collection Method R.F. Method
Sample Team Leader C. Murray
Sample Team Member V. Rothman
Sample Team Member
Sample Team Member
Container Size (Oz) ✓ % Full
16 oz Rad Nukes, 8 oz PCB, BCN, 8 oz Metals, 8 oz Nitrate, 100 ml. Rad S.

Comments

Completed By: Claude D. Murray (Print Name) Claude D. Murray (Signature) 12/30/92 (Date)

Subcontractor:

(4011-930-0069-930)(GT8REV.2)(03/02/92)

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40041AE Type : SS
Contractor : Applied Environmental
Station Code : SS402593

Collection Date : 12-30-92 Quarter: Disposition:
Collection Time : 14:20 Purpose:
Sample Location : SS402593 (OU4 Buffer zone)
Composite : (Y/N)
Composite Desc :
QC Type : Partner: V. Rothman
Collection Method : R.F. Methods

Sample Team Leader : C. Murray
Member : V. Rothman
Member :
Volume Collected : 43.4 Units: OZ.
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments

S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 04-4-40104 ✓
Sample Number : SS 40043 AE   Type : SS
Contractor : Rust
Station Code : SS402793

Collection Date : 5/20/93   Quarter: ~~Disposition:~~
Collection Time : 1325   ~~Purpose:~~
Sample Location : SS402793
Composite : (Y/N)
Composite Desc : N/A
QC Type : Real   Partner: N/A
Collection Method : GRAB

Sample Team Leader : G. Murray
Member : H. Leighton
Member : —
Volume Collected : 1283   Units: ml
Prepared By : T. Sauko

Surface Soil Sample Form

Depth of Take   Start   End
0 in 2"
in
in
~~in~~

Headspace Reading   N/A
Comments

PG
5/28/93

!.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40043AE Type : SS
Contractor : Rust E.I.
Station Code : SS402793

Collection Date : 5/20/93 Quarter: Disposition:
Collection Time : 1325 Purpose:
Sample Location : SS402793
Composite : (Y/N) N
Composite Desc :
QC Type : Real Partner:
Collection Method : R/F Modified

Sample Team Leader : C. Murray
Member : H. Leighton
Member :
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take Start End
0 in 2"
in
~~in~~ CDM
in

Headspace Reading
Comments

CE 5/31/93

. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40644AE Type : SS
Contractor ICE 5-27-93: ~~SS402843~~ AE
Station Code : SS402893

Collection Date : 5/27/93 Quarter: – Disposition: Sampled
Collection Time : 1326 Purpose: –
Sample Location : SS402893
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : RFP Modified

Sample Team Leader : J. C. Evans
Member : K. Krumvieda
Member : –
Volume Collected : 43.4 Units: OZ
Prepared By : J. C. Evans

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2
		in	
		in	
		in	

nk

Headspace Reading Ø
Comments –

MK 6/1

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40 104
Sample Number : SS40579AE   Type : SS
Contractor : AE
Station Code : SS402893

Collection Date : 5/27/93   Quarter: -   Disposition: Sampled
Collection Time : 1345   Purpose: Equipment rinseate
Sample Location : SS402893
Composite : (Y/N)
Composite Desc : -
QC Type : ~~Reat~~ RNS JCE 6-1-93   Partner: -
Collection Method : 2 Equipment rnse

Sample Team Leader : John Evans
Member : Kent Krumvredq
Member :
Volume Collected : 2 1/2   Units: gal
Prepared By : John Evans

Surface Soil Sample Form

Depth of Take	Start	End
	in	
	- in	N/C
	in	
	in	

Headspace Reading Ø
Comments Equipment Rinseate

NK 6/1

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40045AE
Type : SS
Contractor : AE
Station Code : SS402993

Collection Date : 5-27-93
Quarter: –
Disposition: Sampled
Collection Time : 1245
Purpose: –
Sample Location : SS402993
Composite : (Y/N)
Composite Desc : –
QC Type : Real
Partner: –
Collection Method : RFP Modified

Sample Team Leader : J. C. Evans
Member : K. Krumrieda
Member : –
Volume Collected : 43.4
Units: 0z
Prepared By : J. C. Evans

