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Baseline Characterization of a Proposed Concrete Rubble Storage Area at the Former Building 980 Site

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• Environmental Restoration •
Rocky Flats Environmental Technology Site

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Site	Rocky Flats Environmental Technology Site (RFETS), Golden, Colorado
Project Name	Baseline Characterization of a Proposed Concrete Rubble Storage Area at the Former Building 980 Site
Date Prepared	September, 1999

APPROVALS

I have read and approved this Baseline Characterization with respect to the regulatory requirements

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Note Classification review has been waived in accordance with exemption number CEX-072-99

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1. INTRODUCTION

This report documents the baseline characterization of an area proposed for storage of concrete rubble originating from Deactivation and Decommissioning (D&D) activities at the Rocky Flats Environmental Technology Site (RFETS) located near Golden, Colorado Baseline characterization of the area was required to assure project planners/managers that the area is acceptable for placement of concrete rubble and to document the initial conditions of the site before it is used as a staging area for concrete These activities were performed in support of the draft RFCA Standard Operating Protocol for Recycling Concrete (K-H, 1999) and the project specific sampling and analysis plan (RMRS, 1999)

The area assessed includes the former Building 980 concrete slab and the surrounding areas to the east, south and west The area surrounding the concrete slab is made up of an uncovered gravel base Well 0660 represented on Figure 1-1, has been abandoned and has no impact on the proposed use of the site

This report is organized into seven sections Section 1 presents introductory material, site background information, and the general project approach Section 2 provides a description of the sampling activities conducted in support of this baseline characterization Section 3 describes the analytical results, while Section 4 illustrates the data evaluation performed on the analytical results Section 5 addresses other relevant data and information Section 6 and 7 present the conclusions and project references, respectively

1 1 BACKGROUND

Building 980 was constructed in 1957 as a metal skinned facility of approximately 13,000 square feet It was used for storage, warehousing and as support shops for site construction activities (RMRS, 1997a) The Building was removed and taken down to the concrete slab in 1997 as part of plant wide D&D operations Operations within the building included sheet metal work, painting, iron work, asbestos abatement, carpentry, millwrighting, and motorpool operation Contamination was not expected to be present in the facility, however, the east section of Building 980 (about 1/5 of the footprint) was used to store a radioactively contaminated vacuum truck that was used to remove liquid and sludge from the solar ponds

Reconnaissance level characterization activities confirmed radiological contamination on the exterior of the 980 Building above unrestricted release criteria The presence of plutonium was initially verified by AP-2 alpha analysis, and later confirmed by radiochemical analysis Elevated levels were predominantly located on the north facing walls, however, survey results confirmed the presence of contamination on the exterior metal surfaces of the other walls and the roof (RMRS, 1997b) The source of this contamination was assumed to be from solar pond spray However, based on the final status survey, no radioactive material was detected above unrestricted release criteria within the interiors of Building 980 (RMRS 1997b)

Process knowledge based assessments of most painted surfaces on the Building 980 concrete slab have already been made (RMRS, 1997b), and conclude that the paint is lead based As a result of this knowledge, the painted surfaces were not assessed (sampled) as part of this investigation Staining on the concrete pad has also been assessed and is assumed to be non-hazardous (See Section 5 3) The area surrounding Building 980 consists of an uncovered gravel base, which was the focus of this assessment

1 2 PROJECT APPROACH

The data gaps existing prior the August, 1999 sampling activities related to the lack of sufficient data regarding the concentration of radionuclides in the surface soil surrounding the Building 980 pad The IHSS/PACs/UBCs discussed in Section 5 2 are not believed to be a potential source of contamination and as a result, were not sampled Sampling activities focused on collection of data to characterize surface contamination, which if present was believed to be relatively uniform, originating from solar pond spray As a result, collection of surficial soil samples for radiological analysis was the only material sampled as part of this investigation

2 DESCRIPTION OF SAMPLING ACTIVITIES

A sampling and analysis plan was prepared (RMRS, 1999) which established criteria for collection of samples in accordance with the process established in "Guidance for Data Quality Objective Process", EPA QA/G4 (EPA, 1994) The data gaps, study boundaries, and decisions were discussed in detail in the SAP The primary objective of the SAP was to collect preliminary information to conduct a baseline characterization The information developed was used in this report to determine appropriateness of this site for staging concrete rubble and to baseline the area so that impacts of the proposed action can be evaluated after the staged concrete is removed

Sampling of the site was conducted on August 26, 1999 Samples were collected as surface grabs from the surface to approximately four inches below ground surface at ten locations around the former Building 980 slab (See Figure 1-1) Samples were collected, handled and custody was maintained in accordance the Procedure CAS SOP-003 *Sampling for Waste Characterization for General Sampling activities at the Rocky Flats Environmental Technology Site* (CAS, 1999) Sampling equipment included both disposable plastic sampling scoopulas (disposed between each sampling location) and reusable stainless steel picks and scoops (decontaminated between each sampling location) Each sampling location was marked and on September 2, 1999, each sampling location was surveyed All field sampling information including sampling coordinates have been transferred to the RFETS Soil & Water Database (SWD) for electronic archival Original hard copy records of the sampling activities and custody forms reside in the K-H Analytical Services Division (ASD) files under Report Identification Number (RIN) 99A9500

3. ANALYTICAL RESULTS

All radiochemical samples were ground prior to analysis and the results were reported on a "dry weight" basis The analytical laboratory (Paragon Analytics, Inc) reported that no anomalous conditions were encountered during the preparation and analysis of the samples The analytical results obtained from this investigation along with field documentation are presented in Appendix A All original hard copy analytical results reside with the field forms in the K-H ASD files under RIN 99A9500 Section 4 discusses the evaluation of the data set with respect to the Data Quality Objectives (DQOs) that were established in the SAP (RMRS, 1999)

4 DATA EVALUATION

The analytical results obtained from this investigation are summarized in Tables 4-1 and 4-2 The calculations required to satisfy the DQO Evaluations required by the SAP (RMRS, 1999) are also presented in these tables Section 4 1 presents the analytical results with respect to the DQOs established in the SAP Section 4 2 presents the evaluation of the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters

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TABLE 4-1 RADIOLOGICAL RESULTS AND TIER II SUM-OF-RATIO EVALUATIONS

		Results (pCi/g)					Calculated Tier II	Total Propagated Uncertainty (TPU), pCi/g)				
Sample Number	Type	Am-241	Pu-239/240	U-234	U-235	U-238	Sum-of-Ratios	Am-241	Pu-239/240	U-234	U-235	U-238
99A9500-001 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 01	N A	N A	N A	N A	N A
99A9500-002 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 01	N A	N A	N A	N A	N A
99A9500-003 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 01	0 033	0 037	0 19	0 039	0 2
99A9500-004 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 02	N A	N A	N A	N A	N A
99A9500-005 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 01	N A	N A	N A	N A	N A
99A9500-006 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 02	N A	N A	N A	N A	N A
99A9500-007 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 01	N A	N A	N A	N A	N A
99A9500-008 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 02	N A	N A	N A	N A	N A
99A9500-009 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 02	N A	N A	N A	N A	N A
99A9500-010 002	Real	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0 02	N A	N A	N A	N A	N A
99A9500-011 001	DUP of 003	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	not applicable	0 046	0 026	0 22	0 046	0 23
RFCA Tier II Surface Soil		38	252	307	24	103						
Precision by DER		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]						

TABLE 4- 2 RADIOLOGICAL RESULTS AND BACKGROUND COMPARISONS

	Results (pCi/g)									
Sample Number	Am-241	nat log	Pu-239/240	nat log	U-234	nat log	U-235	Nat log	U-238	nat log
99A9500-001 002	[redacted]	-2 718	[redacted]	-3 101	[redacted]	-0 198	[redacted]	-4 135	[redacted]	-0 198
99A9500-002 002	[redacted]	-2 659	[redacted]	-2 688	[redacted]	-0 198	[redacted]	-2 645	[redacted]	-0 371
99A9500-003 002	[redacted]	-3 411	[redacted]	-3 270	[redacted]	-0 511	[redacted]	-3 730	[redacted]	-0 416
99A9500-004 002	[redacted]	-1 355	[redacted]	-1 687	[redacted]	-0 094	[redacted]	-2 489	[redacted]	-0 117
99A9500-005 002	[redacted]	-2 590	[redacted]	-2 112	[redacted]	-0 151	[redacted]	-5 298	[redacted]	-0 186
99A9500-006 002	[redacted]	-1 864	[redacted]	-1 273	[redacted]	-0 186	[redacted]	-2 703	[redacted]	-0 416
99A9500-007 002	[redacted]	-2 865	[redacted]	-2 244	[redacted]	0 010	[redacted]	-3 411	[redacted]	-0 151
99A9500-008 002	[redacted]	-3 863	[redacted]	-2 453	[redacted]	-0 041	[redacted]	-3 244	[redacted]	0 068
99A9500-009 002	[redacted]	-3 324	[redacted]	-3 817	[redacted]	-0 174	[redacted]	-2 397	[redacted]	-0 073
99A9500-010 002	[redacted]	-1 347	[redacted]	-0 128	[redacted]	-0 248	[redacted]	-3 016	[redacted]	-0 198
Mean	0 1031	-2 600	0 1831	-2 277	0 843	-0 179	0 0478	-3 307	0 823	-0 206
Standard Deviation	0 090	0 852	0 257	1 067	0 111	0 141	0 029	0 896	0 129	0 156
Number of samples (n)	10									
[redacted]	[redacted]		[redacted]		[redacted]		[redacted]		[redacted]	
[redacted]		[redacted]		[redacted]		[redacted]		[redacted]		[redacted]
Surface Soil Bkg	0 0227		0 066		2 253		0 0939		2	
95% UCL (Normal)	**0 155**		**0 332**		0 907		0 065		0 898	
95% UCL (Log Normal)		**0 243**		**0 661**		0 922		**0 130**		0 909

4 1 DATA QUALITY OBJECTIVE EVALAUTION

This section describes the results of the DQO evaluation established in the SAP (RMRS, 1999)

4 1 1 Problem

The area surrounding the 980 slab (the area characterized by an uncovered gravel base) lacked sufficient process knowledge or radiological analytical data to determine whether or not the area is suitable for staging concrete rubble This data gap was filled as part of the investigation

4 1 2 Decisions/Results

Characterization data was used to make the following decisions

- Radionuclides were determined to be present above established background concentrations As a result concrete staged on the affected soil will require a radiological release evaluation if an offsite disposal option is considered

- Radionuclides present in the surface soils were determined to not exceed the Tier II surface soil action levels established for industrial use As a result, the area will not require radiological access controls

4 1 3 Decision Inputs

The following inputs were used to make the decisions

- Radiochemical analytical results from soils sampled by this investigation,
- Background concentration summary statistics from the Geochemical Characterization of Background Surface Soils (DOE, 1995b)
- RFCA action levels (DOE, 1996a (as amended) and DOE, 1996b)

4 1 4 Boundaries

The boundary of this characterization is the former Building 980 slab and the surrounding surface soils represented by the cross hatched lines on Figure 1-1 The area is roughly bound by the northern edge of the Building 980 concrete slab, just south of Spruce Avenue The west side of the site is bound by the overhead steam lines on the east side of Tenth Street To the south, the site is roughly bound by the top of the hillside, and to the east, the area is roughly bound by the eastern edge of the exit driveway (See Figure 1-1) The entire site is approximately 1 2 acres in area and includes the former Building 980 concrete slab

4 1 5 Decision Rules

The following bullets address the decision rules used to make the decisions noted above

- Are radionuclides present in the surface soil above surficial soil background levels established for use at the Rocky Flats Environmental Technology Site (DOE, 1995b)?

