300502-0610300001

CH2M HILL Mound, Inc.
1075 Mound Road
P.O. Box 750
Miamisburg, OH 45343-0750

CH2MHILL

SMO-435/06
July 19, 2006

Mr. Don Pfister, Director
Miamisburg Closure Project
U. S. Department of Energy
175 Tri-County Parkway
Springdale, OH 45246

ATTENTION: Paul Lucas

SUBJECT: **Contract No. DE-AC24-03OH20152:** Deliverable #39 Potential release site and removal action documentation; Section C.2.3.1.3 Remaining Response Actions; PRS 70 OSC Report, Final

Dear Mr. Pfister:

Attached is the following Final document for your records.

- PRS 70 OSC Report, Final

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact Dave Rakel at 937-865-4203.

Sincerely,

Michael D. Ebben
Site Manager

ME/jg

Enclosures

cc: T. Fischer, USEPA, (1) w/attachments
B. Nickel, OEPA, (1) w/attachments
S.Helmer, ODH, (1) w/attachments
J. Crombie, ODH, (1) w/attachments
M. Wojciechowski, Tetra Tech, (1) w/attach
G. Gorsuch, DOE/MCP, (1) w/attachments
R. Tormey, DOE/OH, (1) w/attachments
G. Desai, DOE/HQ, (1) w/attachments
C. Kline, CH2M Hill, (1) w/attachments
Public Reading Room (1) w/attachments
Admin Records, CH2M Hill, (2) w/attachs
ER Records, CH2M Hill, (1) w/attachs
DCC (1) w/attachments
M. Ebben, CH2M Hill, w/o attachments
K. Armstrong, CH2M Hill, w/o attachments
D. Rakel, CH2M Hill, w/o attachments
D. Kramer, CH2M Hill, w/o attachments
J. Fontaine, CH2M Hill, w/o attachments
S. Barr, CH2M Hill, w/o attachments
M. McDougal, CH2M Hill, w/o attachments
file, CH2M Hill, w/o attachments

PRS 70

Removal Action

OSC REPORT

July 2006

Final

Department of Energy
Miamisburg Closure Project

CH2MHILL

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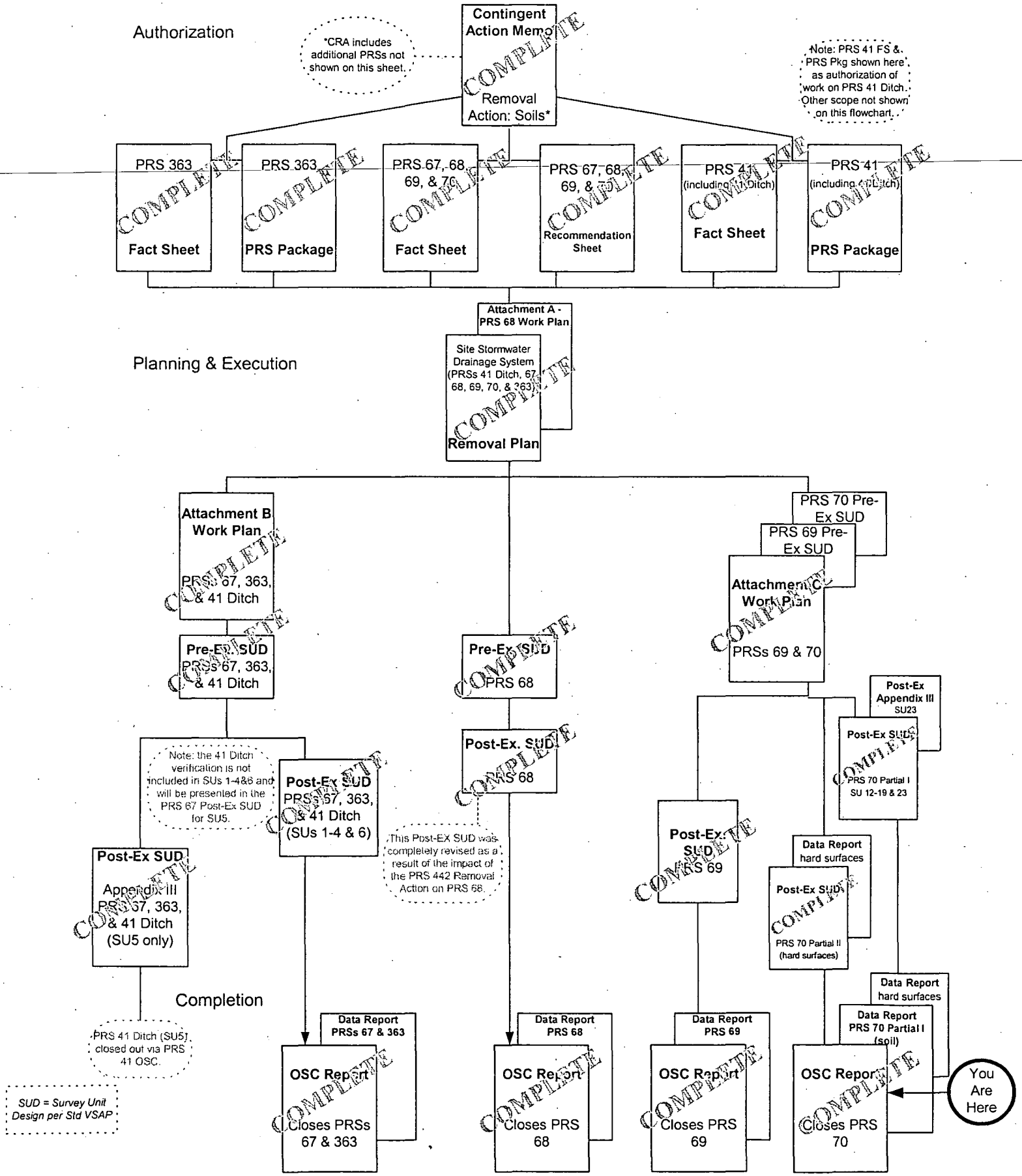
PRSs 67, 68, 69, 70, 363, & 41 Ditch



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Attachment A	Data Report : PRS 70 Soil (SUs 12-19 & 23)
Attachment B	Data Report : PRS 70 Hard Surfaces (SUs 1-11 & 20-22)
Attachment C	General Media Information
Attachment D	Public Fact Sheet

Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	cleanup objective
COC	contaminant of concern
cy	cubic yards
DOE	Department of Energy
Ex	Excavation
HS	hot spot
MCP	Miamisburg Closure Project
OEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
pCi/g	picoCuries per gram
PRP	Potentially Responsible Parties
PRS	Potential Release Site
RA	Removal Action
RBGV	Risk-Based Guideline Value
SUD	Survey Unit Design
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
VSAP	Verification Sampling and Analysis Plan

RECOMMENDATION: PRS 70

The Potential Release Site (PRS) 70 Removal Action (RA) was authorized via the Contingent Action Memo, (Action Memorandum EE/CA, Contingent Removal Action for Contaminated Soil, Final, June 2002) and Public Fact Sheet (PRSs 67, 68, 69, & 70: Site Stormwater Drainage System, Final, March 2005). The PRS 70 RA was performed as a result of historical knowledge and processes, and radiological surveys which showed elevated levels of Ac-227, Pu-238, Ra-226, and U-238.

Verification sampling was performed per the associated Action Memo, the Standard VSAP, Soils Verification Sampling & Analysis Plan [VSAP], Final, August 2004, and the Post-Excavation SUDs to demonstrate that the remaining soil meets the cleanup criteria. This removal action was successfully completed and resulted in the excavation and disposal of approximately 3,974 cubic yards of soil/debris (for disposal at Envirocare).

The soil cleanup criteria established in the Standard VSAP are satisfied if all verification sample results are below cleanup objectives (COs) or all sample results are below hot spot (HS) criteria and the 95% UCL (upper confidence limit) for the area of interest is less than the CO and the data set passes the Sign test.

The hard surfaces cleanup criteria established in the Standard VSAP are satisfied if all results meet the most stringent of the surface free release criteria (average of results less than 100 disintegrations per minute (dpm) per 100cm^2 and maximum result not greater than 300 dpm/100 cm^2). The hard surfaces cleanup criteria also require that if any results are greater than the CO (100 dpm/100 cm^2), the 95% UCL for the area of interest is less than the CO and the data set passes the Sign test.

Verification sampling documents that the soil and hard surfaces cleanup criteria were met.

After a thorough review of this On-Scene Coordinator (OSC) Report, the Core Team agrees that the RA associated with PRS 70 is complete, and that all previously existing environmental issues associated with it have been resolved.

Paul 7/6/06

Paul Lucas, OSC
U.S. Department of Energy
Springdale, Ohio

7/6/06

Timothy J. Fischer, Remedial Project Manager
USEPA
Chicago, Illinois

7/5/06

Brian Nickel, Project Manager
OEPA
Dayton, Ohio

1.0 SUMMARY OF EVENTS

This section describes the site background and events leading up to the removal action (RA), parties involved in responding to the RA, cleanup objective (CO) determination, chronological narrative of the RA, and resources committed to complete the projects.

1.1 Site Conditions and Background

Background. Potential Release Site (PRS) 70 includes the retention and weir basins and the concrete drainage feature known as the "Missouri Crossing", all located at the end of the site stormwater drainage ditch.

Removal Action. The PRS 70 RA was authorized via the Contingent Action Memorandum, Final, June 2002 and Public Fact Sheet (PRSs 67, 68, 69, & 70: Site Stormwater Drainage System, Final, March 2005). The level of soil and possible surface radiological contamination present warranted a RA under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act). The location of PRS 70 is shown on Figure 1 of Appendix A (page A7/89).