Surface Soil Sample Form

Depth of Take

Start		End
0	in	2
	~~in~~	
	~~in~~	
	in	

MC

Headspace Reading Ø

Comments –

MC 6/1

!.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40046AE
Type : SS
Contractor : Rust E.C.
Station Code : SS403093

Collection Date : 5/20/93
Quarter:
Disposition:
Collection Time : 12:30
Purpose:
Sample Location : SS403093
Composite : (Y/N) N
Composite Desc :
QC Type : Real
Partner:
Collection Method : R/F Modified

Sample Team Leader : C. Murray
Member : H. Leighton
Member : —
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		~~in~~	CDm
		in	

Headspace Reading —
Comments —

[handwritten initials] 5/31/93

5. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : OU-4-40104
Sample Number : SS40046AE Type : SS
Contractor : RUST
Station Code : SS403093

Collection Date : 5/20/93 ~~Quarter:~~ ~~Disposition:~~
Collection Time : 1230 ~~Purpose:~~
Sample Location : SS403093
Composite : (Y/N)
Composite Desc : N/A
QC Type : REAL Partner: N/A
Collection Method : GRAB

Sample Team Leader : G. Murray
Member : H. Leighton
Member : ——
Volume Collected : 1283 Units: ml
Prepared By : T. SAVKO

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments N/A

PG
5/24/93

·. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 04-4-40104
Sample Number : SS40047AE
Type : SS
Contractor : RUST
Station Code : SS403193

Collection Date : 5/24/93 ~~Quarter:~~ ~~Disposition:~~
Collection Time : 1240 ~~Purpose:~~
Sample Location : SS403193
Composite : (Y/N)
Composite Desc : N/A
QC Type : REAL Partner: N/A
Collection Method : GRAB

Sample Team Leader : C. Murray
Member : H. Leighton
Member : ——
Volume Collected : 1283 Units: ml
Prepared By : T. SAVKO

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments N/A

PG 5/24/93

.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS400047AE
Type : SS
Contractor : Rust E.I.
Station Code : SS403193

Collection Date : 5/20/93 Quarter:
Disposition:
Collection Time : 12:40 Purpose:
Sample Location : SS403193
Composite : (Y/N) N
Composite Desc :
QC Type : Real Partner:
Collection Method : R/F Modified

Sample Team Leader : C. Murray
Member : H. Leighton
Member :
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		~~in~~	CDM
		in	

Headspace Reading —
Comments —

& 5/31

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40048AE
Type : SS
Contractor : RUST E.I.
Station Code : SS403293

Collection Date : 5/20/93
Quarter:
Disposition:
Collection Time : 11:1050
Purpose:
Sample Location : SS403293 cdm
Composite : (Y/N) N
Composite Desc :
QC Type : Real
Partner:
Collection Method : R/F Modified

Sample Team Leader : C. Murray
Member : H. LEIGHTON
Member :
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		~~in~~ cdm	
		in	

Headspace Reading ——
Comments ——

cdm 5/31

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number	: 04-4-40104
Sample Number	: SS40048AE
Type :	SS
Contractor	: RUST
Station Code	: SS403293
Collection Date	: 5/20/93
~~Quarter:~~	
~~Disposition:~~	
Collection Time	: 1150
~~Purpose:~~	
Sample Location	: SS403293
Composite	: (Y/N)
Composite Desc	: N/A
QC Type	: REAL
Partner:	N/A
Collection Method	: GRAB
Sample Team Leader	: C. Murray
Member	: H. Leighton
Member	: ———
Volume Collected	: 1283
Units:	ml
Prepared By	: T. SAVKO

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments N/A

PE 5/24/93

.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40048AE
Type : SS
Contractor : Rust E.I.
Station Code : SS403293

Collection Date : 5/20/93 Quarter:
Disposition:
Collection Time : 11:50 Purpose:
Sample Location : SS403293
Composite : (Y/N) N
Composite Desc :
QC Type : Real Partner:
Collection Method : R/F Modified

Sample Team Leader : C. Murray
Member : H. Leighton
Member :
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		~~in~~	
		in	