  To be consistent with the plan, the data set was evaluated by taking all real (exclusive of duplicates) surface soil samples and calculating the 95% upper confidence limit (UCL) of the mean concentration (activity) for the specific isotope This value was compared to the mean plus two standard deviation background activities established in Table E-1 (for

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uranium isotopes) and Table E-3 (for americium and plutonium isotopes) of the background geochemical report (DOE, 1995b) As indicated by Table 4-2, the results indicate detected concentrations and calculated 95% upper confidence limits above background, for Am-241 and Pu-239/240 The results also indicate that the 95% UCL of the mean concentration for U-235 is above the established background levels using log normal statistics

In addition to plan requirements each data result was compared with the mean + 2 standard deviations from the background data set If a single result exceeded this background concentration, the area was considered to be above background for that radionuclide Using this methodology, Am-241, Pu-239/240 are considered to be above background As a result, subsequent offsite release of staged concrete from the area will require additional radiological engineering evaluation

An additional evaluation was done to determine the effect that this soil may have on the 100 dpm/100cm^2 transuranic release criteria (DOE Order 5400 5) which was used initially to release the concrete Maximum transuranic soil concentrations were input into the following equation along with an assumed soil density of 1 8 g/cm^3, an evaluation area of 100 cm^2 and a depth of soil coating of 0 1 cm and the standard activity conversion of 2 22 dpm/pCi

$$(2\ 2\ \text{dpm/pCi})\text{x}[(0\ 258_{\text{Am-241}}+0\ 185_{\text{Pu239/240}})\text{pCi/g}]\text{x}(1\ 8\text{g/cm}^3)\text{x}(100\text{cm}^2)\text{x}(0\ 1\text{cm}) = 18\ \text{dpm}$$

The resulting activity was calculated at 18 dpm per 100cm^2 assessment area which is below the surface contamination release limits for transuranic radionuclides stipulated in DOE Order 5400 5 Therefore, staging concrete in this area should not pose significant radiological concerns

- Are radionuclides present in the surface soil above the RFCA Tier II surface soil action levels established for the industrial use scenario (DOE, 1996b)?

  The data set was evaluated by comparing the analytical results from each sample location (exclusive of duplicates) with the Tier II surface soil action levels All data sets generated sum-of-ratios results less than one Therefore, the area is not considered to exceed established Tier II action levels and as a result, the area requires no posting or access controls for radiological purposes

4 2 PARCC EVALUATION

Analytical data was evaluated by the project using the guidance established by the Rocky Flats Procedure RF/RMRS-98-200, *Evaluation of Data for Usability in Final Reports* (RMRS, 1998) This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy, representativeness, completeness, and comparability (PARCC) Field precision for radiological contaminants of concern was set at a duplicate error ratio of < 1 96, a common precision test statistic used by several radioanalytical laboratories used by RFETS Completeness goals have been established at 90% for the project (all matrices and all methods) The following sections detail the results of the PARCC evaluation

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4 2 1 Precision

Precision is a measure of the reproducibility of analytical results For radioanalytical parameters precision is expressed quantitatively by the Duplicate Error Ration (DER) between real and duplicate sample results as defined by the following equation

$$DER = \frac{|S-D|}{(TPU_S^2 + TPU_D^2)^{\wedge 0\ 5}}$$

where

S = Sample Result
D = Duplicate Result
TPU_S = Total Propagated Uncertainty of the duplicate
TPU_D = Total Propagated Uncertainty of the duplicate

The DER was calculated between the regular and duplicate sample 99A9500-003 and 99A96500-011, respectively The results for each isotope are summarized below

As indicated by Table 4-1, the calculated DERs for the real and field duplicate ranged from 0 30 to 0 84 which are well below the 1 96 threshold for each of the five isotopes of concern It is therefore noted that precision as calculated by the DER is acceptable and that data is spatially reproducible within the parameters established by the SAP

4 2 2 Accuracy

Accuracy is a measure of how closely an analytical result corresponds to the "true" concentration in a sample Accuracy is evaluated by comparing the required analytical method and detection limit with the actual method used The radioanalytical methods used by Paragon Analytics, Inc were approved by K-H ASD and were performed The detection levels were sufficient to evaluate the data set against the requirements established by the DQOs for the project and meet the contract required detection limits The laboratory case narrative stated that no anomalous conditions were encountered during the preparation and analysis of these samples Laboratory blanks, duplicates, and control samples were analyzed as part of the laboratory internal QC requirements Target analytes were not detected in any of the laboratory method blank runs The DERs associated with laboratory duplicate samples ranged from 0 06 to 1 03, well below the laboratory established DER threshold of 1 50 Percent recoveries on the laboratory control samples ranged from 94% and 112%, within their acceptability range of 75% to 125%

As a result, accuracy has been determined to be acceptable Verification and/or validation of the data set will be performed per ASD requirements Management will be made aware if unanticipated problems arise

4 2 3 Representativeness

The discussion of representativeness is limited to an evaluation of whether analytical results for field samples are truly representative of environmental concentrations or whether they may have been influenced by the introduction of contamination during collection and handling

Sample representativeness was insured by a combination of the use of new sampling equipment used between sampling locations and the use of standard equipment decontamination procedures for reusable sampling equipment, which was also used between individual sampling locations Though sample equipment rinsates were not collected, the use of standard procedures for decontamination, assures effective decontamination, though this parameter cannot be quantitatively determined As such samples from discrete locations are representative of those locations from a field collection perspective Other aspects of representativeness such as numbers of samples and spatial distribution were determined prior to sample collection and are addressed in the SAP (RMRS, 1999)

4 2 4 Completeness

All eleven samples (10 regular and one duplicate) specified in the SAP were collected Though these data have not been validated to date, the use of K-H audited and approved laboratories suggests that the data will be usable As such, completeness is assumed to be 100%, which exceeds the goal of 90% established in the SAP

4 2 5 Comparability

Analytical methods and sampling techniques remained consistent for the project Laboratory sample preparation and analyses were performed according to standard radioanalytical protocols used by Paragon Analytics, Inc

The sample preparation procedures used were

- PAI SOP721R5
- PAI SOP773R3
- PAI SOP778R3
- PAI SOP780R2

The isotopic analytical procedure used was

- PAI SOP714R4

These procedures generate results that are comparable to data produced by similar methods, at other quality laboratories

5. OTHER RELEVANT DATA AND INFORMATION

In addition to the analytical data collected as part of this project, the following supplementary data and information summaries were used to evaluate the appropriateness of this site for potential concrete storage

- Recently collected radiological survey data on the 980 slab,
- Historical Release Report (HRR) information regarding the surrounding areas,
- Notes regarding staining on the 980 concrete slab

5 1 RECENT RADIOLOGICAL SURVEY DATA

On September 8, 1999 the 980 concrete slab was surveyed by radiological control technicians The survey consisted of both fixed and removable alpha surveys at 100 locations across the slab The fixed (direct) readings were taken with a N E Electra and all results were less than the instrument Minimum Detectable Activity (MDA) of 51-52 dpm/100cm^2 The removable (swipe) samples were analyzed using an Eberline SAC-4 and all results were less than the instrument MDA as well (<20 dpm/100cm^2) Appendix B contains the results of this survey The survey indicates that the pad surface is not contaminated by alpha emitting radiological constituents

5 2 SUPPLEMENTARY HRR INFORMATION

The HRR (DOE, 1992) is the primary source of information summarizing environmental releases at Rocky Flats Several Potential Areas of Concern/Individual Hazardous Substance Sites (PACs/IHSSs) are identified in the HRR which fall within the physical footprint of the proposed concrete staging area These include

- PAC 000-500, Sanitary Sewer System,
- IHSS 900-175, Contractor Storage Facility,
- PAC 900-1308, Gasoline Spill Outside Building 980,
- UBC-991 Storage Vault

These areas were evaluated for significant impact on the proposed concrete staging activities The impact was determined to be insignificant Appendix C contains summaries of each of the sites described above and the evaluation of impact on the proposed staging activities

5 3 STAINING ON THE BUILDING 980 PAD

Several areas of staining exist on the Building 980 pad These stains were previously assessed and were assumed to be non-hazardous As a result, these areas of staining are assumed to have no consequence to planned staging activities Appendix D presents correspondences that discuss the stained surfaces

6. CONCLUSIONS

The area including and immediately surrounding the former Building 890 slab was evaluated as to its suitableness to stage non-contaminated concrete rubble from various D&D operations The area was evaluated using guidance provided in the draft RFCA Standard Operating Protocol for Recycling Concrete (K-H, 1999) and the requirements established in the project specific sampling and analysis plan (RMRS, 1999)