Verification sampling and analysis were performed in accordance with the Standard VSAP, Soils Verification Sampling & Analysis Plan [VSAP], Final, August 2004; and the Post-Excavation (Ex) Survey Unit Designs (SUDs). Excerpts of the SUDs are included in Attachments A and B to this On-Scene Coordinator (OSC) Report. Verification sampling was performed and the results demonstrate that the remaining soil and hard surfaces meet the cleanup criteria.

Since the Department of Energy (DOE) is the sole responsible party for verification of PRS 70, no Potentially Responsible Parties (PRPs) were sought to clean up the site. Monsanto Research Corporation, EG&G Mound Applied Technologies, and BWXT of Ohio, Inc were the operating contractors at the site from 1948 to 30 September 1988, from 1 October 1988 until 30 September 1997, and from 1 October 1997 until 31 December 2002 respectively. CH2M Hill Mound, Inc. became the site contractor for the Miamisburg Closure Project (MCP) effective January 1, 2003.

1.2 Organization of the Removal Actions

Table 1 lists the parties responding to the removal actions, and their responsibilities.

Table 1: Organization of the Removal Action

US Environmental Protection Agency (USEPA) SFR-5J 77 W. Jackson Street Chicago, IL 60604 312-353-2000	Timothy J. Fischer	Federal agency responsible for oversight
Ohio Environmental Protection Agency (OEPA) 401 E. Fifth Street Dayton, OH 45402-2911 937-285-6357	Brian K. Nickel	State agency responsible for oversight
US Dept. of Energy Miamisburg Closure Project 175 Tri-County Parkway Springdale, OH 45246 513-246-0071	Paul Lucas	On-Scene Coordinator responsible for oversight and success
CH2M HILL Environmental Restoration Project 1075 Mound Road Miamisburg, OH 45343-3030 937-608-8220	Jim Fontaine	Provide OSC with technical assistance, administrative support, field oversight, sample management, site safety, photo, site documentation, and preparation of the OSC Report

1.3 Objectives

Documentation Objective. The objectives of this OSC Report are to describe the RA fieldwork and document successful completion of the project. Material quantities, disposition locations, and project costs are included in Tables 2 and 3. They include those for the Building 34 footprint RA as well.

Table 2: Materials and Disposition

Type of Material	Quantity (cy)	Disposal Method	Disposal Location
Contaminated soil/debris	3,974	Rail transport	Envirocare of Utah

Table 3: Removal Cost

Cost Category	Cost
Planning/Fieldwork/ Restoration/grading/seeding	309,386
Subcontractors (Verification Sampling, Analyses, & Data Validation)	
Closure Documentation	
Transportation/Disposal of Contaminated Soil	$457,010
Estimated Total Project Cost	766,396

Cleanup Objective. Contaminants of concern (COCs) and COs for PRS 70 are identified in Table 4. COCs associated with individual areas are identified on page A23/89.

Table 4: Soil Cleanup Objectives (pCi/g)

COC	Cleanup Objective	Hot Spot
Actinium-227+D	4.6	13.61
Plutonium-238	55	165
Uranium-238+D	2.2	4.2
Radium-226+D	2.9	4.7

+D: indicates that daughter product activity is included in the CO.

Hard Surfaces Cleanup Objective (dpm/100cm^2)

Pu-238	average < 100 & maximum < 300

All final soil and hard surface verification results were below their respective COs as identified in the following Data Reports:

PRS 70 Soil (SUs 12-19 & 23) Data Report, Rev. 0, July 2006 (Attachment A to this OSC Report). Soil verification results are presented in Table 1 (page A11/89). Soil verification sampling confirmed all results are below cleanup objectives, except Bi-214. The Bi-214 10^{-5} Risk-Based Guideline Value (RBGV) based on the most conservative of Construction Worker and Site Employee scenarios is 1.17 pCi/g and is not inclusive of background or daughter product activity. Three results of Bi-214 were 1.19, 1.21 and 1.31 pCi/g, exceeding the RBGV of 1.17 pCi/g. Bi-214 is a daughter product in equilibrium with its parent U-238. The CO for U-238 accounts for daughter product activity; therefore, these results are not considered significant and are not evaluated further.

PRS 70 Hard Surfaces (SUs 1-11 & 20-22) Data Report, Revision 0, May 2006 (Attachment B to this OSC Report). Hard surface verification results are summarized in Attachment B. Surface verification sampling confirmed all results are below cleanup objectives.

Hot Spot Criteria. The Hot Spot criteria for the COCs are presented in Table 4 above. There were no sample results that exceeded the hot spot criteria for any analyte.

Cleanup Criteria. The soil cleanup criteria are satisfied if all verification sample results are below CO or all sample results are below hot spot (HS) criteria and the 95% UCL (upper confidence limit) for the area of interest is less than the CO and the data set passes the Sign test.

Hard surfaces are evaluated by direct and swipe measurement results. The hard surfaces cleanup criteria established in the Standard VSAP are satisfied if all results meet the most stringent of the surface free release criteria (average of results less than 100 disintegrations per minute (dpm) per 100cm^2 and maximum result not greater than 300 dpm/100 cm^2) presented in the Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, Final, Rev. 0, February 1999 (Attachment A, Table 1). The hard surfaces cleanup criteria also require that if any

results are greater than the CO (100 dpm/100 cm^2), the 95% UCL for the area of interest is less than the CO and the data set passes the Sign test.

Soil and hard surface verification confirmed all remaining surfaces meet the cleanup criteria.

1.4 Chronological Narrative of the Removal Action

Table 5 presents a chronological narrative of events surrounding the RA.

Table 5: Chronology of RA

Timeframe	Activity
June 2002	Contingent AM finalized
March 2005	PRS 70 Fact Sheet approved
August 2005	PRS 69/70 Work Plan approved
September 2005 -March 2006	RA fieldwork and excavation
September 2005 - April 2006	Verification sampling & analysis
June 2006	OSC Report prepared

2.0 EFFECTIVENESS OF THE REMOVAL ACTIONS

The PRS 70 removal action is complete, and the objectives of the Action Memorandum have been met. The limits of verification are identified on Figures 2 and 3 (see pages A8&9/89) and Figure 1 (page B7/75). Results of verification sampling and analysis are provided in Attachments A and B.

2.1 Actions Taken by Mound Personnel

CH2M Hill Mound, Inc. personnel planned and performed removal action oversight, and performed excavation, monitoring, sampling and analyses, and documentation. The project met the removal action objectives (Section 1.3), as outlined in the Action Memorandum.

2.2 Actions Taken by Local, State, and Federal Agencies

The DOE/MCP was the lead agency for the RA and provided the funding. DOE, USEPA, and OEPA had oversight responsibility for the RA and review of the Action Memorandum and OSC Report to ensure that the objectives were met.

2.3 Actions Taken by Subcontractors

Subcontractors involved in the project included:

- Envirocare (Clive, Utah) - disposal of radiologically contaminated waste via rail transport.
- Severn Trent Laboratory (St. Louis, MO) – analyzed verification samples.
- SAIC (Dublin, OH) – sample collection, data management, and validation.
- Piqua Concrete (West Milton, OH) – provided concrete for sediment stabilization prior to excavation.
- SK Construction (Middletown, OH) – provided concrete for restoration.

3.0 DIFFICULTIES ENCOUNTERED

3.1 Items that Affect the Removal Actions

No difficulties were encountered during the removal actions.

3.2 Issues of Intergovernmental Coordination

All DOE/OEPA/USEPA interactions were good. The agencies were updated informally on a regular basis, and formally at monthly Core Team meetings. The Mound 2000 Process worked well.

4.0 RECOMMENDATIONS

4.1 Means to Prevent a Recurrence

Soil sampling verified removal of radiological contamination. Mound Removal Actions have regulator approved work plans, each of which has a section that addresses runon/runoff controls. In addition, the site Storm Water Pollution Prevention Plan applies to the entire site and is monitored by the Environmental Compliance and Analytical Services group. As a result of the removal of contamination and the implementation of runon/runoff protection, spread of contamination is prevented. After the removal action and the CERCLA process for the parcel are complete, the area will be transferred from Federal to private ownership. All State and Federal disposal rules will apply.

ATTACHMENT A

DATA REPORT

PRS 70 SOIL (SUs 12-19 & 23)

DATA REPORT

PRS 70 Soil (SUs 12-19 & 23)

July 2006

Rev. 0

Department of Energy

Miamisburg Closure Project

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Figure 2: SU19 Verification Locations
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Appendix B Tables
Appendix C Post-Ex SUD Excerpt
Appendix D Backfill Packages
Appendix E Walkover Documentation
Appendix F Review and Validation Report

A 2/89

Acronyms

Ex	Excavation
pCi/g	picoCuries per gram
PRS	Potential Release Site
QC	quality control
RA	removal action
R&V	review and validation
SU	Survey Unit
SUD	Survey Unit Design
VSAP	Verification Sampling and Analysis Plan

A3/89

1.0 PURPOSE

This Data Report provides documentation of sampling activities conducted in accordance with the Standard VSAP, Soils Verification Sampling & Analysis Plan [VSAP], Final, August 2004 and the Post-Excavation (Ex) Survey Unit Design (SUD); required to close out the soil associated with the Potential Release Site (PRS) 70 Removal Action (RA). The location of the PRS 70 area is shown on Figure 1. Verification locations are shown on Figures 2 and 3.

The purposes of this Data Report are to:

- document any variances to the VSAP/Post-Ex SUD,
- present statistical and bias data (separately),
- present summary statistics and statistical analyses of the applicable data, including retrospective power curve, and
- provide documentation of data review and validation.

2.0 DOCUMENT ORGANIZATION / SUMMARY

This Data Report is for soil surfaces associated with PRS 70 and includes Survey Units (SUs) 12-19 and 23. A separate Data Report was prepared (and is incorporated herein by reference) to document hard surfaces of SUs 1-11 and 20-22 associated with PRS 70 [PRS 70 Hard Surfaces (SUs 1-11 & 20-22) Data Report, Revision 0, May 2006].