Headspace Reading ———
Comments ———

& 5/31

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number	: 40104	
Sample Number	: SS40049AE	Type : SS
Contractor	: Rust E.C.	
Station Code	: SS403393	

Collection Date	: 5/20/93	Quarter:	Disposition:
Collection Time	: 11:30	Purpose:	
Sample Location	: SS403393		
Composite	: (Y/N) N		
Composite Desc	:		
QC Type	: Real	Partner:	
Collection Method	: R/F Modified		

Sample Team Leader	: C. Murray
Member	: H. Leighton
Member	: —
Volume Collected	: 43.4 Units: oz
Prepared By	: C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		~~in~~	CDM
		in	

Headspace Reading —

Comments —

2 5/31

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : OU-4-40104
Sample Number : SS40049AE Type : SS
Contractor : RUST
Station Code : SS403393

Collection Date : 5/20/93 ~~Quarter:~~ ~~Disposition:~~
Collection Time : 1130 ~~Purpose:~~
Sample Location : SS403393
Composite : (Y/N)
Composite Desc : N/A
QC Type : Real Partner: N/A
Collection Method : GRAB

Sample Team Leader : C. Murray
Member : H. Leighton
Member :
Volume Collected : 1283 Units: ml
Prepared By : T. SAUKO

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments N/A

PG
5/24/93

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 004-40104
Sample Number : SS 40050AE Type : SS
Contractor : RUST
Station Code : SS 403493

Collection Date : 5/17/93 Quarter: ~~Disposition:~~
Collection Time : 0940 ~~Purpose:~~
Sample Location : SS403493
Composite : (Y/N)
Composite Desc : nA
QC Type : Real Partner: NA
Collection Method : Grab

Sample Team Leader : C. Murray
Member : T. Savko PG
Member : ~~______~~
Volume Collected : ~~810~~ ~~Units: m~~l 1283ml
Prepared By : T. Savko

Surface Soil Sample Form

Depth of ~~Take~~	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments na

PG

5/24/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40050AE   Type : SS
Contractor : Rust E.I.
Station Code : ~~SS 34~~ SS403493

Collection Date : 5/17/93   Quarter: Disposition:
Collection Time : 9:40am   Purpose:
Sample Location : SS ~~34~~ 40 3493
Composite : (Y/N) N
Composite Desc :
QC Type : REAL   Partner: ~~T. SAVKO~~ com
Collection Method : R.F. Modified

Sample Team Leader : C. Murray
Member : T. SAVKO
Member : —
Volume Collected : 434   Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take   Start   End
0 in 2"
in
in
in

Headspace Reading
Comments

5/21

DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 04-4-40104
Sample Number : SS40051AE Type : SS
Contractor : RUST
Station Code : SS403593

Collection Date : 5/17/93 Quarter: ~~Disposition~~:
Collection Time : 1005 Purpose:
Sample Location : SS403593
Composite : (Y/N)
Composite Desc : N/A
QC Type : REAL Partner: N/A
Collection Method : GRAB

Sample Team Leader : C. Murray
Member : T. SAVKO
Member : ———
Volume Collected : 1283 Units: Ml
Prepared By : T. SAVKO

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments N/A

PG 5/24/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS400SIAE   Type : SS
Contractor : Rust E.I.
Station Code : SS ~~35~~ 403593

Collection Date : 5/17/93   Quarter: Disposition:
Collection Time : 10:05   Purpose:
Sample Location : SS ~~35~~ 403593
Composite : (Y/N) N
Composite Desc :
QC Type : REAL   Partner: —
Collection Method : R/F modified

Sample Team Leader : C. Murray
Member : T. Savko
Member : —
Volume Collected : 43.4   Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2"
		in	
		in	
		in	

Headspace Reading
Comments

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : SS40052AE Type : SS
Contractor : Rust ~~EE~~.
Station Code : SS ~~36~~ 403693

Collection Date : 5/17/93 Quarter: Disposition:
Collection Time : 10:15 Purpose:
Sample Location : SS ~~36~~ 403693
Composite : (Y/N) N
Composite Desc :
QC Type : Real Partner: —
Collection Method : Rocky Flats Modified

Sample Team Leader : C. Murray
Member : T. Sevko
Member : —
Volume Collected : 43.4 Units: oz
Prepared By : C. Murray