Several issues exist with selection of this site for staging concrete, however, these issues may be viewed as minor/acceptable to project planners Ideally, the protocol (K-H, 1999) suggests that staging areas be approximately 3 7 acres in size This site is roughly one third the ideal size, however, this is not viewed as a major limitation, as this does not preclude the use of additional sites to meet the surface area requirements Analytical results indicate that the area is contaminated above background for several alpha emitting radionuclides Radiological engineering will require that if staged concrete is removed from this area for offsite disposal, that a proper release evaluation be performed which may require the performance of additional surveys on the concrete and/or concrete washing to remove any soil This is not an ideal condition however, it is recognized that in all likelihood other areas proposed for staging at

Rocky Flats will contain similar radiological conditions, and the concrete is proposed to be used as backfill

This area has several strengths The area is located near a major source of concrete rubble generation and eventual (planned) disposition The area is less restrictive with respect to overhead utility lines (e g , natural gas) that can result in safety issues as concrete is placed in relatively high piles, near the overhead lines Radiological contamination present in the area is at relatively low levels which do not result in a requirement for radiological controls or special access restrictions

As no area at Rocky Flats is likely to meet ideal conditions for staging concrete, the area surrounding (and including) the former Building 980 slab comes relatively close and is acceptable for use if staging concrete generated in the protected area is pursued

7 REFERENCES

CAS, 1999, Sampling for Waste characterization for General Sampling Activities at the Rocky Flats Environmental Technology site, CAS SOP-003, August

DOE, 1992, Historical Release Report for the Rocky Flats Plant, U S Department of Energy, Rocky Flats Plant, Golden, CO, Final, June

DOE, 1995b Geochemical Characterization of Background Surface Soils Background Soils Characterization Program, Rocky flats Environmental Technology Site, Golden, CO , Final, May

DOE, 1996a, Final Rocky Flats Cleanup Agreement, U S Department of Energy, Rocky Flats Environmental Technology site, Golden, CO, July 19, as amended

DOE, 1996b, Action Levels for Radionuclides in Soils for the Rocky Flats cleanup Agreement, Final, U S Department of Energy, U S Environmental Protection Agency, Colorado Department of Public Health and Environment, October 31

EPA, 1994, Guidance for the Data Quality Objectives Process, EPA QA/G-4, September

K-H, 1999, Rocky Flats Environmental Technology Site RFCA Standard Operating Protocol for Recycling Concrete, Draft, June

RMRS, 1997a, Reconnaissance Level Characterization Report for the Building 980 Cluster, RF/RMRS-97-019, Rev 0, August

RMRS, 1997b, Closeout Report for the Building 980 Cluster, RF/RMRS-97-095, Rev 0, October

RMRS, 1998, Evaluation of Data for Usability in Final Reports, RF/RMRS-98-200, Rev 0, August

RMRS, 1999, Sampling and analysis Plan for the Baseline Characterization of a Proposed Concrete Rubble Storage Area at the Former Building 980 Site, RF/RMRS-99-417, Rev 0, August

Appendix A

Analytical Data and Field Documentation Regarding the Building 980 Area Characterization

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ANALYTICAL SERVICES DIVISION

FAX COVER SHEET FOR FINAL DATA PACKAGE REPORTS

RIN NUMBER: 99 A 9500

FROM: **TOM SZYDLOWSKI**

PHONE: **(303) 966-8165**

FAX: **(303) 966-4555**

TO: H. Salomon

FAX: 4046

PHONE: _____

NUMBER OF PAGES, INCLUDING COVER SHEET: _____

Please contact _____ **if the fax is not received in its entirety.**
(phone number)

NOTE:
This facsimile contains the results, in the Final Sample Data Package, for the analytes requested in this RIN The package has been scheduled for verification or validation Until verification or validation is completed the results must be considered preliminary You will be forwarded a copy of the verification or validation report shortly after it is received by ASD You should examine this report to determine if any qualifiers (flags) have been attached to the results Flagged data may or may not be suitable for use as originally intended and should be evaluated for acceptability before use If you have any questions please contact your Analytical Services Project Lead, do no contact the laboratory directly

VERIFICATION
SOM ANALYTICAL SERVICES

15

Case Narrative for Isotopic Uranium, Plutonium and Americium-241

Soils

Kaiser-Hill / RFETS

E T S RIN 99A9500

PAI WO 9908161

1 This report consists of 11 soil samples received by Paragon on 08/28/99 The soil samples were ground prior to analyses and results are reported on a "dry weight" basis

2 Due to expected activity, a 1 0 gram aliquot was used for the analysis of these samples The samples were prepared according to Paragon Analytics, Inc procedures PAI SOP721R5, PAI SOP773R3, PAI SOP778R3 and PAI SOP780R2

3 The samples were analyzed sequentially for the presence of isotopic uranium, plutonium and americium according to Paragon Analytics, Inc procedure PAI SOP714R4 The analyses were completed on 09/08/99

4 Following discussions with Kip Harward on 6/30/98, samples showing tracer peak FWHM of less than or equal to 80 keV are evaluated as acceptable The monthly calibration package, RC01CAL_PARA_10Sep1999, is included in Section 9

5 The EDD was produced automatically and was manually reviewed prior to approval

6 No anomalous situations were encountered during the preparation and analysis of these samples

The data contained in the following report have been reviewed and approved by the personnel listed below In addition, Paragon Analytics, Inc certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed

Kurt Garrett — 9/10/99

Kurt Garrett
Radiochemistry Instrumentation

Date

Renee Hallegos — 9/10/99

Radiochemistry Final Data Review

Date

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RMRS

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

99081 61

COC # 9[illegible]9500#002

Page 1 of 2

Collector Nerdley 511 9027 / B.L. [illegible] 513278	Contact/Requester SZYDLOWSKI, TOM	Telephone No 8165 MSIN FAX 4046
RIN 99A9500	Sampling Origin Bldg 980 Pad	Purchase Order/Charge Code KT03DT00
Project Title N/A	Logbook No Milker	Ice Chest No N/A Temp N/A
To (Lab) Paragon Analytics	Method of Shipment Fed. Ex	Bill of Lading/Air Bill No 4533 2125 0424
Protocol CAS-SOP. 003		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **
Asphalt may be present

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A9500-001 002	Event 001	SOLID	8/26/99	6:55	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -01	None None
99A9500-002 002	Event 002	SOLID		7 10	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -02	None None
99A9500-003 002	Event 003	SOLID		7 43	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -03	None None
99A9500-004 002	Event 004	SOLID		7:20	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -04	None None
99A9500-005 002	Event 005	SOLID		7:29	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -05	None None
99A9500-006 002	Event 006	SOLID		7:35	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -06	None None
99A9500-007 002	Event 007	SOLID		7:52	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -07	None None

Relinquished By / Date/Time	Received By / Date/Time	Relinquished By / Date/Time	Received By / Date/Time
Nerdley 8/26/99 9:52	T891R Frig #2 8/26/99 9:52	T891R Frig. #2 8-27-99/1400	L. Miller 8-27-99/1400
L. Miller 8-27-99/1500	Fed Ex	Fed Ex	Shei Mathe 8-28-99 0930

FINAL SAMPLE DISPOSITION: Disposal Method (e g , Return to customer, per lab procedure, used in process) Disposed By Date/Time

RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

99081161

COC # 99[illegible]500#002

RIN 99A9500 | Contact/Requestor SZYDLOWSKI, TOM | Telephone No 8165 | MSIN | FAX

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A9500-008 002	Event 008	SOLID	8/26/99	8:06	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -08	None None
99A9500-009 002	Event 009	SOLID		8:14	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -09	None None
99A9500-010 002	Event 010	SOLID		8:21	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -10	None None
99A9500-011 001	Event ~~008~~ 011 8/26/99	Solid		7:43	Bldg 980 Pad	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] -11	None None

8/26/99 MIN

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Hershey	8/26/99 9 52	T891R Frig #2	8/26/99 9 52	T89/R Frig #2	8-27-99/1400	L. Miller	8-27-99/1400
L. Miller	8-27-99/1500	Fed Ex		Fed Ex		Sha Mathe	8-28-99 0938

FINAL SAMPLE DISPOSITION	Disposal Method (e g Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday, September 09, 1999 16 56 06

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-1	99A9500-001 002	AM-241	Am-241	0 066 +/- 0 052	0 060	pCi/g	Soil	AS02762	9/7/99	J
9908161-2	99A9500-002 002	AM-241	Am-241	0 070 +/- 0 049	0 027	pCi/g	Soil	AS02762	9/8/99	J
9908161-3	99A9500-003 002	AM-241	Am-241	0 033 +/- 0 033	0 025	pCi/g	Soil	AS02762	9/8/99	J
9908161-4	99A9500-004 002	AM-241	Am-241	0 258 +/- 0 099	0 046	pCi/g	Soil	AS02762	9/8/99	J
9908161-5	99A9500-005 002	AM-241	Am-241	0 075 +/- 0 053	0 029	pCi/g	Soil	AS02762	9/8/99	J
9908161-6	99A9500-006 002	AM-241	Am-241	0 155 +/- 0 074	0 026	pCi/g	Soil	AS02762	9/8/99	J
9908161-7	99A9500-007 002	AM-241	Am-241	0 057 +/- 0 047	0 059	pCi/g	Soil	AS02762	9/8/99	J
9908161-8	99A9500-008 002	AM-241	Am-241	0 021 +/- 0 028	0 049	pCi/g	Soil	AS02762	9/8/99	U
9908161-9	99A9500-009 002	AM-241	Am-241	0 036 +/- 0 039	0 062	pCi/g	Soil	AS02762	9/8/99	U
9908161-10	99A9500-010 002	AM-241	Am-241	0 260 +/- 0 100	0 030	pCi/g	Soil	AS02762	9/8/99	U
9908161-11	99A9500-011 001	AM-241	Am-241	0 062 +/- 0 046	0 027	pCi/g	Soil	AS02762	9/8/99	J

Comments

Abbreviations
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags
U - Result is less than the sample specific minimum detectable activity
LT - Result is less than Requested MDC greater than sample specific MDC
Y2 - Chemical Yield outside default limits

20

Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday, September 09, 1999 16 56 06