Unless otherwise specified as a variance, sampling and analyses were conducted in accordance with the VSAP and Post-Ex SUD.

3.0 FIELD ACTIVITIES

SUs 12-18 are concrete walls located within SU19 that were removed and therefore no verification data are presented. Verification sampling locations for SUs 19 and 23 are shown on Figures 2 and 3 and verification sampling occurred from February to April 2006. The samples were field-screened by a radiological control technician at the site and screened by the Mound Soil Screening Laboratory prior to shipment to the contract laboratory. Samples were submitted to Severn Trent St. Louis lab for gamma spec and isotopic uranium and plutonium analyses. Results are reported in Table 1. Since no backfill was required for SUs 12-18, a Backfill Information Package was not prepared.

The Backfill Packages for SUs 19 and 23 are included in Appendix D. Walkover survey documentation is provided in Appendix E.

4.0 DATA REVIEW / VALIDATION

All data were reviewed and 10% of offsite data were validated.

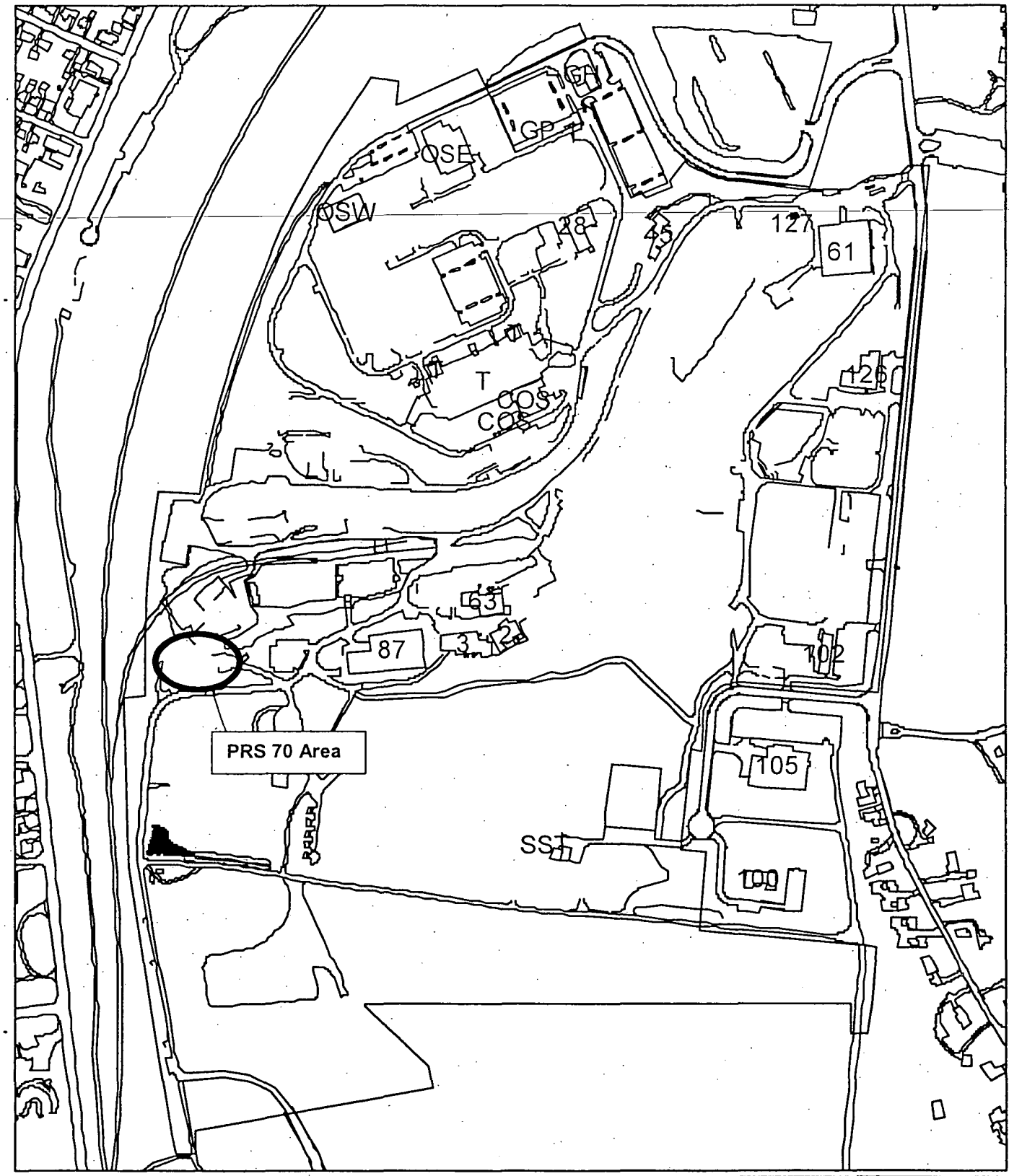
Field and laboratory QC (quality control) were assessed as part of the data review and validation (R&V) process.

Documentation of review and validation (and related variances) is provided in Appendix F. Review and validation supports that the data are usable.

APPENDIX A

FIGURES

A6/89



Scale in feet

0 200400 600 8001000

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Figure 1:
Location of PRS 70 Area

A7/89

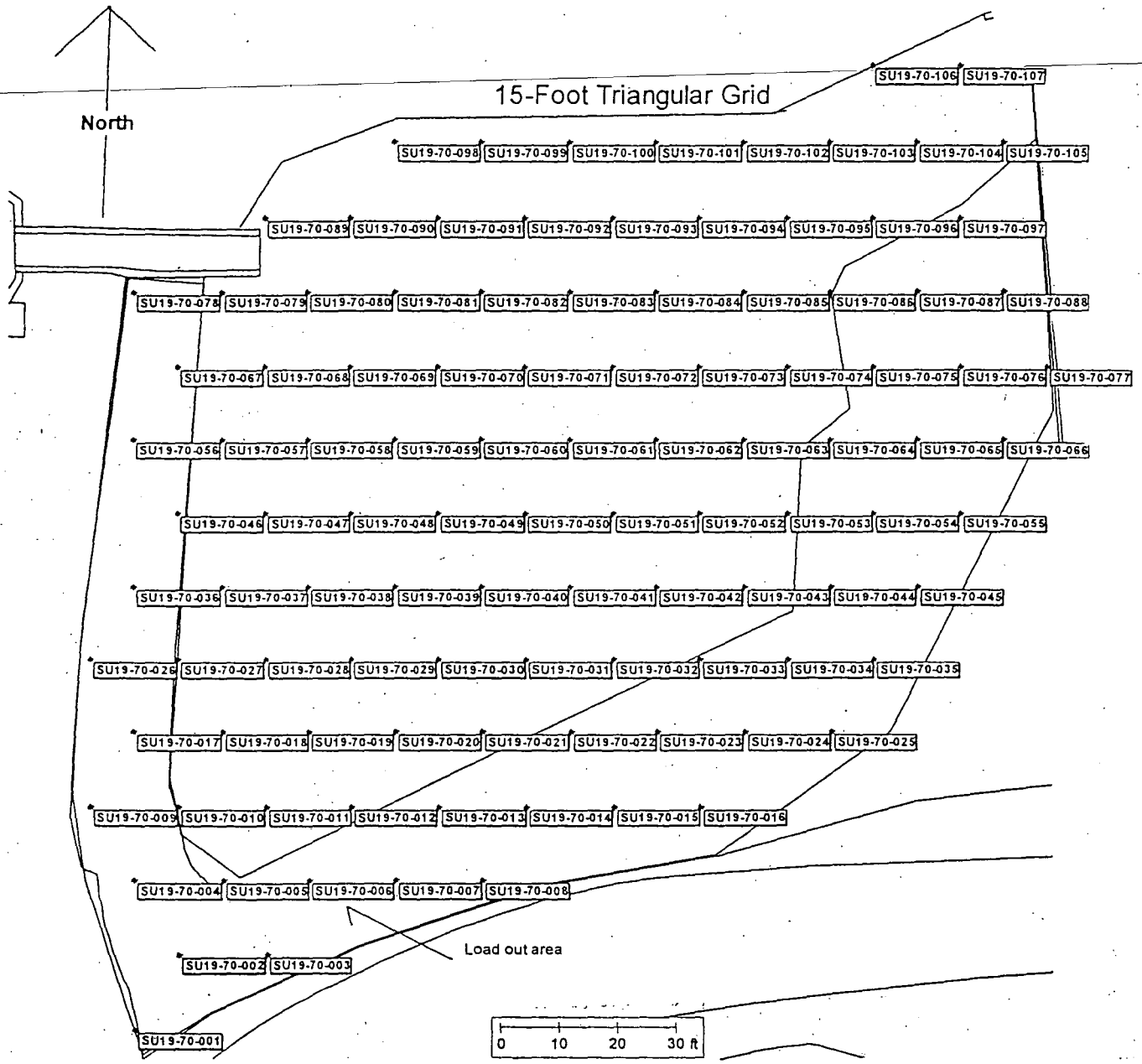
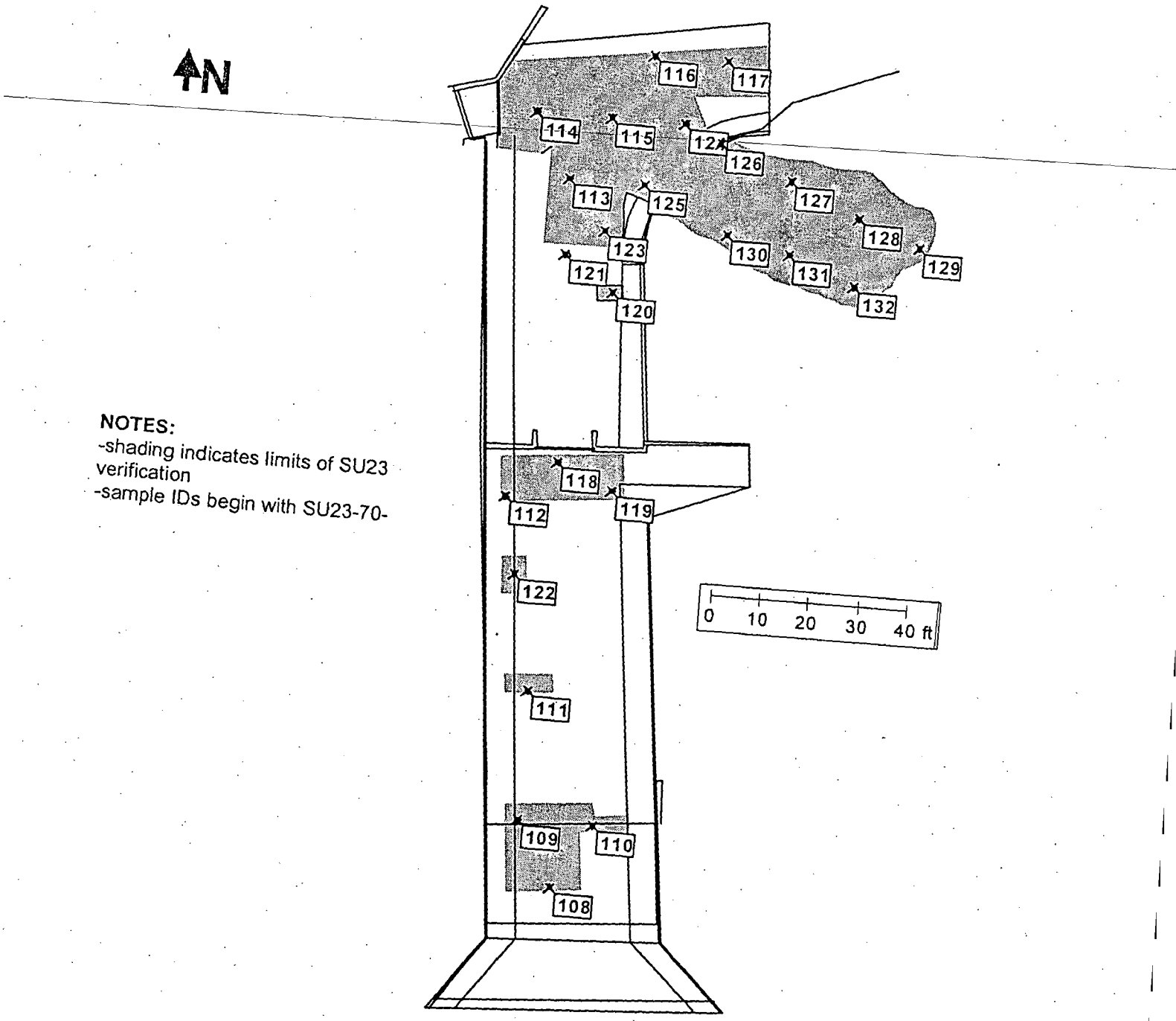