Surface Soil Sample Form

Depth of Take Start End
0" in 2"
— in —
in
in

Headspace Reading ——
Comments ——

. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : OU-4-40104
Sample Number : SS40062AE   Type : SS
Contractor : RUST
Station Code : SS403693

Collection Date : 5/17/93   Quarter: Disposition:
Collection Time : 1015   Purpose:
Sample Location : SS403693
Composite : (Y/N)
Composite Desc : N/A
QC Type : REAL   Partner: N/A
Collection Method : GRAB

Sample Team Leader : C. Murray
Member : T. SAVKO
Member : ——
Volume Collected : 1283   Units: ml.
Prepared By : T. SAVKO

Surface Soil Sample Form

~~Depth of Take   Start   End~~
~~0 in 2"~~
~~in~~
~~in~~
~~in~~

Headspace Reading
Comments   N/A   PG

5/24/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 004-40104
Sample Number : SS40101AE
Type : SS
Contractor : AE
Station Code : SS404193

Collection Date : 5/28/93
~~Quarter: Disposition:~~
Collection Time : 08:45
~~Purpose:~~ NK
Sample Location : SS404193
Composite : (Y/N)
Composite Desc :
QC Type : Real
Partner: UA
Collection Method : Push Sampler

Sample Team Leader : Jim Uhlinger
Member : ~~Patty Goodman~~ NK Nkwsmarrad
Member : C Murray
Volume Collected : 1050
Units: ML
Prepared By : Jess Fuentes

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	9"
		~~in~~	
		~~in~~	
		~~in~~ NK	

Headspace Reading NK
Comments NK

NK 6/2

U. S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 0U4 -40104
Sample Number : SS40102AE Type : SS
Contractor : AE
Station Code : SS404293

Collection Date : 5/28/93 ~~Quarter:~~ ~~Disposition:~~
Collection Time : 0900 ~~Purpose:~~ NK
Sample Location : SS404293
Composite : (Y/N)
Composite Desc : —
QC Type : Real Partner: NA
Collection Method : Push Sample

Sample Team Leader : Jim Unlinger
Member : N Kusachan NK
Member : C Murray NK
Volume Collected : 1050 Units: ML
Prepared By : Jess Fevnts

Surface Soil Sample Form

Depth of Take Start End
0 in 9"
~~in~~ NK
~~in~~
~~in~~

Headspace Reading — NK
Comments — NK

NK 6/2

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : 004-40104
Sample Number : SS40103AE
Type : SS
Contractor : AE
Station Code : SS404393

Collection Date : 5/28/93
~~Quarter: Disposition:~~ N/C
Collection Time : 0915
~~Purpose:~~
Sample Location : SS404393
Composite : (Y/N) NC
Composite Desc : ——
QC Type : Real
Partner: NA
Collection Method : push sample

Sample Team Leader : Jim Uhlinger NC
Member : N Kiusalaas NC
Member : C Murray NC
Volume Collected : 1050
Units: ml
Prepared By : Jim Fenders

Surface Soil Sample Form

Depth of Take	Start	End
	0 in	9"
	~~in~~	
	~~in~~	N/C
	~~in~~	

Headspace Reading —— N/C
Comments —— NC

NK 6/2

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40105AE   Type : PT
Contractor : AE/RUST
Station Code : SS404593

Collection Date : 7-9-93   Quarter: -   Disposition: Sampled
Collection Time : 0840   Purpose: -
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : -
QC Type : Real   Partner: -
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : -
Volume Collected : 35.2   Units: OZ
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
0.0	FT	0.1	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14I
Revision 10-2-92

Sample Collection Form

Project Number : 80127.920
Sample Number : SS40106AE
Type : PT
Contractor : AE/RUST
Station Code : SS404593

Collection Date : 7-9-93
Quarter: –
Disposition: Sampled
Collection Time : 0850
Purpose: –
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : –
QC Type : Real
Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2
Units: oz
Prepared By : JLE

Pit and Trench Form

Depth of Take

Start		End	
0.1	FT	0.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40107AE
Contractor : AE / RUST
Station Code : SS404593