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-1	99A9500-001 002	PU-ISO	Pu-238	-0 010 +/- 0 030	0 075	pCi/g	Soil	AS02762	9/4/99	U
9908161-1	99A9500-001 002	PU-ISO	Pu-239	0 045 +/- 0 044	0 059	pCi/g	Soil	AS02762	9/4/99	U
9908161-2	99A9500-002 002	PU-ISO	Pu-238	-0 005 +/- 0 027	0 058	pCi/g	Soil	AS02762	9/4/99	U
9908161-2	99A9500-002 002	PU-ISO	Pu-239	0 068 +/- 0 049	0 045	pCi/g	Soil	AS02762	9/4/99	J
9908161-3	99A9500-003 002	PU-ISO	Pu-238	-0 019 +/- 0 029	0 091	pCi/g	Soil	AS02762	9/4/99	U
9908161-3	99A9500-003 002	PU-ISO	Pu-239	0 038 +/- 0 037	0 029	pCi/g	Soil	AS02762	9/4/99	J
9908161-4	99A9500-004 002	PU-ISO	Pu-238	0 013 +/- 0 029	0 063	pCi/g	Soil	AS02762	9/4/99	U
9908161-4	99A9500-004 002	PU-ISO	Pu-239	0 185 +/- 0 086	0 063	pCi/g	Soil	AS02762	9/4/99	J
9908161-5	99A9500-005 002	PU-ISO	Pu-238	0 023 +/- 0 033	0 063	pCi/g	Soil	AS02762	9/4/99	U
9908161-5	99A9500-005 002	PU-ISO	Pu-239	0 121 +/- 0 068	0 049	pCi/g	Soil	AS02762	9/4/99	J
9908161-6	99A9500-006 002	PU-ISO	Pu-238	0 009 +/- 0 028	0 028	pCi/g	Soil	AS02762	9/4/99	U
9908161-6	99A9500-006 002	PU-ISO	Pu-239	0 280 +/- 0 110	0 047	pCi/g	Soil	AS02762	9/4/99	J
9908161-7	99A9500-007 002	PU-ISO	Pu-238	0 014 +/- 0 026	0 051	pCi/g	Soil	AS02762	9/4/99	U
9908161-7	99A9500-007 002	PU-ISO	Pu-239	0 106 +/- 0 062	0 057	pCi/g	Soil	AS02762	9/4/99	J
9908161-8	99A9500-008 002	PU-ISO	Pu-238	-0 002 +/- 0 030	0 050	pCi/g	Soil	AS02762	9/4/99	U

Comments

Abbreviations
TPU Total Propagated Uncertainty (see PAI SOP 743)
MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags
U Result is less than the sample specific minimum detectable activity
LT Result is less than Requested MDC greater than sample specific MDC
Y2 Chemical Yield outside default limits

21

Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday, September 09, 1999 16 56 06

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-8	99A9500-008 002	PU-ISO	Pu-239	0 086 +/- 0 059	0 050	pCi/g	Soil	AS02762	9/4/99	J
9908161-9	99A9500-009 002	PU-ISO	Pu-238	0 009 +/- 0 034	0 057	pCi/g	Soil	AS02762	9/4/99	U
9908161-9	99A9500-009 002	PU-ISO	Pu-239	0 022 +/- 0 034	0 034	pCi/g	Soil	AS02762	9/4/99	U
9908161-10	99A9500-010 002	PU-ISO	Pu-238	-0 004 +/- 0 032	0 062	pCi/g	Soil	AS02762	9/4/99	U
9908161-10	99A9500-010 002	PU-ISO	Pu-239	0 880 +/- 0 210	0 069	pCi/g	Soil	AS02762	9/4/99	
9908161-11	99A9500-011 001	PU-ISO	Pu-238	0 005 +/- 0 026	0 050	pCi/g	Soil	AS02762	9/4/99	U
9908161-11	99A9500-011 001	PU-ISO	Pu-239	-0 002 +/- 0 026	0 043	pCi/g	Soil	AS02762	9/4/99	U

Comments

Abbreviations
TPU Total Propagated Uncertainty (see PAI SOP 743)
MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags
U Result is less than the sample specific minimum detectable activity
LT Result is less than Requested MDC greater than sample specific MDC
Y2 - Chemical Yield outside default limits

22

Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday, September 09, 1999 16 56 06

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-1	99A9500-001 002	U-ISO	U-234	0 820 +/- 0 270	0 095	pCi/g	Soil	AS02762	9/4/99	J
9908161-1	99A9500-001 002	U-ISO	U-235	0 016 +/- 0 062	0 110	pCi/g	Soil	AS02762	9/4/99	U
9908161-1	99A9500-001 002	U-ISO	U-238	0 820 +/- 0 270	0 062	pCi/g	Soil	AS02762	9/4/99	J
9908161-2	99A9500-002 002	U-ISO	U-234	0 820 +/- 0 230	0 084	pCi/g	Soil	AS02762	9/4/99	J
9908161-2	99A9500-002 002	U-ISO	U-235	0 071 +/- 0 064	0 067	pCi/g	Soil	AS02762	9/4/99	J
9908161-2	99A9500-002 002	U-ISO	U-238	0 690 +/- 0 210	0 077	pCi/g	Soil	AS02762	9/4/99	J
9908161-3	99A9500-003 002	U-ISO	U-234	0 600 +/- 0 190	0 059	pCi/g	Soil	AS02762	9/4/99	J
9908161-3	99A9500-003 002	U-ISO	U-235	0 024 +/- 0 039	0 059	pCi/g	Soil	AS02762	9/4/99	U
9908161-3	99A9500-003 002	U-ISO	U-238	0 660 +/- 0 200	0 074	pCi/g	Soil	AS02762	9/4/99	J
9908161-4	99A9500-004 002	U-ISO	U-234	0 910 +/- 0 250	0 087	pCi/g	Soil	AS02762	9/4/99	J
9908161-4	99A9500-004 002	U-ISO	U-235	0 083 +/- 0 073	0 093	pCi/g	Soil	AS02762	9/4/99	U
9908161-4	99A9500-004 002	U-ISO	U-238	0 890 +/- 0 250	0 087	pCi/g	Soil	AS02762	9/4/99	J
9908161-5	99A9500-005 002	U-ISO	U-234	0 860 +/- 0 250	0 110	pCi/g	Soil	AS02762	9/4/99	J
9908161-5	99A9500-005 002	U-ISO	U-235	0 005 +/- 0 050	0 110	pCi/g	Soil	AS02762	9/4/99	U
9908161-5	99A9500-005 002	U-ISO	U-238	0 830 +/- 0 250	0 100	pCi/g	Soil	AS02762	9/4/99	J

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity

LT Result is less than Requested MDC greater than sample specific MDC

Y2 Chemical Yield outside default limits

23

Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday September 09, 1999 16 56 06

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-6	99A9500-006 002	U-ISO	U-234	0 830 +/- 0 240	0 090	pCi/g	Soil	AS02762	9/4/99	J
9908161-6	99A9500-006 002	U-ISO	U-235	0 067 +/- 0 064	0 084	pCi/g	Soil	AS02762	9/4/99	U
9908161-6	99A9500-006 002	U-ISO	U-238	0 660 +/- 0 210	0 084	pCi/g	Soil	AS02762	9/4/99	J
9908161-7	99A9500-007 002	U-ISO	U-234	1 01 +/- 0 300	0 110	pCi/g	Soil	AS02762	9/4/99	
9908161-7	99A9500-007 002	U-ISO	U-235	0 033 +/- 0 057	0 100	pCi/g	Soil	AS02762	9/4/99	U
9908161-7	99A9500-007 002	U-ISO	U-238	0 860 +/- 0 270	0 087	pCi/g	Soil	AS02762	9/4/99	J
9908161-8	99A9500-008 002	U-ISO	U-234	0 960 +/- 0 260	0 092	pCi/g	Soil	AS02762	9/4/99	J
9908161-8	99A9500-008 002	U-ISO	U-235	0 039 +/- 0 051	0 086	pCi/g	Soil	AS02762	9/4/99	U
9908161-8	99A9500-008 002	U-ISO	U-238	1 07 +/- 0 280	0 069	pCi/g	Soil	AS02762	9/4/99	
9908161-9	99A9500-009 002	U-ISO	U-234	0 840 +/- 0 250	0 100	pCi/g	Soil	AS02762	9/4/99	J
9908161-9	99A9500-009 002	U-ISO	U-235	0 091 +/- 0 075	0 072	pCi/g	Soil	AS02762	9/4/99	J
9908161-9	99A9500-009 002	U-ISO	U-238	0 930 +/- 0 260	0 072	pCi/g	Soil	AS02762	9/4/99	J
9908161-10	99A9500-010 002	U-ISO	U-234	0 780 +/- 0 220	0 081	pCi/g	Soil	AS02762	9/4/99	J
9908161-10	99A9500-010 002	U-ISO	U-235	0 049 +/- 0 056	0 087	pCi/g	Soil	AS02762	9/4/99	U
9908161-10	99A9500-010 002	U-ISO	U-238	0 820 +/- 0 230	0 074	pCi/g	Soil	AS02762	9/4/99	J

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity

LT - Result is less than Requested MDC greater than sample specific MDC

Y2 Chemical Yield outside default limits

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Sample Results Summary

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Reported on Thursday September 09, 1999 16 56 07

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
9908161-11	99A9500-011 001	U-ISO	U-234	0 710 +/- 0 220	0 120	pCi/g	Soil	AS02762	9/4/99	J
9908161-11	99A9500-011 001	U-ISO	U-235	0 004 +/- 0 046	0 110	pCi/g	Soil	AS02762	9/4/99	U
9908161-11	99A9500-011 001	U-ISO	U-238	0 750 +/- 0 230	0 081	pCi/g	Soil	AS02762	9/4/99	J

Comments

Abbreviations
TPU Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags
U Result is less than the sample specific minimum detectable activity
LT Result is less than Requested MDC greater than sample specific MDC
Y2 Chemical Yield outside default limits

Isotopic Americium By Alpha Spectroscopy

Method PAI714R4

Method Blank Results

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID	
Lab ID	AS02762BLK1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 08-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 200

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0 009 +/- 0 029	0 029	pCi/g	U