Figure 2: SU19 Verification Locations

A8/89



NOTES:
-shading indicates limits of SU23 verification
-sample IDs begin with SU23-70-

Figure 3: SU23 Verification Locations

A9/B9

APPENDIX B

TABLES

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU19-70-001	Plutonium-238	55	0.580	0.030	02/14/2006			1463988.111	597587.940
SU19-70-001	Plutonium-239/240	62	0.028	0.028	02/14/2006	U	UJ	1463988.111	597587.940
SU19-70-002	Plutonium-238	55	1.390	0.040	02/14/2006			1463995.611	597600.931
SU19-70-002	Plutonium-239/240	62	0.025	0.025	02/14/2006	U	UJ	1463995.611	597600.931
SU19-70-003	Plutonium-238	55	0.870	0.040	02/15/2006			1464010.611	597600.931
SU19-70-003	Plutonium-239/240	62	0.021	0.021	02/15/2006	U	UJ	1464010.611	597600.931
SU19-70-004	Plutonium-238	55	2.100	0.040	02/14/2006			1463988.111	597613.921
SU19-70-004	Plutonium-239/240	62	0.026	0.026	02/14/2006	U	UJ	1463988.111	597613.921
SU19-70-005	Plutonium-238	55	1.970	0.050	02/14/2006			1464003.111	597613.921
SU19-70-005	Plutonium-239/240	62	0.045	0.045	02/14/2006	U	UJ	1464003.111	597613.921
SU19-70-006	Plutonium-238	55	1.560	0.040	02/14/2006			1464018.111	597613.921
SU19-70-006	Plutonium-239/240	62	0.037	0.037	02/14/2006	U	UJ	1464018.111	597613.921
SU19-70-007	Plutonium-238	55	0.060	0.060	02/14/2006	U	U	1464033.111	597613.921
SU19-70-007	Plutonium-239/240	62	0.045	0.045	02/14/2006	U	UJ	1464033.111	597613.921
SU19-70-008	Plutonium-238	55	0.460	0.030	02/14/2006			1464048.111	597613.921
SU19-70-008	Plutonium-239/240	62	0.029	0.029	02/14/2006	U	UJ	1464048.111	597613.921
SU19-70-009	Plutonium-238	55	0.720	0.050	02/14/2006			1463980.611	597626.911
SU19-70-009	Plutonium-239/240	62	0.032	0.032	02/14/2006	U	UJ	1463980.611	597626.911
SU19-70-010	Plutonium-238	55	1.380	0.050	02/14/2006			1463995.611	597626.911
SU19-70-010	Plutonium-239/240	62	0.030	0.013	02/14/2006	J	J	1463995.611	597626.911
SU19-70-011	Plutonium-238	55	2.030	0.010	02/15/2006			1464010.611	597626.911
SU19-70-011	Plutonium-239/240	62	0.022	0.022	02/15/2006	U	UJ	1464010.611	597626.911
SU19-70-012	Plutonium-238	55	0.790	0.030	02/15/2006			1464025.611	597626.911
SU19-70-012	Plutonium-239/240	62	0.024	0.024	02/15/2006	U	UJ	1464025.611	597626.911
SU19-70-013	Plutonium-238	55	0.540	0.050	02/15/2006			1464040.611	597626.911
SU19-70-013	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464040.611	597626.911
SU19-70-014	Plutonium-238	55	0.156	0.051	02/14/2006			1464055.611	597626.911
SU19-70-014	Plutonium-239/240	62	0.033	0.033	02/14/2006	U	UJ	1464055.611	597626.911
SU19-70-015	Plutonium-238	55	1.170	0.050	02/14/2006			1464070.611	597626.911
SU19-70-015	Plutonium-239/240	62	0.029	0.029	02/14/2006	U	UJ	1464070.611	597626.911
SU19-70-016	Plutonium-238	55	0.920	0.040	02/15/2006			1464085.611	597626.911
SU19-70-016	Plutonium-239/240	62	0.021	0.014	02/15/2006	J	J	1464085.611	597626.911
SU19-70-017	Plutonium-238	55	3.820	0.040	02/14/2006			1463988.111	597639.902
SU19-70-017	Plutonium-239/240	62	0.028	0.028	02/14/2006	U	UJ	1463988.111	597639.902
SU19-70-018	Plutonium-238	55	7.140	0.050	02/15/2006			1464003.111	597639.902
SU19-70-018	Plutonium-239/240	62	0.040	0.040	02/15/2006	U	U	1464003.111	597639.902
SU19-70-019	Plutonium-238	55	4.660	0.040	02/15/2006			1464018.111	597639.902
SU19-70-019	Plutonium-239/240	62	0.026	0.014	02/15/2006	J	J	1464018.111	597639.902
SU19-70-020	Plutonium-238	55	0.590	0.040	02/15/2006			1464033.111	597639.902
SU19-70-020	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464033.111	597639.902
SU19-70-021	Plutonium-238	55	1.880	0.030	02/15/2006			1464048.111	597639.902
SU19-70-021	Plutonium-239/240	62	0.025	0.025	02/15/2006	U	UJ	1464048.111	597639.902
SU19-70-022	Plutonium-238	55	3.140	0.040	02/14/2006			1464063.111	597639.902
SU19-70-022	Plutonium-239/240	62	0.028	0.025	02/14/2006	J	J	1464063.111	597639.902
SU19-70-023	Plutonium-238	55	1.030	0.050	02/14/2006			1464078.111	597639.902
SU19-70-023	Plutonium-239/240	62	0.022	0.022	02/14/2006	U	UJ	1464078.111	597639.902
SU19-70-024	Plutonium-238	55	0.320	0.040	02/14/2006			1464093.111	597639.902
SU19-70-024	Plutonium-239/240	62	0.030	0.030	02/14/2006	U	UJ	1464093.111	597639.902
SU19-70-025	Plutonium-238	55	2.290	0.050	02/14/2006			1464108.111	597639.902
SU19-70-025	Plutonium-239/240	62	0.041	0.041	02/14/2006	U	UJ	1464108.111	597639.902
SU19-70-026	Plutonium-238	55	1.900	0.040	02/14/2006			1463980.611	597652.892
SU19-70-026	Plutonium-239/240	62	0.035	0.035	02/14/2006	U	UJ	1463980.611	597652.892
SU19-70-027	Plutonium-238	55	1.120	0.050	02/14/2006			1463995.611	597652.892
SU19-70-027	Plutonium-239/240	62	0.038	0.038	02/14/2006	U	UJ	1463995.611	597652.892
SU19-70-028	Plutonium-238	55	0.252	0.032	02/15/2006			1464010.611	597652.892
SU19-70-028	Plutonium-239/240	62	0.032	0.032	02/15/2006	U	UJ	1464010.611	597652.892
SU19-70-029	Plutonium-238	55	0.720	0.040	02/15/2006			1464025.611	597652.892
SU19-70-029	Plutonium-239/240	62	0.027	0.027	02/15/2006	U	UJ	1464025.611	597652.892
SU19-70-030	Plutonium-238	55	2.860	0.050	02/15/2006			1464040.611	597652.892