Type : PT

Collection Date : 7-9-93
Quarter: –
Disposition: Sampled
Collection Time : 0908
Purpose: –
Sample Location : SS404593
Composite : (Y/N)
Composite Desc :
JCE 7-13-93
QC Type : Real
Partner: ~~SS 40137 AE~~
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2
Units: Oz
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
0.2	FT	0-4	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG

8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.420
Sample Number : SS40108AE
Type : PT
Contractor : AE/RUST
Station Code : SS404593

Collection Date : 7-9-93
Quarter: -
Disposition: Sampled
Collection Time : 0920
Purpose: -
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: —
Collection Method : Stainless Steel Spoon

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2
Units: oz
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
0.4	FT	0.6	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123-920
Sample Number : SS40109AE
Contractor : AE/RUST
Station Code : SS404593

Type : PT

Collection Date : 7-9-93 Quarter: - Disposition: Sampled
Collection Time : 0925 Purpose: -
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : -
QC Type : Real Partner: -
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Sauki
Member : -
Volume Collected : 35.2 Units: oz
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
0.6	FT	0-8	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PE 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.420
Sample Number : SS40110AE
Type : PT
Contractor : AE/RUST
Station Code : SS404593

Collection Date : 7-9-93
Quarter: ~
Disposition: Sampled
Collection Time : 0935
Purpose: –
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : –
QC Type : Real
Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2
Units: Oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.8	FT	1.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40111AE
Contractor : AE/RVST
Station Code : SS404693

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1500 Purpose: –
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-0	FT	0-1	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS401124E
Type : PT
Contractor : AE/RVST
Station Code : SS404693

Collection Date : 7-8-93
Quarter: —
Disposition: Sampled
Collection Time : 1505
Purpose: —
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2
Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-1	FT	0-2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40113AE
Type : PT
Contractor : AE/RVST
Station Code : SS404693

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1515 Purpose: –
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0.2 FT	0.4 FT
~~FT~~	FT
FT	FT
FT	~~FT~~
FT	FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS401144E
Type : PT
Contractor : AE/RVST
Station Code : SS404693

Collection Date : 7-8-93
Quarter: –
Disposition: Sampled
Collection Time : 1520
Purpose: –
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : –
QC Type : Real
Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-4	FT	0-6	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40115AE
Contractor : AE/RVST
Station Code : SS404693

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1530 Purpose: –
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-6	FT	0-8	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40116AE
Type : PT
Contractor : AE/RUST
Station Code : SS404693

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1535 Purpose: –
Sample Location : SS404693
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.8	FT	1.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40117AE
Contractor : AE/RVST
Station Code : SS404793
Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1355 Purpose: –
Sample Location : SS404793
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.0	FT	0.1	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY-ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-9?

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40118AE
Contractor : AE/RUST
Station Code : SS404793

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1405 Purpose: –
Sample Location : SS404793
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0.1 FT	0.2 FT
FT	FT
FT	FT
FT	FT
FT	FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40114AE
Contractor : AE/RVST
Station Code : SS404793

Type : PT

Collection Date : 7-8-93
Collection Time : 1410
Sample Location : SS404793
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Collection Method : Stainless Steel Scoop

Quarter: —
Purpose: —
Disposition: Sampled
Partner:

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0.2 FT	0.4 FT
FT	FT
FT	FT
FT	FT
FT	FT

Comments:

PC 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-9.

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40120AE
Contractor : AE/RVST
Station Code : SS404793

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1415 Purpose: –
Sample Location : SS404793
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.4	FT	0.6	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-93

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40121AE
Contractor : AE/RUST
Station Code : SS404793

Type : PT

Collection Date : 7-8-93 Quarter: — Disposition: Sampled
Collection Time : 1425 Purpose: —
Sample Location : SS 404793
Composite : (Y/N)
Composite Desc : —
QC Type : Real Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.6	FT	0.8	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14I
Revision 10-2-92

Sample Collection Form

Project Number : 80123-920
Sample Number : SS 40122AE
Type : PT
Contractor : AE/RUST
Station Code : SS404793

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1430 Purpose: –
Sample Location : SS 404793
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.8	FT	1.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40123AE
Type : PT
Contractor : AE/RVST
Station Code : SS404893