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	4 51	3 52	pCi/g	78%	20-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)
MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity
LT Result is less than Requested MDC greater than sample specific MDC
Y2 - Chemical Yield outside default limits
B3 Analyte concentration greater than MDC but less than Requested MDC
B - Analyte concentration greater than MDC

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Isotopic Americium By Alpha Spectroscopy

Method PAI714R4

LCS Results

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID:
Lab ID: AS02762LCS1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 08-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 200

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	4 65 +/- 0 670	0 027	4 971	pCi/g	94%	100 +/- 25%	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	4 51	3 61	pCi/g	80%	20-110%

Comments

Abbreviations
Total Propagated Uncertainty (see PAI SOP 743)
MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags
U Result is less than the sample specific minimum detectable activity
LT Result is less than Requested MDC greater than sample specific MDC
Y2 Chemical Yield outside default limits
Duplicate DER not within control limits

Isotopic Americium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday, September 09, 1999 16 56 06

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Sample ID	99A9500-001 002	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Sample ID	9908161-01	9/1/99	9/7/99	AS02762	1 000
Duplicate ID	9908161-1-D1	9/1/99	9/7/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Am-241	0 066 +/- 0 052	0 049 +/- 0 046	pCi/g	0 24	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	4 51	3 41	pCi/g	76%	20-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)
DER Duplicate Error Ratio

Qualifiers/Flags

Warn DER is greater than Warning Limit of 1 42
Fail DER is greater than Control Limit of 2 14

Isotopic Americium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co , L L C

Client Project Name B779 FINAL SURVEY

Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc

PAI Work Order 9908161

Field ID	99A9500-011 001	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID	9908161-11	9/1/99	9/8/99	AS02762	1 000
DUP ID	9908161-11-D1	9/1/99	9/8/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Am-241	0 062 +/- 0 046	0 040 +/- 0 037	pCi/g	0 37	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	4 51	3 91	pCi/g	87%	20-110%

Comments

Abbreviations

- Total Propagated Uncertainty (see PAI SOP 743)
- Duplicate Error Ratio

Qualifiers/Flags

Warn DER is greater than Warning Limit of 1 42

Fail DER is greater than Control Limit of 2 14

Isotopic Plutonium By Alpha Spectroscopy

Method PAI714R4

Method Blank Results

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID
Lab ID AS02762BLK1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 04-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 200

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	-0 020 +/- 0 039	0 110	pCi/g	U
Pu-239	-0 003 +/- 0 039	0 065	pCi/g	U

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	4 50	2 52	pCi/g	56%	20-110%

Comments

Abbreviations

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U - Result is less than the sample specific minimum detectable activity

LT - Result is less than Requested MDC greater than sample specific MDC

Y2 - Chemical Yield outside default limits

B3 Analyte concentration greater than MDC but less than Requested MDC

B Analyte concentration greater than MDC

Isotopic Plutonium By Alpha Spectroscopy

Method PAI714R4

LCS Results

Reported on Thursday, September 09 1999 16 56 07

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID:
Lab ID: AS02762LCS1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 04-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 200

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Pu-238	-0 008 +/- 0 025	0 063	N/A	pCi/g	N/A	N/A	U
Pu-239	4 57 +/- 0 650	0 049	4 756	pCi/g	96%	100 +/- 25%	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	4 50	3 96	pCi/g	88%	20-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity

LT Result is less than Requested MDC greater than sample specific MDC

Y2 - Chemical Yield outside default limits

Duplicate DER not within control limits

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Isotopic Plutonium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday, September 09, 1999 16 56 06

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID	Prep Date	Analysis Date	Prep Batch	Final Aliquot
99A9500-001 002				
Lab ID 9908161-01	9/1/99	9/4/99	AS02762	1 000
DUP ID 9908161-1-D1	9/1/99	9/4/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Pu-238	-0 010 +/- 0 030	-0 006 +/- 0 033	pCi/g	0 09	< 1 50	
Pu-239	0 045 +/- 0 044	0 039 +/- 0 043	pCi/g	0 10	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	4 50	3 03	pCi/g	67%	20-110%

Comments

Abbreviations

TPU - Total Propagated Uncertainty (see PAI SOP 743)

DER Duplicate Error Ratio

Qualifiers/Flags

Warn DER is greater than Warning Limit of 1 42

Fail DER is greater than Control Limit of 2 14

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Isotopic Plutonium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co , L L C

Client Project Name B779 FINAL SURVEY

Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc

PAI Work Order 9908161

Field ID	99A9500-011 001	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID	9908161-11	9/1/99	9/4/99	AS02762	1 000
QC Lab ID	9908161-11-D1	9/1/99	9/4/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Pu-238	0 005 +/- 0 026	-0 004 +/- 0 033	pCi/g	0 21	< 1 50	
Pu-239	-0 002 +/- 0 026	0 032 +/- 0 037	pCi/g	0 75	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	4 50	2 99	pCi/g	66%	20-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

DER - Duplicate Error Ratio

Qualifiers/Flags

Warn - DER is greater than Warning Limit of 1 42

Fail DER is greater than Control Limit of 2 14

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Isotopic Uranium By Alpha Spectroscopy

Method PAI714R4

Method Blank Results

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID
Lab ID AS02762BLK1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 04-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 120

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
U-234	-0 001 +/- 0 048	0 120	pCi/g	U
U-235	0 026 +/- 0 048	0 092	pCi/g	U
U-238	-0 004 +/- 0 048	0 084	pCi/g	U

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	4 86	3 93	pCi/g	81%	30-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity

LT Result is less than Requested MDC greater than sample specific MDC

Y2 Chemical Yield outside default limits

B3 Analyte concentration greater than MDC but less than Requested MDC

B - Analyte concentration greater than MDC

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Isotopic Uranium By Alpha Spectroscopy

Method PAI714R4

LCS Results

Reported on Thursday, September 09, 1999 16 56 07

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID
Lab ID AS02762LCS1

Sample Matrix Soil
Date Prepared 01-Sep-99
Prep SOP PAI 780R2
Prep Batch AS02762

Date Collected 01-Sep-99
Date Analyzed 04-Sep-99
Analytical SOP PAISOP714R4

Final Aliquot 1 000
Aliquot Units g
Report Basis Dry Weight
Count Time (min) 120

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
U-234	5 27 +/- 0 850	0 120	5 055	pCi/g	104%	100 +/- 25%	
U-235	0 370 +/- 0 170	0 130	N/A	pCi/g	N/A	N/A	J
U-238	5 65 +/- 0 900	0 110	5 055	pCi/g	112%	100 +/- 25%	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	4 86	3 81	pCi/g	78%	30-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

MDC Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags

U Result is less than the sample specific minimum detectable activity

LT Result is less than Requested MDC greater than sample specific MDC

Y2 - Chemical Yield outside default limits

* Duplicate DER not within control limits

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Isotopic Uranium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday, September 09, 1999 16 56 06

Client Name Kaiser-Hill Co , L L C

Client Project Name B779 FINAL SURVEY

Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc

PAI Work Order 9908161

Field ID	Prep Date	Analysis Date	Prep Batch	Final Aliquot
99A9500-001 002				
Lab ID 9908161-01	9/1/99	9/4/99	AS02762	1 000
DUP ID 9908161-1-D1	9/1/99	9/4/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-234	0 820 +/- 0 270	0 630 +/- 0 220	pCi/g	0 55	< 1 50	
U-235	0 016 +/- 0 062	0 011 +/- 0 053	pCi/g	0 06	< 1 50	
U-238	0 820 +/- 0 270	0 710 +/- 0 230	pCi/g	0 31	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	4 86	4 30	pCi/g	88%	30-110%

Comments

Abbreviations

TPU Total Propagated Uncertainty (see PAI SOP 743)

DER Duplicate Error Ratio

Qualifiers/Flags

Warn DER is greater than Warning Limit of 1 42

Fail DER is greater than Control Limit of 2 14

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Isotopic Uranium By Alpha Spectroscopy

Method PAI714R4

Duplicate Sample Results (DER)

Reported on Thursday September 09 1999 16 56 07

Client Name Kaiser-Hill Co , L L C
Client Project Name B779 FINAL SURVEY
Client Project Number 99A9500

Laboratory Name Paragon Analytics, Inc
PAI Work Order 9908161

Field ID:	99A9500-011 001	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID:	9908161-11	9/1/99	9/4/99	AS02762	1 000
DUP ID:	9908161-11-D1	9/1/99	9/4/99	AS02762	1 000

Sample Matrix Soil
Date Collected 26-Aug-99
Analytical SOP PAISOP714R4
Prep SOP PAI 780R2
Aliquot Units g
Report Basis Dry Weight

Analyte	Sample Result +/ 2s TPU	Duplicate Result +/ 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-234	0 710 +/- 0 220	0 430 +/- 0 160	pCi/g	1 03	< 1 50	
U-235	0 004 +/- 0 046	0 047 +/- 0 055	pCi/g	0 60	< 1 50	
U-238	0 750 +/- 0 230	0 710 +/- 0 210	pCi/g	0 13	< 1 50	

Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	4 86	4 59	pCi/g	94%	30-110%

Comments

Abbreviations
TPU Total Propagated Uncertainty (see PAI SOP 743)
DER - Duplicate Error Ratio

Qualifiers/Flags
Warn DER is greater than Warning Limit of 1 42
Fail - DER is greater than Control Limit of 2 14

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RMRS RFETS	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # 99A9500#001 Page 1 of 2

Collector Murphy 514927/D. Zgunt 513278	Contact/Requester SZYDLOWSKI, TOM	Telephone No. 8165 MSIN FAX 4046
RIN 99A9500	Sampling Origin Bldg 980 Pad	Purchase Order/Charge Code KT03DT00
Project Title N/A	Logbook No. Milker	Ice Chest No. Temp. N/A
To (Lab) Thermo NuTech	Method of Shipment Vehicle	Bill of Lading/Air Bill No. N/A
Protocol CAS-SOP 003		PRE N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** ** Please fax results to 4046 + 3308
Asphalt may be present