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU19-70-030	Plutonium-239/240	62	0.014	0.014	02/15/2006	U	UJ	1464040.611	597652.892
SU19-70-031	Plutonium-238	55	2.020	0.010	02/14/2006			1464055.611	597652.892
SU19-70-031	Plutonium-239/240	62	0.021	0.021	02/14/2006	U	UJ	1464055.611	597652.892
SU19-70-031D	Plutonium-238	55	2.900	0.050	02/14/2006			1464055.611	597652.892
SU19-70-031D	Plutonium-239/240	62	0.030	0.030	02/14/2006	U	UJ	1464055.611	597652.892
SU19-70-032	Plutonium-238	55	0.030	0.028	02/14/2006	J	J	1464070.611	597652.892
SU19-70-032	Plutonium-239/240	62	0.023	0.023	02/14/2006	U	UJ	1464070.611	597652.892
SU19-70-033	Plutonium-238	55	0.146	0.039	02/15/2006			1464085.611	597652.892
SU19-70-033	Plutonium-239/240	62	0.025	0.025	02/15/2006	U	UJ	1464085.611	597652.892
SU19-70-033D	Plutonium-238	55	0.115	0.044	02/15/2006			1464085.611	597652.892
SU19-70-033D	Plutonium-239/240	62	0.028	0.028	02/15/2006	U	UJ	1464085.611	597652.892
SU19-70-034	Plutonium-238	55	1.350	0.040	02/14/2006			1464100.611	597652.892
SU19-70-034	Plutonium-239/240	62	0.027	0.027	02/14/2006	U	UJ	1464100.611	597652.892
SU19-70-035	Plutonium-238	55	1.000	0.050	02/15/2006			1464115.611	597652.892
SU19-70-035	Plutonium-239/240	62	0.028	0.028	02/15/2006	U	UJ	1464115.611	597652.892
SU19-70-036	Plutonium-238	55	1.100	0.040	02/14/2006			1463988.111	597665.883
SU19-70-036	Plutonium-239/240	62	0.014	0.014	02/14/2006	U	UJ	1463988.111	597665.883
SU19-70-037	Plutonium-238	55	16.800	0.040	02/15/2006			1464003.111	597665.883
SU19-70-037	Plutonium-239/240	62	0.092	0.025	02/15/2006	J		1464003.111	597665.883
SU19-70-038	Plutonium-238	55	3.900	0.030	02/15/2006			1464018.111	597665.883
SU19-70-038	Plutonium-239/240	62	0.049	0.013	02/15/2006	J	J	1464018.111	597665.883
SU19-70-039	Plutonium-238	55	1.560	0.040	02/15/2006			1464033.111	597665.883
SU19-70-039	Plutonium-239/240	62	0.014	0.014	02/15/2006	U	UJ	1464033.111	597665.883
SU19-70-040	Plutonium-238	55	3.320	0.050	02/15/2006			1464048.111	597665.883
SU19-70-040	Plutonium-239/240	62	0.034	0.034	02/15/2006	U	UJ	1464048.111	597665.883
SU19-70-041	Plutonium-238	55	0.321	0.033	02/15/2006			1464063.111	597665.883
SU19-70-041	Plutonium-239/240	62	0.026	0.026	02/15/2006	U	UJ	1464063.111	597665.883
SU19-70-042	Plutonium-238	55	1.680	0.050	02/15/2006			1464078.111	597665.883
SU19-70-042	Plutonium-239/240	62	0.027	0.027	02/15/2006	U	UJ	1464078.111	597665.883
SU19-70-043	Plutonium-238	55	2.210	0.040	02/15/2006			1464093.111	597665.883
SU19-70-043	Plutonium-239/240	62	0.021	0.021	02/15/2006	U	UJ	1464093.111	597665.883
SU19-70-044	Plutonium-238	55	1.940	0.040	02/14/2006			1464108.111	597665.883
SU19-70-044	Plutonium-239/240	62	0.026	0.026	02/14/2006	U	UJ	1464108.111	597665.883
SU19-70-045	Plutonium-238	55	2.000	0.050	02/14/2006			1464123.111	597665.883
SU19-70-045	Plutonium-239/240	62	0.045	0.045	02/14/2006	U	UJ	1464123.111	597665.883
SU19-70-046	Plutonium-238	55	0.950	0.040	02/14/2006			1463995.611	597678.873
SU19-70-046	Plutonium-239/240	62	0.037	0.037	02/14/2006	U	UJ	1463995.611	597678.873
SU19-70-047	Plutonium-238	55	0.910	0.060	02/15/2006			1464010.611	597678.873
SU19-70-047	Plutonium-239/240	62	0.047	0.047	02/15/2006	U	UJ	1464010.611	597678.873
SU19-70-048	Plutonium-238	55	6.210	0.030	02/15/2006			1464025.611	597678.873
SU19-70-048	Plutonium-239/240	62	0.040	0.035	02/15/2006	J	J	1464025.611	597678.873
SU19-70-048D	Plutonium-238	55	4.800	0.050	02/15/2006			1464025.611	597678.873
SU19-70-048D	Plutonium-239/240	62	0.027	0.027	02/15/2006	U	UJ	1464025.611	597678.873
SU19-70-049	Plutonium-238	55	2.860	0.050	02/15/2006			1464040.611	597678.873
SU19-70-049	Plutonium-239/240	62	0.033	0.030	02/15/2006	J	J	1464040.611	597678.873
SU19-70-050	Plutonium-238	55	2.920	0.050	02/15/2006			1464055.611	597678.873
SU19-70-050	Plutonium-239/240	62	0.033	0.015	02/15/2006	J	J	1464055.611	597678.873
SU19-70-051	Plutonium-238	55	0.032	0.012	02/15/2006	J	J	1464070.611	597678.873
SU19-70-051	Plutonium-239/240	62	0.020	0.020	02/15/2006	U	UJ	1464070.611	597678.873
SU19-70-052	Plutonium-238	55	1.510	0.030	02/15/2006			1464085.611	597678.873
SU19-70-052	Plutonium-239/240	62	0.024	0.024	02/15/2006	U	UJ	1464085.611	597678.873
SU19-70-053	Plutonium-238	55	2.860	0.050	02/14/2006			1464100.611	597678.873
SU19-70-053	Plutonium-239/240	62	0.032	0.032	02/14/2006	U	UJ	1464100.611	597678.873
SU19-70-053D	Plutonium-238	55	3.830	0.040	02/14/2006			1464100.611	597678.873
SU19-70-053D	Plutonium-239/240	62	0.058	0.014	02/14/2006	J	J	1464100.611	597678.873
SU19-70-054	Plutonium-238	55	2.100	0.040	02/14/2006			1464115.611	597678.873
SU19-70-054	Plutonium-239/240	62	0.026	0.026	02/14/2006	U	UJ	1464115.611	597678.873
SU19-70-055	Plutonium-238	55	3.820	0.040	02/14/2006			1464130.611	597678.873
SU19-70-055	Plutonium-239/240	62	0.027	0.027	02/14/2006	U	UJ	1464130.611	597678.873