Collection Date : 7-8-93
Quarter: —
Disposition: Sampled
Collection Time : 1240
Purpose: —
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2
Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.0	FT	0.1	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40124AE
Type : PT
Contractor : AE/RVST
Station Code : SS404893

Collection Date : 7-8-93
Quarter: –
Disposition: Sampled
Collection Time : 1250
Purpose: –
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.1	FT	0.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40125AE
Type : PT
Contractor : AE/RVST
Station Code : SS404893

Collection Date : 7-8-93
Quarter: —
Disposition: Sampled
Collection Time : 1305
Purpose: —
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.2	FT	0.4	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-93

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40126AE
Contractor : AE/RVST
Station Code : SS404843

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1315 Purpose: –
Sample Location : SS404843
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0.4 FT	0.6 FT
FT	FT
FT	FT
FT	FT
FT	FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40127AE
Contractor : AE/RUST
Station Code : SS404893

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1325 Purpose: –
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.6	FT	0.8	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

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U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40128AE
Contractor : AE/RVST
Station Code : SS404893

Type : PT

Collection Date : 7-8-93
Collection Time : 1370
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Collection Method : Stainless Steel Scoop

Quarter: —
Purpose: —
Disposition: Sampled
Partner:

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.8	FT	1.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40129AE
Contractor : AE/RUST
Station Code : SS404993

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 0940 Purpose: –
Sample Location : SS404993
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: Oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.0	FT	0-1	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PE 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40130AE
Type : PT
Contractor : AE/RUST
Station Code : SS404993

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 0955 Purpose: –
Sample Location : SS404993
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0-1 FT	0-2 FT
FT	FT
FT	FT
FT	FT
FT	FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40131AE
Contractor : AE/RVST
Station Code : SS404993

Type : PT

Collection Date : 7-8-93
Collection Time : 1010
Quarter: —
Purpose: —
Disposition: Sampled
Sample Location : SS404993
Composite : (Y/N)
Composite Desc : —
QC Type : Real
Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-2	FT	0-4	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40132AE
Type : PT
Contractor : AE/RVST
Station Code : SS404493

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1025 Purpose: –
Sample Location : SS404493
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.4	FT	0.6	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40133AE
Contractor : AE/RVST
Station Code : SS404993

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1035 Purpose: –
Sample Location : SS404993
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: –
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-6	FT	0-8	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40134AE
Contractor : AE/RUST
Station Code : SS404993

Type : PT

Collection Date : 7-8-93 Quarter: – Disposition: Sampled
Collection Time : 1050 Purpose: –
Sample Location : SS404993
Composite : (Y/N)
Composite Desc : –
QC Type : Real Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2 Units: Oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0-8	FT	1.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40135AE
Contractor : AE/RVST
Station Code : SS404893

Type : PT

Collection Date : 7-8-93
Collection Time : 1250
Sample Location : SS404893
Composite : (Y/N)
Composite Desc : —
QC Type : Duplicate
Collection Method : Stainless Steel Scoop

Quarter: —
Purpose: —
Disposition: Sampled
Partner: SS40124AE

Sample Team Leader : John Evans
Member : Todd Savko
Member : —
Volume Collected : 35.2
Units: oz
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start		End	
0.1	FT	0.2	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14I
Revision 10-2-92

Sample Collection Form

Project Number : 80123-920
Sample Number : SS40136AE
Type : PT
Contractor : AE/RUST
Station Code : SS404793

Collection Date : 7-8-93
Quarter: –
Disposition: Sampled
Collection Time : 1425
Purpose: –
Sample Location : SS404793
Composite : (Y/N)
Composite Desc : –
QC Type : Duplicate
Partner: SS 40121AE
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Jauko
Member : –
Volume Collected : 35.2
Units: OZ
Prepared By : John Evans

Pit and Trench Form

Depth of Take

Start	End
0-6 FT	0-8 FT
FT	FT
FT	FT
FT	FT
FT	FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.141
Revision 10-2-92

Sample Collection Form

Project Number : 80123.920
Sample Number : SS40137AE
Type : PT
Contractor : AE/RUST
Station Code : SS404593