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐

COPY

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A9500-001 001 ✓	Event 001	SOLID	8/24/99	6:55	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-002 001 ✓	Event 002	SOLID		7:10	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-003 001 ✓	Event 003	SOLID		7:45 ~~7:40~~	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-004 001 ✓	Event 004	SOLID		7:20	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-005 001 ✓	Event 005	SOLID		7:29	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-006 001 ✓	Event 006	SOLID		7:35	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-007 001 ✓	Event 007	SOLID		7:52	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
D. Zgunt	8/26/99 0945	[illegible]	8/26/99 0945				

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer per lab procedure, used in process) | Disposed By | Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 99A9500#001

RIN 99A9500

Contact/Requestor SZYDLOWSKI TOM

Telephone No. 8165

MSIN

FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A9500-008 001 ✓	Event 008	SOLID	8/24/99	8:04	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-009 001 ✓	Event 009	SOLID	↓	8:14	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None
99A9500-010 001 ✓	Event 010	SOLID	↓	8:21	Bldg 980 Pad	60-G P/G	OS01A003 (Rad-Screen - Solid) [Routine]	None None

COPY

8/24/99 MXX

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[illegible]	8/24/99 0945	[illegible]	8/24/99 0945				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By

Date/Time

Thermo NUtech

Rocky Flats Environmental Technology Site
P.O. Box 186
Golden, CO 80402-0186

Fax Cover

Date: 8/27/99

To: Report Distribution

From: Kathy Hagglund

Phone Number:

Phone Number: 7799

Fax Number: See Distribution

Fax Number 303-966-4303

Total Pages Including Cover Sheet 2

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Message:

Radscreen Report

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Thermo NUtech - Rocky Flats
Radscreen Results

RIN: 99A9500
Analysis: Radscreen
Report Date: 08/27/99

Distribution/Fax: ASD/ 4655
CAS/ 3308
/ 4046

Laboratory Sample ID	APO Sample ID			Matrix	Gross Alpha		Gross Beta		Total Activity pCi/g	DOT Class
	RIN	Event	Bottle		pCi/g	2σ	pCi/g	2σ		
99080309-01	99A9500	001	001	Soil	22	9	42	6	79 00	NONRAD
99080309-02	99A9500	002	001	Soil	31	10	45	6	92.00	NONRAD
99080309-03	99A9500	003	001	Soil	17	8	33	5	63 00	NONRAD
99080309-04	99A9500	004	001	Soil	25	10	43	6	84 00	NONRAD
99080309-05	99A9500	005	001	Soil	20	8	44	6	78 00	NONRAD
99080309-06	99A9500	006	001	Soil	22	8	37	6	73 00	NONRAD
99080309-07	99A9500	007	001	Soil	24	8	35	5	72 00	NONRAD
99080309-08	99A9500	008	001	Soil	34	10	37	6	87 00	NONRAD
99080309-09	99A9500	009	001	Soil	30	11	49	6	96 00	NONRAD
99080309-10	99A9500	010	001	Soil	36	10	36	6	88 00	NONRAD

DOT Classification <2000 pCi/g total activity is NONRAD
>= 2000 pCi/g total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements.
If the measured activity is negative, 0 pCi/g (instead of the negative value) is used to calculate the total activity

Analysis Methods Sample Preparation Procedure L-6283-A, "Sample Preparation for Radiological Screening of Soil Samples by Gas Proportional Counting"
Counting Procedure ATP-006, "Operation of Tennelec LB4100 Gas Proportional Counters"

L M Hoagland /Date 8/27/99
Technical Review

Ronald L. Taylor /Date 8/27/99
Quality Assurance Review

Thermo NUtech Rocky Flats
RFETS - Building 750D
Golden, Colorado 80402
(303) 966-6660

RP-0002 (11/97)

CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 001
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK ✓

Comments/Problems encountered during sampling Dug a hole down about 4 inches then scraped dirt around the sides of the hole for a composite of the entire hole. Decorned equipment between each hole.

Location Description Bldg. 980

Other ID Event 001, see attached map for location

Sample Appearance Brown dry dirt/soil with some small rocks

Sampling Device Stainless steel pick + plastic scoopula

Sample Date 8/26/99 Sample Time 16:55 Rad Screen Date 8/26/99

Was generator no [redacted]

Samplers Signatur [redacted]
Employee Number [redacted]

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN. 99A9500
EVENT 002
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sample method

Location Description Bldg 980, see attached map for location

Other ID Event 002

Sample Appearance Dry brown soil/dirt with some small rocks

Sampling Device Stainless steel pick + plastic scoopula

Sample Date 8/26/99 Sample Time 7:10 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 003
DUPLICATE ID 011
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID.
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for Sampling method

Location Description Bldg. 980, See attached map for Sampling location

Other ID 003

Sample Appearance Brown soil/dirt like material with some small rocks

Sampling Device Stainless steel pick + scoop

Sample Date 8/26/99 Sample Time 7:43 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 004
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sample method

Location Description Bldg 980, See attached map

Other ID Event 004

Sample Appearance Brown dry dirt/soil may have some small rocks

Sampling Device Stainless steel pick + plastic scoopula

Sample Date 8/26/99 Sample Time 7:20 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signatur [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 005
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID.
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sample method

Location Description Bldg 980, see attached map

Other ID Event 005

Sample Appearance Brown dirt/soil like material, with some small rock

Sampling Device Stainless steel pick + scoopula

Sample Date 8/26/99 Sample Time 7:29 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signatu[redacted]
Employee Number[redacted]

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 006
DUPLICATE ID N/A
ISSUE DATE 8/16/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sample method.

Location Description Bldg. 986, see attached map for location

Other ID Event 006

Sample Appearance Brown dust/soil like material with some small rocks

Sampling Device Stainless steel scoop + pick

Sample Date 8/26/99 Sample Time 7:35 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 007
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sampling method. Possible aphalt

Location Description Bldg 980, see attached map for location

Other ID Event 007

Sample Appearance Dust/Soil like material brown in color with some small rocks

Sampling Device Stainless steel pick + scoop

Sample Date 8/26/99 Sample Time 7:52 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 008
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK ✓

Comments/Problems encountered during sampling See Event 001 for sample method. Asphalt may be present

Location Description Bldg. 980, see attached map for sample location

Other ID Event 008

Sample Appearance Brown dirt/soil like material with some small rocks

Sampling Device Stainless steel pick + scoop

Sample Date 8/26/99 Sample Time 8:07 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 009
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID.
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sampling method. ~~They as a possibility of Rosbitt asphalt~~ MM 8/26/99 MM 8/26/99

Location Description Bldg 980, see attached map for sample location

Other ID Event 009

Sample Appearance Brown dry dirt/soil like material, with some small rocks

Sampling Device Stainless steel pick + scoop

Sample Date 8/26/99 Sample Time 8:14 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date ~~8/26/99~~ 8/26/99

CAS SAMPLE REQUEST WORKSHEET

RIN 99A9500
EVENT 010
DUPLICATE ID N/A
ISSUE DATE 8/18/99

WASTE STREAM ID N/A
CUSTOMER SAMPLE ID
FIELD BLANK ID
EQUIPMENT BLANK ID
TRIP BLANK

Comments/Problems encountered during sampling See event 001 for sampling method

Location Description Bldg 980, see attached map for sample location

Other ID Event 010

Sample Appearance Brown dirt/soil like material, with some small rocks

Sampling Device Stainless steel scoop + pick

Sample Date 8/26/99 Sample Time 8:21 Rad Screen Date 8/26/99

Was generator notified to receive excess sample? (YES) X (NO)

Samplers Signature [redacted]
Employee Number

Date 8/26/99 8/26/99

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ASI SAMPLE REQUEST WORKSHEET

RIN: 99A9500
EVENT: 011
DUPLICATE ID: 003
ISSUE DATE: 8/18/99

WASTE STREAM ID: N/A
CUSTOMER SAMPLE ID:
FIELD BLANK ID:
EQUIPMENT BLANK ID:
TRIP BLANK:

Comments/Problems encountered during sampling: See Event 001 for sample method

Location Description: Bldg 980, see attached map for location

Other ID Event 011

Sample Appearance: Brown dirt/soil like material with some small rocks.

Sampling Device Stainless steel pick + scoop

Sample Date 8/26/99 Sample Time 7:43 Rad Screen Sample Date 8/26/99

Was generator notified to receive excess sample? (Yes) X (No)

Sampler's Signature [redacted]

Employee Numb [redacted]

Date 8/26/99 8/26/99

51

Lmc 10/08/98

98 Boreholes Survey 9/2/99
Coordinate Listing - State Plane

Description	Northing	Easting	Elevation
001	750177 97	2084745 02	5974 8
002	750129 16	2084736 56	5974 5
003&011	750101 67	2084807 43	5973 5
004	750134 48	2084869 75	5973 6
005	750082 43	2084894 24	5971 6
006	750132 20	2084956 23	5972 1
007	750119 47	2085009 90	5970 5
008	750136 33	2085056 86	5970 4
009	750110 57	2085119 30	5969 4
010	750176 55	2085148 88	5969 4

011 DUP

980 Soils

8.18.99

ANALYTICAL SERVICES DIVISION
SAMPLING AND ANALYSIS REQUEST FORM

ASD USE ONLY

RIN 99A9500 Priority Rush

ASD Project Lead SZYDLOWSKI, TOM Phone 8165 Pager

CUSTOMER INFORMATION

Date 08/18/1999

Project Charge No KT03DT00

Requestor SALOMON, HOPI Phone 6627 Pager
Bldg Fax

Secondary Contact Phone Pager
Bldg Fax

Fax Data Results To SALOMOM, HOPI Phone 4046 Fax

SAMPLE INFORMATION

Sample Location Bldg 980 Pad

Sample Description and Sample Identifiers Surficial Soils

Sample Matrix ☐ Aqueous ☐ Org Liquid ☑ Solid ☐ Sludge ☐ Multi Phase

When will sample be available for sampling? 03/26/1999

When is data required by requestor? 09/10/1999

Estimated quantity Available for Sampling

Waste Stream ID No (if known) Waste Stream Name (if known)