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU19-70-056	Plutonium-238	55	1.260	0.040	02/14/2006			1463988.111	597691.863
SU19-70-056	Plutonium-239/240	62	0.043	0.015	02/14/2006	J	J	1463988.111	597691.863
SU19-70-057	Plutonium-238	55	5.420	0.040	02/15/2006			1464003.111	597691.863
SU19-70-057	Plutonium-239/240	62	0.026	0.026	02/15/2006	J	U	1464003.111	597691.863
SU19-70-058	Plutonium-238	55	7.240	0.040	02/14/2006			1464018.111	597691.863
SU19-70-058	Plutonium-239/240	62	0.039	0.039	02/14/2006	U	U	1464018.111	597691.863
SU19-70-059	Plutonium-238	55	6.630	0.040	02/15/2006			1464033.111	597691.863
SU19-70-059	Plutonium-239/240	62	0.037	0.013	02/15/2006	J	J	1464033.111	597691.863
SU19-70-060	Plutonium-238	55	6.960	0.040	02/15/2006			1464048.111	597691.863
SU19-70-060	Plutonium-239/240	62	0.033	0.033	02/15/2006	U	UJ	1464048.111	597691.863
SU19-70-060D	Plutonium-238	55	5.860	0.040	02/15/2006			1464048.111	597691.863
SU19-70-060D	Plutonium-239/240	62	0.037	0.027	02/15/2006	J	J	1464048.111	597691.863
SU19-70-061	Plutonium-238	55	2.340	0.050	02/15/2006			1464063.111	597691.863
SU19-70-061	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464063.111	597691.863
SU19-70-062	Plutonium-238	55	2.210	0.040	02/15/2006			1464078.111	597691.863
SU19-70-062	Plutonium-239/240	62	0.040	0.026	02/15/2006	J	J	1464078.111	597691.863
SU19-70-063	Plutonium-238	55	4.960	0.030	02/15/2006			1464093.111	597691.863
SU19-70-063	Plutonium-239/240	62	0.062	0.026	02/15/2006	J	J	1464093.111	597691.863
SU19-70-064	Plutonium-238	55	1.220	0.030	02/14/2006			1464108.111	597691.863
SU19-70-064	Plutonium-239/240	62	0.024	0.024	02/14/2006	U	UJ	1464108.111	597691.863
SU19-70-065	Plutonium-238	55	1.450	0.040	02/14/2006			1464123.111	597691.863
SU19-70-065	Plutonium-239/240	62	0.031	0.031	02/14/2006	U	UJ	1464123.111	597691.863
SU19-70-066	Plutonium-238	55	3.850	0.030	02/14/2006			1464138.111	597691.863
SU19-70-066	Plutonium-239/240	62	0.052	0.024	02/14/2006	J	J	1464138.111	597691.863
SU19-70-067	Plutonium-238	55	0.900	0.030	02/14/2006			1463995.611	597704.854
SU19-70-067	Plutonium-239/240	62	0.020	0.020	02/14/2006	U	UJ	1463995.611	597704.854
SU19-70-068	Plutonium-238	55	4.660	0.030	02/15/2006			1464010.611	597704.854
SU19-70-068	Plutonium-239/240	62	0.041	0.022	02/15/2006	J	J	1464010.611	597704.854
SU19-70-069	Plutonium-238	55	6.710	0.040	02/15/2006			1464025.611	597704.854
SU19-70-069	Plutonium-239/240	62	0.042	0.032	02/15/2006	J	J	1464025.611	597704.854
SU19-70-070	Plutonium-238	55	6.160	0.030	02/15/2006			1464040.611	597704.854
SU19-70-070	Plutonium-239/240	62	0.049	0.021	02/15/2006	J	J	1464040.611	597704.854
SU19-70-071	Plutonium-238	55	8.480	0.030	02/15/2006			1464055.611	597704.854
SU19-70-071	Plutonium-239/240	62	0.124	0.018	02/15/2006			1464055.611	597704.854
SU19-70-072	Plutonium-238	55	4.590	0.040	02/15/2006			1464070.611	597704.854
SU19-70-072	Plutonium-239/240	62	0.040	0.029	02/15/2006	J	J	1464070.611	597704.854
SU19-70-072D	Plutonium-238	55	3.660	0.040	02/15/2006			1464070.611	597704.854
SU19-70-072D	Plutonium-239/240	62	0.037	0.037	02/15/2006	U	UJ	1464070.611	597704.854
SU19-70-073	Plutonium-238	55	4.790	0.030	02/15/2006			1464085.611	597704.854
SU19-70-073	Plutonium-239/240	62	0.031	0.027	02/15/2006	J	J	1464085.611	597704.854
SU19-70-074	Plutonium-238	55	12.100	0.020	02/14/2006			1464100.611	597704.854
SU19-70-074	Plutonium-239/240	62	0.048	0.025	02/14/2006	J	J	1464100.611	597704.854
SU19-70-075	Plutonium-238	55	1.850	0.030	02/14/2006			1464115.611	597704.854
SU19-70-075	Plutonium-239/240	62	0.021	0.021	02/14/2006	U	UJ	1464115.611	597704.854
SU19-70-076	Plutonium-238	55	4.580	0.040	02/14/2006			1464130.611	597704.854
SU19-70-076	Plutonium-239/240	62	0.045	0.022	02/14/2006	J	J	1464130.611	597704.854
SU19-70-077	Plutonium-238	55	17.300	0.020	02/14/2006			1464145.611	597704.854
SU19-70-077	Plutonium-239/240	62	0.223	0.024	02/14/2006			1464145.611	597704.854
SU19-70-078	Plutonium-238	55	1.470	0.040	02/14/2006			1463988.111	597717.844
SU19-70-078	Plutonium-239/240	62	0.022	0.022	02/14/2006	U	UJ	1463988.111	597717.844
SU19-70-079	Plutonium-238	55	1.850	0.030	02/15/2006			1464003.111	597717.844
SU19-70-079	Plutonium-239/240	62	0.030	0.026	02/15/2006	J	J	1464003.111	597717.844
SU19-70-080	Plutonium-238	55	3.160	0.030	02/14/2006			1464018.111	597717.844
SU19-70-080	Plutonium-239/240	62	0.024	0.013	02/14/2006	J	J	1464018.111	597717.844
SU19-70-081	Plutonium-238	55	5.310	0.050	02/15/2006			1464033.111	597717.844
SU19-70-081	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464033.111	597717.844
SU19-70-082	Plutonium-238	55	9.500	0.040	02/15/2006			1464048.111	597717.844
SU19-70-082	Plutonium-239/240	62	0.042	0.023	02/15/2006	J	J	1464048.111	597717.844
SU19-70-083	Plutonium-238	55	7.100	0.040	02/15/2006			1464063.111	597717.844

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU19-70-083	Plutonium-239/240	62	0.077	0.026	02/15/2006	J	J	1464063.111	597717.844
SU19-70-084	Plutonium-238	55	6.170	0.030	02/15/2006			1464078.111	597717.844
SU19-70-084	Plutonium-239/240	62	0.046	0.024	02/15/2006	J	J	1464078.111	597717.844
SU19-70-085	Plutonium-238	55	3.360	0.030	02/14/2006			1464093.111	597717.844
SU19-70-085	Plutonium-239/240	62	0.027	0.023	02/14/2006	J	J	1464093.111	597717.844
SU19-70-086	Plutonium-238	55	0.237	0.033	02/16/2006			1464108.111	597717.844
SU19-70-086	Plutonium-239/240	62	0.028	0.028	02/16/2006	U	UJ	1464108.111	597717.844
SU19-70-087	Plutonium-238	55	6.720	0.030	02/14/2006			1464123.111	597717.844
SU19-70-087	Plutonium-239/240	62	0.025	0.025	02/14/2006	U	UJ	1464123.111	597717.844
SU19-70-088	Plutonium-238	55	11.900	0.030	02/14/2006			1464138.111	597717.844
SU19-70-088	Plutonium-239/240	62	0.088	0.022	02/14/2006	J	J	1464138.111	597717.844
SU19-70-089	Plutonium-238	55	3.000	0.030	02/15/2006			1464010.611	597730.834
SU19-70-089	Plutonium-239/240	62	0.021	0.021	02/15/2006	U	UJ	1464010.611	597730.834
SU19-70-090	Plutonium-238	55	0.430	0.030	02/14/2006			1464025.611	597730.834
SU19-70-090	Plutonium-239/240	62	0.027	0.027	02/14/2006	U	UJ	1464025.611	597730.834
SU19-70-091	Plutonium-238	55	5.550	0.030	02/14/2006			1464040.611	597730.834
SU19-70-091	Plutonium-239/240	62	0.024	0.021	02/14/2006	J	J	1464040.611	597730.834
SU19-70-092	Plutonium-238	55	4.510	0.030	02/14/2006			1464055.611	597730.834
SU19-70-092	Plutonium-239/240	62	0.041	0.020	02/14/2006	J	J	1464055.611	597730.834
SU19-70-093	Plutonium-238	55	4.100	0.030	02/14/2006			1464070.611	597730.834
SU19-70-093	Plutonium-239/240	62	0.028	0.028	02/14/2006	U	UJ	1464070.611	597730.834
SU19-70-094	Plutonium-238	55	3.750	0.030	02/15/2006			1464085.611	597730.834
SU19-70-094	Plutonium-239/240	62	0.025	0.025	02/15/2006	U	UJ	1464085.611	597730.834
SU19-70-095	Plutonium-238	55	14.700	0.030	02/15/2006			1464100.611	597730.834
SU19-70-095	Plutonium-239/240	62	0.084	0.021	02/15/2006	J	J	1464100.611	597730.834
SU19-70-096	Plutonium-238	55	11.600	0.040	02/14/2006			1464115.611	597730.834
SU19-70-096	Plutonium-239/240	62	0.078	0.021	02/14/2006	J	J	1464115.611	597730.834
SU19-70-097	Plutonium-238	55	11.000	0.020	02/14/2006			1464130.611	597730.834
SU19-70-097	Plutonium-239/240	62	0.054	0.025	02/14/2006	J	J	1464130.611	597730.834
SU19-70-098	Plutonium-238	55	12.400	0.040	02/14/2006			1464033.111	597743.825
SU19-70-098	Plutonium-239/240	62	0.104	0.020	02/14/2006			1464033.111	597743.825
SU19-70-099	Plutonium-238	55	34.800	0.030	02/14/2006			1464048.111	597743.825
SU19-70-099	Plutonium-239/240	62	0.290	0.026	02/14/2006			1464048.111	597743.825
SU19-70-100	Plutonium-238	55	14.600	0.030	03/02/2006			1464063.111	597743.825
SU19-70-100	Plutonium-239/240	62	0.121	0.013	03/02/2006			1464063.111	597743.825
SU19-70-101	Plutonium-238	55	12.000	0.050	02/14/2006			1464078.111	597743.825
SU19-70-101	Plutonium-239/240	62	0.055	0.039	02/14/2006	J	J	1464078.111	597743.825
SU19-70-102	Plutonium-238	55	3.750	0.060	02/15/2006			1464093.111	597743.825
SU19-70-102	Plutonium-239/240	62	0.044	0.044	02/15/2006	U	UJ	1464093.111	597743.825
SU19-70-103	Plutonium-238	55	0.520	0.030	02/15/2006			1464108.111	597743.825
SU19-70-103	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464108.111	597743.825
SU19-70-104	Plutonium-238	55	1.800	0.050	02/15/2006			1464123.111	597743.825
SU19-70-104	Plutonium-239/240	62	0.031	0.031	02/15/2006	U	UJ	1464123.111	597743.825
SU19-70-105	Plutonium-238	55	9.800	0.050	02/14/2006			1464138.111	597743.825
SU19-70-105	Plutonium-239/240	62	0.052	0.014	02/14/2006	J	J	1464138.111	597743.825
SU19-70-106	Plutonium-238	55	0.048	0.013	02/15/2006	J	J	1464115.611	597756.815
SU19-70-106	Plutonium-239/240	62	0.020	0.020	02/15/2006	U	UJ	1464115.611	597756.815
SU19-70-107	Plutonium-238	55	2.910	0.030	02/15/2006			1464130.611	597756.815
SU19-70-107	Plutonium-239/240	62	0.038	0.028	02/15/2006	J	J	1464130.611	597756.815
SU23-70-108	Actinium-227	4.6	0.280	0.280	02/16/2006	U	U	1464168.387	597606.446
SU23-70-108	Actinium-228	1.93	0.370	0.370	02/16/2006	U	U	1464168.387	597606.446
SU23-70-108	Americium-241	63	0.180	0.120	02/16/2006		J	1464168.387	597606.446
SU23-70-108	Bismuth-207	1.2	0.049	0.049	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Bismuth-210M	8.3	0.068	0.068	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Bismuth-214	1.17	0.330	0.250	02/16/2006			1464168.387	597606.446
SU23-70-108	Cesium-137	3.8	0.070	0.070	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Cobalt-60	0.7	0.064	0.064	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Lead-210	7.4	1.500	1.500	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Lead-212	16.6	0.227	0.093	02/16/2006			1464168.387	597606.446