Collection Date : 7-9-93
Quarter: –
Disposition: sampled
Collection Time : 0900
Purpose: –
Sample Location : SS404593
Composite : Y N No JCE 7-13-93
Composite Desc :
QC Type : Duplicate
Partner: SS40107AE
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : Todd Savko
Member : –
Volume Collected : 35.2
Units: oz
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
0.2	FT	0.4	FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

Comments:

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14I
Revision 10-2-92

Sample Collection Form

Project Number : 40104
Sample Number : ~~SS4138AE~~ SS40138AE PG Type : PT
Contractor : AE
Station Code : SS404593

Collection Date : 7-9-93 Quarter: — Disposition: Sampled
Collection Time : 0955 Purpose: —
Sample Location : SS404593
Composite : (Y/N)
Composite Desc : —
QC Type JCE 7-20-93 : ~~Real~~ ER Partner: —
Collection Method : Stainless Steel Scoop

Sample Team Leader : John Evans
Member : — T. Sauko
Member : —
Volume Collected : 2 Units: gallons
Prepared By : JCE

Pit and Trench Form

Depth of Take

Start		End	
	FT		FT
	FT		FT
	FT		FT
	FT		FT
	FT		FT

NA
JCE
7-20-93

Comments: Equipment Rinseate

PG 8/11/93

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14C
Revision 10-2-92

Sample Collection Form

Project Number : OU4 40104
Sample Number : 55406~~44~~ 199 AE JAL Type : SS
Contractor : A.E.
Station Code : ~~55402593~~ JAL 55402693

Collection Date : 1-4-93 Quarter: / Disposition:
Collection Time : 13:30 Purpose:
Sample Location JAL ~~55402593~~ (PA) 55402693
Composite : (Y/N)
Composite Desc : Frozen, Sandy gravel
QC Type : Partner: A.M. Edwards
Collection Method : R/F

Sample Team Leader : C. Murray
Member : AM Edwards
Member : —
Volume Collected : 434 Units: oz
Prepared By : C. Murray

JAL 1/6/93

Surface Soil Sample Form

Depth of Take	Start		End
	0	in	2 inches
	—	in	—
	—	in	—
	—	in	—

Headspace Reading —
Comments —

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number	SS~~400177~~ 40200 AE (E.R.)
Collection Date	1-4-93
Collection Time	12:20
Location Code	~~SS402593~~ SS402693
Chain of Custody No.	AE100084, AE200018, AE100085, AE000033

Coordinates North or Y ______ East or X ______

Sample Location	~~SS402593~~ SS402693
Composite (Y/N)	YES
Composite Description	E. R.
Collection Method	E. R.
Sample Team Leader	C. Murray
Sample Team Member	A.M. Edwards
Sample Team Member	
Sample Team Member	
Container Size (Oz)	100 % Full

1/6/93

Comments

Completed By: Claude Murray (Print Name) Claude D Murray (Signature) 1-5-93 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)

Hold for Loc. Change OK JL

U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANTS

FORM GT.8A (REV. 2)