EPA CODES MSDS ○ Yes ◉ No ATTACHED ○ Yes ◉ No

COMPATIBILITY CODE WFC/ IDC

90 Day Area? ○ Yes ◉ No Start Date End Date

ANALYSES REQUESTED

☑ Alpha/Beta Screen	☐ Total VOA	☐ TCLP VOA	☐ pH	Other
☐ Gross Alpha/Beta	☐ Total SVOAS	☐ TCLP SVOAS	☐ Fingerprint	
☑ Isotopics	☐ Total Metals (ICP)	☐ TCLP Metals	☐ IR	
☐ g/l Isotopics	☐ Total PCBs	☐ TCLP PCBs		
☐ Gamma Spec	☐ Total Herbicides	☐ TCLP Herbicides		

Analyses Criticality Sensitive? ○ Yes ◉ No

If Yes ○ Single ○ Double Analyses

RADIOLOGICAL ENTRY REQUIREMENTS

IS THIS A RADIOACTIVE WASTE STREAM? Suspected to be radioactive? ◉ Yes ○ No

☑ Pu ☑ Am ☐ U Other

Located In ☐ RBA ☐ RMA ☐ RMMA ☐ CA ☐ HCA ☐ RA ☐ HRA Other Area Not Posted

RCT Support ◉ Yes ○ No

RWP Required ○ Yes ◉ No

PWRE Required ◉ Yes ○ No

Comments

GENERAL ENTRY REQUIREMENTS/SAFETY CONCERNS

☑ Plan of the Day	☐ Industrial Hygiene Assistance	☐ Electrical
☐ Maintenance Assistance	☐ Carcinogen Control Area	☐ IWCP
☐ Operator's Assistance	☐ Lock-out/Tag-out	☐ Confined Space
☐ Mechanical	☐ Waste Contains Fluorides	Other

Special Instructions Follow RMRS HSP

Requestor Signature [signature] Date 8/26/99

Note Excess sample will be returned to generator

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Appendix B

Recent Radiological Surveys on the Former Building 980 Slab

RS FORMS 07.02-01

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg Eberline	Mfg Eberline	Mfg Eberline
Model SAC-4	Model SAC-4	Model SAC-4
Serial # 1407	Serial # 814	Serial #
Cal Due 12/17/99	Cal Due 2/11/00	Cal Due
Bkg 0.5	Bkg 0.2	Bkg N/A
Efficiency 33.3%	Efficiency 33.3%	Efficiency
MDA 20	MDA 20	MDA

Mfg N.E. ELECTRA	Mfg N.E. ELECTRA	Mfg
Model ELECTRA	Model ELECTRA	Model
Serial # 1265	Serial # 2383	Serial #
Cal Due 3-2-00	Cal Due 2-4-00	Cal Due
Bkg 3.0	Bkg 3.0	Bkg N/A
Efficiency 21.18	Efficiency 21.72	Efficiency
MDA 52	MDA 51	MDA

Survey Type: Contamination

Building NONE -

Location PAD 980

Purpose SURVEY OF PAD BEFORE LAYDOWN MATERIAL

RWP # N/A

Date 9/8/99 Time 1005

[redacted]

~~PRE #~~ Jmt 9/8/99

Comments SURVEY POINTS WHERE SMEARS TAKEN 60 SECOND PAT TAKEN

COPY

SURVEY RESULTS

ID #	Location/Description	dpm/100cm²α (swipe)	dpm/100cm²α (direct)
1	PAD	<20	<51
2	PAD	<20	<51
3	PAD	<20	<51
4	PAD	<20	<52
5	PAD	<20	<52
6	PAD	<20	<52
7	PAD	<20	<51
8	PAD	<20	<51
9	PAD	<20	<51
10	PAD	<20	<52
11	PAD	<20	<52
12	PAD	<20	<52
13	PAD	<20	<51
14	PAD	<20	<51
15	PAD	<20	<51
16	PAD	<20	<52
17	PAD	<20	<52
18	PAD	<20	<52
19	PAD	<20	<51
20	PAD	<20	<51
21	PAD	<20	<51
22	PAD	<20	<52
23	PAD	<20	<52
24	PAD	<20	<52
25	PAD	<20	<51
26	PAD	<20	<51
27	PAD	<20	<51
28	PAD	<20	<52
29	PAD	<20	<52
30	PAD	<20	<52
31	PAD	<20	<51
32	PAD	<20	<51
33	PAD	<20	<51
34	PAD	<20	<52
35	PAD	<20	<52
36	PAD	<20	<52
37	PAD	<20	<52
38	PAD	<20	<51
39	PAD	<20	<51
40	PAD	<20	<51
41	PAD	<20	<52
42	PAD	<20	<52
43	PAD	<20	<52
44	PAD	<20	<51
45	PAD	<20	<51
46	PAD	<20	<51
47	PAD	<20	<52
48	PAD	<20	<52
49	PAD	<20	<52
50	PAD	<20	<51
51	PAD	<20	<51
52	PAD	<20	<51
53	PAD	<20	<52
54	PAD	<20	<52

Date Reviewed 9/9/99 RS Supervision [redacted]

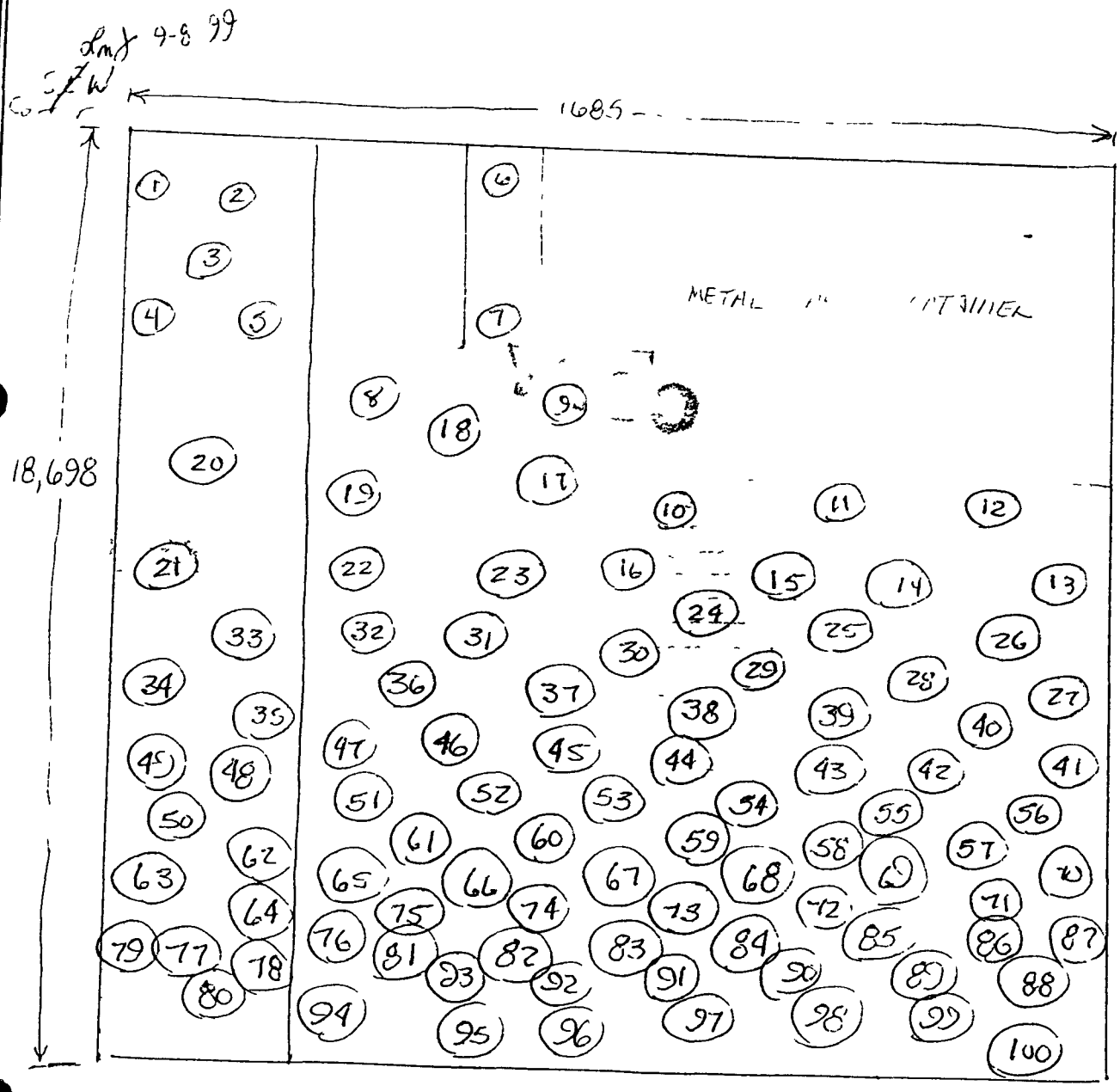
55

RS FORMS 07.02-01

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Drawing Showing Survey Points



NOTE. PAD 980 - DISCOLORED & WEATHERED BARE CONCRETE.
ALL DIMENSIONS ARE IN CENTIMETERS

North →

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

SURVEY RESULTS

ID #	LOCATION ~~PAD~~ Ln. 2 7/8/99	SWIPE DPM/100CM2	DIRECT DPM/100CM2	ID #	LOCATION ~~PAD~~ Ln 2 7/8/99	SWIPE DPM/100CM2	DIRECT DPM/100CM2
55	PAD	<20	<52	88	PAD	<20	<51
56	PAD	<20	<52	89	PAD	<20	<51
57	PAD	<20	<52	90	PAD	<20	<51
58	PAD	<20	<51	91	PAD	<20	<52
59	PAD	<20	<51	92	PAD	<20	<52
60	PAD	<20	<51	93	PAD	<20	<52
61	PAD	<20	<51	94	PAD	<20	<52
62	PAD	<20	<52	95	PAD	<20	<51
63	PAD	<20	<52	96	PAD	<20	<51
64	PAD	<20	<52	97	PAD	<20	<51
[illegible]	PAD	<20	<51	98	PAD	<20	<51
66	PAD	<20	<51	99	PAD	<20	<52
67	PAD	<20	<51	100	PAD	<20	<52
68	PAD	<20	<52				
69	PAD	<20	<52				
70	PAD	<20	<52				
71	PAD	<20	<51				
72	PAD	<20	<51				
73	PAD	<20	<51				
74	PAD	<20	<52				
75	PAD	<20	<52				
76	PAD	<20	<52				
77	PAD	<20	<51				
78	PAD	<20	<51				
79	PAD	<20	<51				
80	PAD	<20	<52				
81	PAD	<20	<52				
[illegible]	PAD	<20	<51				
83	PAD	<20	<51				
84	PAD	<20	<51				
85	PAD	<20	<52				
86	PAD	<20	<52				
87	PAD						

COPY

N A

Appendix C

Supplemental HRR Information Regarding the Area Surrounding the Former Building 980 Slab

Appendix D

Correspondences Summarizing Staining on the Former Building 980 Slab

Salomon, Hopi

From Salomon, Hopi
Sent Monday, August 16, 1999 7 11 AM
To Dorr, Kent
Cc Broussard, Marcella, Zbryk, Kathy
Subject FW Cement Pad For Building 980

Kent, I had an excellent walkdown with Kathy on Friday Based on Kathy's notes and the information contained in the RLCR and Closeout report for 980, I believe that we can note that staining on the pad can be attributable to non-hazardous sources Also, the painted surfaces on the pad, though essentially unsampled are already ASSUMED to contain lead (Table 3-1 of B980 Closeout Report) With this information, I proposed that I focus the assessment on the surrounding soils, exclusively Do you concur?