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Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-108	Plutonium-238	55	12.600	0.070	02/16/2006			1464168.387	597606.446
SU23-70-108	Plutonium-239/240	62	0.172	0.041	02/16/2006	J		1464168.387	597606.446
SU23-70-108	Potassium-40	47.8	7.000	0.500	02/16/2006			1464168.387	597606.446
SU23-70-108	Protactinium-231	4	1.300	1.300	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Radium-226	2.9	0.330	0.250	02/16/2006			1464168.387	597606.446
SU23-70-108	Thorium-229	18.9	0.630	0.630	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Uranium-234	2	0.580	0.040	02/16/2006			1464168.387	597606.446
SU23-70-108	Uranium-235	3.2	0.055	0.055	02/16/2006	U	UJ	1464168.387	597606.446
SU23-70-108	Uranium-238	2.2	0.410	0.060	02/16/2006			1464168.387	597606.446
SU23-70-109	Actinium-227	4.6	0.780	0.570	02/16/2006			1464160.887	597619.437
SU23-70-109	Actinium-228	1.93	0.670	0.290	02/16/2006			1464160.887	597619.437
SU23-70-109	Americium-241	63	0.170	0.170	02/16/2006	U	U	1464160.887	597619.437
SU23-70-109	Bismuth-207	1.2	0.061	0.061	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Bismuth-210M	8.3	0.092	0.092	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Bismuth-214	1.17	0.960	0.140	02/16/2006			1464160.887	597619.437
SU23-70-109	Cesium-137	3.8	0.100	0.100	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Cobalt-60	0.7	0.085	0.085	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Lead-210	7.4	2.300	2.300	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Lead-212	16.6	0.640	0.130	02/16/2006			1464160.887	597619.437
SU23-70-109	Plutonium-238	55	15.800	0.060	02/16/2006			1464160.887	597619.437
SU23-70-109	Plutonium-239/240	62	0.123	0.041	02/16/2006	J	J	1464160.887	597619.437
SU23-70-109	Potassium-40	47.8	11.800	1.000	02/16/2006			1464160.887	597619.437
SU23-70-109	Protactinium-231	4	1.900	1.900	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Radium-226	2.9	0.960	0.140	02/16/2006			1464160.887	597619.437
SU23-70-109	Thorium-229	18.9	1.000	1.000	02/16/2006	U	UJ	1464160.887	597619.437
SU23-70-109	Uranium-234	2	0.940	0.040	02/16/2006			1464160.887	597619.437
SU23-70-109	Uranium-235	3.2	0.039	0.036	02/16/2006	J	J	1464160.887	597619.437
SU23-70-109	Uranium-238	2.2	0.710	0.030	02/16/2006			1464160.887	597619.437
SU23-70-110	Actinium-227	4.6	0.280	0.280	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Actinium-228	1.93	0.340	0.340	02/16/2006	U	U	1464175.887	597619.437
SU23-70-110	Americium-241	63	0.140	0.140	02/16/2006	U	U	1464175.887	597619.437
SU23-70-110	Bismuth-207	1.2	0.046	0.046	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Bismuth-210M	8.3	0.063	0.063	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Bismuth-214	1.17	0.500	0.110	02/16/2006			1464175.887	597619.437
SU23-70-110	Cesium-137	3.8	0.063	0.063	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Cobalt-60	0.7	0.099	0.099	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Lead-210	7.4	1.600	1.600	02/16/2006	U	U	1464175.887	597619.437
SU23-70-110	Lead-212	16.6	0.330	0.092	02/16/2006			1464175.887	597619.437
SU23-70-110	Plutonium-238	55	11.600	0.050	02/16/2006			1464175.887	597619.437
SU23-70-110	Plutonium-239/240	62	0.128	0.046	02/16/2006	J	J	1464175.887	597619.437
SU23-70-110	Potassium-40	47.8	10.800	0.500	02/16/2006			1464175.887	597619.437
SU23-70-110	Protactinium-231	4	1.100	1.100	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Radium-226	2.9	0.500	0.110	02/16/2006			1464175.887	597619.437
SU23-70-110	Thorium-229	18.9	0.590	0.590	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110	Uranium-234	2	0.460	0.050	02/16/2006			1464175.887	597619.437
SU23-70-110	Uranium-235	3.2	0.030	0.030	02/16/2006	U	U	1464175.887	597619.437
SU23-70-110	Uranium-238	2.2	0.540	0.040	02/16/2006			1464175.887	597619.437
SU23-70-110D	Actinium-227	4.6	0.380	0.380	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Actinium-228	1.93	0.450	0.280	02/16/2006		J	1464175.887	597619.437
SU23-70-110D	Americium-241	63	0.199	0.190	02/16/2006			1464175.887	597619.437
SU23-70-110D	Bismuth-207	1.2	0.066	0.066	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Bismuth-210M	8.3	0.089	0.089	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Bismuth-214	1.17	0.580	0.330	02/16/2006			1464175.887	597619.437
SU23-70-110D	Cesium-137	3.8	0.097	0.097	02/16/2006	U	U	1464175.887	597619.437
SU23-70-110D	Cobalt-60	0.7	0.069	0.069	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Lead-210	7.4	1.800	1.800	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Lead-212	16.6	0.360	0.130	02/16/2006			1464175.887	597619.437
SU23-70-110D	Plutonium-238	55	14.000	0.080	02/16/2006			1464175.887	597619.437
SU23-70-110D	Plutonium-239/240	62	0.135	0.026	02/16/2006	J	J	1464175.887	597619.437

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-110D	Potassium-40	47.8	9.100	0.400	02/16/2006			1464175.887	597619.437
SU23-70-110D	Protactinium-231	4	1.700	1.700	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Radium-226	2.9	0.580	0.330	02/16/2006			1464175.887	597619.437
SU23-70-110D	Thorium-229	18.9	0.870	0.870	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Uranium-234	2	0.510	0.050	02/16/2006			1464175.887	597619.437
SU23-70-110D	Uranium-235	3.2	0.036	0.036	02/16/2006	U	UJ	1464175.887	597619.437
SU23-70-110D	Uranium-238	2.2	0.600	0.050	02/16/2006			1464175.887	597619.437
SU23-70-111	Actinium-227	4.6	0.280	0.280	02/16/2006	U	U	1464160.887	597645.418
SU23-70-111	Actinium-228	1.93	0.270	0.270	02/16/2006	U	U	1464160.887	597645.418
SU23-70-111	Americium-241	63	0.100	0.100	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Bismuth-207	1.2	0.044	0.044	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Bismuth-210M	8.3	0.051	0.051	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Bismuth-214	1.17	0.320	0.220	02/16/2006			1464160.887	597645.418
SU23-70-111	Cesium-137	3.8	0.050	0.050	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Cobalt-60	0.7	0.049	0.049	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Lead-210	7.4	1.300	1.300	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Lead-212	16.6	0.138	0.087	02/16/2006			1464160.887	597645.418
SU23-70-111	Plutonium-238	55	1.530	0.050	02/16/2006			1464160.887	597645.418
SU23-70-111	Plutonium-239/240	62	0.037	0.037	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Potassium-40	47.8	5.270	0.440	02/16/2006			1464160.887	597645.418
SU23-70-111	Protactinium-231	4	1.300	1.300	02/16/2006	U	U	1464160.887	597645.418
SU23-70-111	Radium-226	2.9	0.320	0.220	02/16/2006			1464160.887	597645.418
SU23-70-111	Thorium-229	18.9	0.540	0.540	02/16/2006	U	UJ	1464160.887	597645.418
SU23-70-111	Uranium-234	2	0.390	0.040	02/16/2006			1464160.887	597645.418
SU23-70-111	Uranium-235	3.2	0.070	0.051	02/16/2006	J	J	1464160.887	597645.418
SU23-70-111	Uranium-238	2.2	0.300	0.030	02/16/2006			1464160.887	597645.418
SU23-70-112	Actinium-227	4.6	0.500	0.430	02/16/2006		J	1464153.387	597684.389
SU23-70-112	Actinium-228	1.93	0.350	0.270	02/16/2006		J	1464153.387	597684.389
SU23-70-112	Americium-241	63	0.130	0.130	02/16/2006	U	U	1464153.387	597684.389
SU23-70-112	Bismuth-207	1.2	0.053	0.053	02/16/2006	U	UJ	1464153.387	597684.389
SU23-70-112	Bismuth-210M	8.3	0.080	0.080	02/16/2006	U	UJ	1464153.387	597684.389
SU23-70-112	Bismuth-214	1.17	0.660	0.290	02/16/2006			1464153.387	597684.389
SU23-70-112	Cesium-137	3.8	0.082	0.082	02/16/2006	U	UJ	1464153.387	597684.389
SU23-70-112	Cobalt-60	0.7	0.084	0.084	02/16/2006	U	U	1464153.387	597684.389
SU23-70-112	Lead-210	7.4	1.500	1.500	02/16/2006	U	U	1464153.387	597684.389
SU23-70-112	Lead-212	16.6	0.400	0.098	02/16/2006			1464153.387	597684.389
SU23-70-112	Plutonium-238	55	19.400	0.050	02/16/2006			1464153.387	597684.389
SU23-70-112	Plutonium-239/240	62	0.219	0.053	02/16/2006			1464153.387	597684.389
SU23-70-112	Potassium-40	47.8	7.700	0.800	02/16/2006			1464153.387	597684.389
SU23-70-112	Protactinium-231	4	1.600	1.600	02/16/2006	U	UJ	1464153.387	597684.389
SU23-70-112	Radium-226	2.9	0.660	0.290	02/16/2006			1464153.387	597684.389
SU23-70-112	Thorium-229	18.9	0.770	0.770	02/16/2006	U	UJ	1464153.387	597684.389
SU23-70-112	Uranium-234	2	1.050	0.040	02/16/2006			1464153.387	597684.389
SU23-70-112	Uranium-235	3.2	0.060	0.060	02/16/2006	U	U	1464153.387	597684.389
SU23-70-112	Uranium-238	2.2	1.100	0.030	02/16/2006			1464153.387	597684.389
SU23-70-113	Actinium-227	4.6	0.360	0.360	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Actinium-228	1.93	0.510	0.260	02/15/2006		J	1464160.887	597749.341
SU23-70-113	Americium-241	63	0.740	0.160	02/15/2006			1464160.887	597749.341
SU23-70-113	Bismuth-207	1.2	0.056	0.056	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Bismuth-210M	8.3	0.083	0.083	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Bismuth-214	1.17	0.570	0.320	02/15/2006			1464160.887	597749.341
SU23-70-113	Cesium-137	3.8	0.084	0.084	02/15/2006	U	U	1464160.887	597749.341
SU23-70-113	Cobalt-60	0.7	0.110	0.110	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Lead-210	7.4	1.900	1.900	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Lead-212	16.6	0.370	0.140	02/15/2006			1464160.887	597749.341
SU23-70-113	Plutonium-238	55	51.300	0.040	02/15/2006			1464160.887	597749.341
SU23-70-113	Plutonium-239/240	62	0.450	0.020	02/15/2006			1464160.887	597749.341
SU23-70-113	Potassium-40	47.8	9.700	0.700	02/15/2006			1464160.887	597749.341
SU23-70-113	Protactinium-231	4	1.600	1.600	02/15/2006	U	UJ	1464160.887	597749.341