SURFACE SOIL
DATA COLLECTION FORM

Sample Number SS ~~40044~~ 40199 AE

Collection Date 01-04-93

Collection Time 13:30

Location Code ~~SS402593~~ SS402693

Chain of Custody No. AE200029, AE100044, AE100043, AE000033

1/6/93 JL

Coordinates North or Y ______ East or X ______

Sample Location ~~SS402593~~ SS402693, North of Bldg. 705

Composite (Y/N) YES

Composite Description Frozen Sandy gravel

Collection Method R. F. Methods

Sample Team Leader C. Murray

Sample Team Member A-M Edwards

Sample Team Member

Sample Team Member

Container Size (Oz) ______ % Full 100%

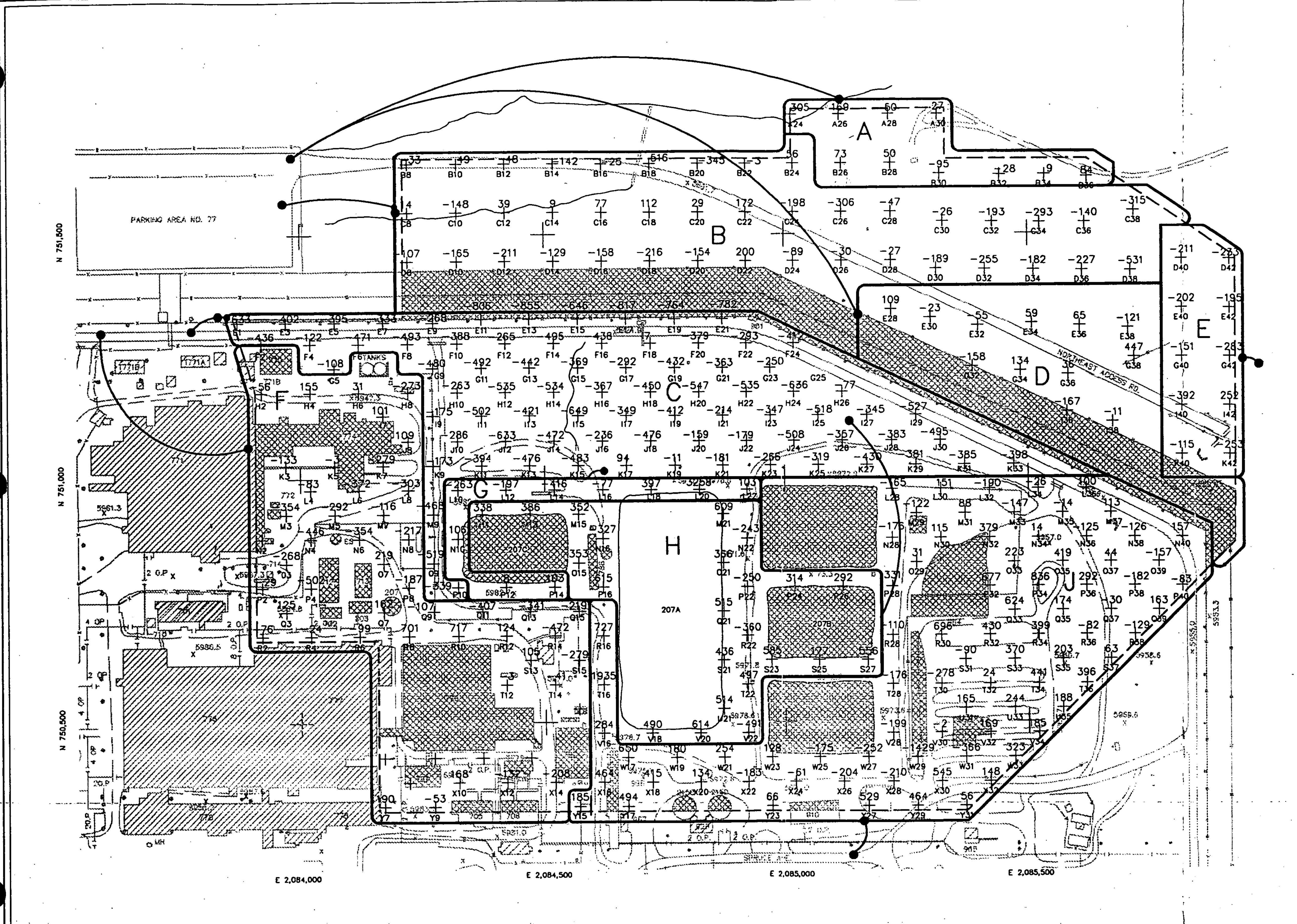
16 oz Rad. Nukes, 8 oz Metals, 8 oz nitrate, 8 oz PCB/Pest, 800 ml R.S.

Comments

Completed By: Claude Murray (Print Name) Claude D. Murray (Signature) 1-5-93 (Date)

Subcontractor: Applied Environmental

(4011-930-0069-930)(GT8REV.2)(03/02/92)



BOUNDED REGION	BACKGROUND READING (cpm)
A	1947
B	2311
C	1929
D	1947
E	1954
F	1855
G	1547
H	1834
J	1429

PREPARED FOR
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

OU4 Phase I RFI/RI
OU4-Wide FIDLER Survey

* POND 207A, 207B CENTER, AND 207B NORTH RAD Surveys have been completed by EG&G.