-----Original Message-----
From Zbryk, Kathy
Sent Friday August 13, 1999 2 30 PM
To Salomon, Hopi
Cc Hickman, Mark
Subject Cement Pad For Building 980

As a member of the demolition team for the 980 Project, I was responsible for characterization activities for most of the 980 Demolition Project Prior to demolition of the facility, a walkdown was performed and no evidence of significant staining was observed Small oil stains were observed where the solar pond guzzler truck was stored on the east side of the building Other small stains were observed on the northwest side of the building where some small equipment, such as lathes and compressors were stored by PU&D These stains were thought to be non-hazardous (light weight oils and motor oil) in nature

With respect to the walkdown that you and I performed today, the larger stains that were observed on the southwest and southeast areas of the building pad were not present during the pre-demolition walkdown of the facility Therefore, I can only conclude that these stains were created either during the demolition process or thereafter It does appear that the pad has been used for the storage of other vehicles subsequent to demolition (tire tracks are evident throughout the length of the pad)

Please contact me if you have and additional questions

Kathy Z

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Salomon, Hopi

From Salomon, Hopi
Sent Thursday, August 12, 1999 4 16 PM
To Barroso, Jeff, Wier, David
Cc Whiting, John, Mathis, Brian, Stevens, Jeffrey, Broussard, Marcella, Henderson, Brian, Dorr, Kent
Subject RE 980 Cluster

My concern about the paint is not a waste issue I believe that the Environmental Waste Compliance Guidance No 27 (Lead based paint and debris disposal) notes that such things are not to be considered a hazardous waste (an excellent guidance document) However, my concern was for health and safety/hygiene issues (e g , any concern about driving trucks over this peeling old paint?) The RLCR and Closeout Report for the Building 980 Cluster projects notes that the paint is assumed to be lead based There is light and dark battleship gray, Tan, some yellow and red paint on the floor Kathy, are you still satisfied that the paint is Tenneco epoxy and free of lead? If so, I will not sample Can you also fax me the PCB data with some kind of indication as to which color it represents? Finally, the RLCR noted that in process sampling of stained areas was to be done during in-process work if signs of historic chemical spills were identified Does anybody know if this was ever done? I can't find any other reference to it

Finally, there is one IHSS (IHSS-175) on the south side of Building 980 that still has got some environmental concern There may be some low concentration chemical contamination from oil or solvent leaks It was sampled in 1988 but I could not locate the data The area was again sampled in 1993 but it really looks like they sampled the surface soil above the IHSS after clean soil had been brought in and regraded (sometime before 1992) What I am getting to is that there is an IHSS there and, If contaminants exist, they are surely below grade However, future work on that IHSS cannot be ruled out I am not planning on sampling this as part of this investigation, but will identify its location on the site map that is being developed, in case barriers are required so that future access remains

Sorry for the long winded message - Hopi

-----Original Message-----
From Barroso, Jeff
Sent Thursday, August 12, 1999 2 44 PM
To Salomon, Hopi, Wier, David
Cc Whiting John Mathis, Brian Stevens, Jeffrey
Subject FW 980 Cluster

Hopi,

The following information should eliminate the need to pull paint samples

-----Original Message-----
From **Zbryk, Kathy**
Sent Thursday, August 12, 1999 11 10 AM
To Barroso, Jeff
Cc Hickman, Mark, Dieter, Thomas
Subject RE 980 Cluster

The paint is Tenneco epoxy that we have used across Site as secondary containment for RCRA units It is non-RCRA, non-haz but even if it was RCRA there would not be enough to make the final waste form on top of the pad RCRA I have PCB data on the pad

Kathy Zbryk

-----Original Message-----
From Barroso Jeff
Sent Wednesday August 11 1999 4 46 PM
To Zbryk, Kathy Henderson Brian
Cc Salomon Hopi
Subject 980 Cluster

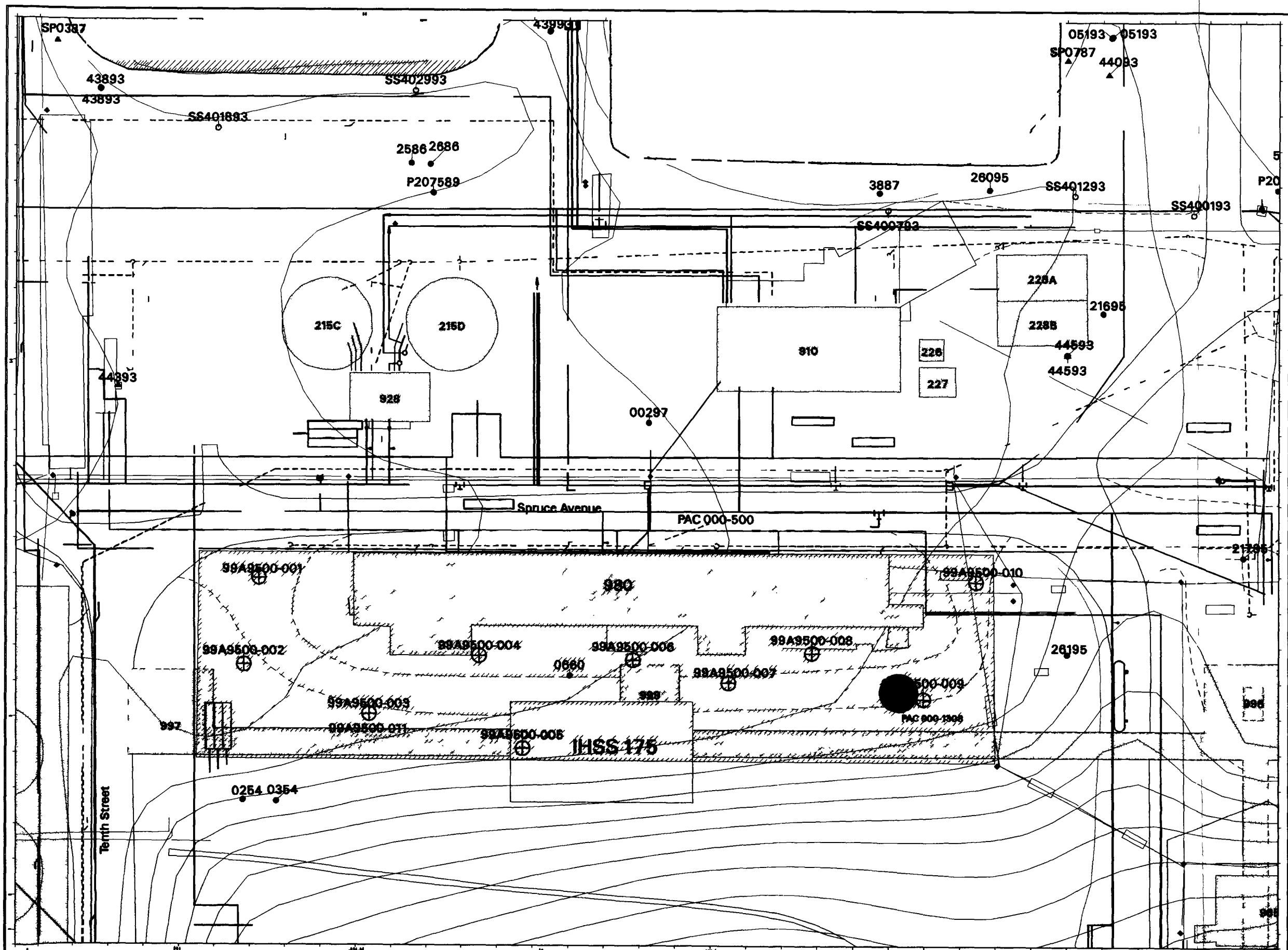
Kathy/Brian,

63

K-H is looking at dumping the released B779 rubble on top of the old 980 pad, but they don't want to potentially cross contaminate it with radiological or hazardous materials As you know, we released it from radiological controls, do either of you still have characterization data from the paint still on top of the pad in several areas? your information might save us from having to perform analysis on the paint

Thanks, Jeff

64/64



Building 900 Proposed Concrete Staging Area Surveyed Sample Locations
Figure 1 1

EXPLANATION

- Domestic Water Lines
- Process Waste Lines
- Sewer Lines
- Natural Gas / Steam Lines
- Telephone Lines
- 2 Foot Contours
- Manhole Covers
- Borehole Locations
- Groundwater Well Locations
- Power Pole Locations
- Surface Soil Locations
- Power Lines
- Valve Vaults
- Proposed Concrete Staging Area (1.20 Acres)
- IHSS 175
- Potential Area of Concern
- Surveyed Sample Locations

Standard Map Features

- Buildings and other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or othe drainage features
- Fences and other barriers
- Paved roads
- Dirt roads

Scale 870
Inch represents approximately 58 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U S. Department f Energy
Rocky Flats Environmental Technology Site

Prepared by
RMRS Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P. O. Box 464
Golden, CO 80402-0464

MAP ID: 00-0007

September 6, 2000

NT @ w/p | te/hy00/00-0007/b000 p p ml