A16/89

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-113	Radium-226	2.9	0.570	0.320	02/15/2006			1464160.887	597749.341
SU23-70-113	Thorium-229	18.9	0.780	0.780	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Uranium-234	2	0.980	0.050	02/15/2006			1464160.887	597749.341
SU23-70-113	Uranium-235	3.2	0.032	0.032	02/15/2006	U	UJ	1464160.887	597749.341
SU23-70-113	Uranium-238	2.2	0.860	0.050	02/15/2006			1464160.887	597749.341
SU23-70-114	Actinium-227	4.6	0.400	0.400	02/15/2006	U	U	1464153.387	597762.331
SU23-70-114	Actinium-228	1.93	0.480	0.300	02/15/2006		J	1464153.387	597762.331
SU23-70-114	Americium-241	63	0.610	0.140	02/15/2006			1464153.387	597762.331
SU23-70-114	Bismuth-207	1.2	0.062	0.062	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Bismuth-210M	8.3	0.089	0.089	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Bismuth-214	1.17	0.670	0.150	02/15/2006			1464153.387	597762.331
SU23-70-114	Cesium-137	3.8	0.100	0.100	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Cobalt-60	0.7	0.110	0.110	02/15/2006	U	U	1464153.387	597762.331
SU23-70-114	Lead-210	7.4	1.800	1.800	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Lead-212	16.6	0.570	0.130	02/15/2006			1464153.387	597762.331
SU23-70-114	Plutonium-238	55	25.500	0.060	02/15/2006			1464153.387	597762.331
SU23-70-114	Plutonium-239/240	62	0.580	0.060	02/15/2006			1464153.387	597762.331
SU23-70-114	Potassium-40	47.8	14.900	0.600	02/15/2006			1464153.387	597762.331
SU23-70-114	Protactinium-231	4	1.600	1.600	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Radium-226	2.9	0.670	0.150	02/15/2006			1464153.387	597762.331
SU23-70-114	Thorium-229	18.9	0.800	0.800	02/15/2006	U	UJ	1464153.387	597762.331
SU23-70-114	Uranium-234	2	0.720	0.050	02/15/2006			1464153.387	597762.331
SU23-70-114	Uranium-235	3.2	0.047	0.032	02/15/2006	J	J	1464153.387	597762.331
SU23-70-114	Uranium-238	2.2	0.510	0.040	02/15/2006			1464153.387	597762.331
SU23-70-115A	Actinium-227	4.6	1.300	0.670	03/31/2006			1464168.387	597762.331
SU23-70-115A	Actinium-228	1.93	0.890	0.380	03/31/2006			1464168.387	597762.331
SU23-70-115A	Americium-241	63	0.200	0.200	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Bismuth-207	1.2	0.081	0.081	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Bismuth-210M	8.3	0.110	0.110	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Bismuth-214	1.17	0.990	0.180	03/31/2006			1464168.387	597762.331
SU23-70-115A	Cesium-137	3.8	0.095	0.095	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Cobalt-60	0.7	0.110	0.110	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Lead-210	7.4	2.500	2.500	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Lead-212	16.6	0.870	0.150	03/31/2006			1464168.387	597762.331
SU23-70-115A	Plutonium-238	55	0.840	0.080	03/31/2006			1464168.387	597762.331
SU23-70-115A	Plutonium-239/240	62	0.052	0.052	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Potassium-40	47.8	18.000	0.900	03/31/2006			1464168.387	597762.331
SU23-70-115A	Protactinium-231	4	2.300	2.300	03/31/2006	U	U	1464168.387	597762.331
SU23-70-115A	Radium-226	2.9	0.990	0.180	03/31/2006			1464168.387	597762.331
SU23-70-115A	Thorium-229	18.9	1.200	1.200	03/31/2006	U	UJ	1464168.387	597762.331
SU23-70-115A	Uranium-234	2	1.160	0.050	03/31/2006			1464168.387	597762.331
SU23-70-115A	Uranium-235	3.2	0.074	0.054	03/31/2006	J	J	1464168.387	597762.331
SU23-70-115A	Uranium-238	2.2	1.450	0.040	03/31/2006			1464168.387	597762.331
SU23-70-116	Actinium-227	4.6	0.330	0.330	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Actinium-228	1.93	0.320	0.320	02/15/2006	U	U	1464175.887	597775.321
SU23-70-116	Americium-241	63	0.320	0.120	02/15/2006			1464175.887	597775.321
SU23-70-116	Bismuth-207	1.2	0.049	0.049	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Bismuth-210M	8.3	0.075	0.075	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Bismuth-214	1.17	0.470	0.280	02/15/2006			1464175.887	597775.321
SU23-70-116	Cesium-137	3.8	0.067	0.067	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Cobalt-60	0.7	0.088	0.088	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Lead-210	7.4	1.800	1.800	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Lead-212	16.6	0.128	0.093	02/15/2006		J	1464175.887	597775.321
SU23-70-116	Plutonium-238	55	12.900	0.080	02/15/2006			1464175.887	597775.321
SU23-70-116	Plutonium-239/240	62	0.141	0.041	02/15/2006	J	J	1464175.887	597775.321
SU23-70-116	Potassium-40	47.8	4.700	0.700	02/15/2006			1464175.887	597775.321
SU23-70-116	Protactinium-231	4	1.400	1.400	02/15/2006	U	UJ	1464175.887	597775.321
SU23-70-116	Radium-226	2.9	0.470	0.280	02/15/2006			1464175.887	597775.321
SU23-70-116	Thorium-229	18.9	0.720	0.720	02/15/2006	U	UJ	1464175.887	597775.321

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-116	Uranium-234	2	0.690	0.050	02/15/2006			1464175.887	597775.321
SU23-70-116	Uranium-235	3.2	0.060	0.032	02/15/2006	J	J	1464175.887	597775.321
SU23-70-116	Uranium-238	2.2	0.590	0.030	02/15/2006			1464175.887	597775.321
SU23-70-117	Actinium-227	4.6	0.700	0.440	02/15/2006			1464190.887	597775.321
SU23-70-117	Actinium-228	1.93	0.410	0.240	02/15/2006		J	1464190.887	597775.321
SU23-70-117	Americium-241	63	0.422	0.130	02/15/2006			1464190.887	597775.321
SU23-70-117	Bismuth-207	1.2	0.049	0.049	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Bismuth-210M	8.3	0.076	0.076	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Bismuth-214	1.17	0.510	0.250	02/15/2006			1464190.887	597775.321
SU23-70-117	Cesium-137	3.8	0.073	0.073	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Cobalt-60	0.7	0.068	0.068	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Lead-210	7.4	1.800	1.800	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Lead-212	16.6	0.347	0.090	02/15/2006			1464190.887	597775.321
SU23-70-117	Plutonium-238	55	24.400	0.040	02/15/2006			1464190.887	597775.321
SU23-70-117	Plutonium-239/240	62	0.167	0.042	02/15/2006	J		1464190.887	597775.321
SU23-70-117	Potassium-40	47.8	8.800	0.500	02/15/2006			1464190.887	597775.321
SU23-70-117	Protactinium-231	4	1.500	1.500	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Radium-226	2.9	0.510	0.250	02/15/2006			1464190.887	597775.321
SU23-70-117	Thorium-229	18.9	0.720	0.720	02/15/2006	U	UJ	1464190.887	597775.321
SU23-70-117	Uranium-234	2	0.690	0.060	02/15/2006			1464190.887	597775.321
SU23-70-117	Uranium-235	3.2	0.038	0.034	02/15/2006	J	J	1464190.887	597775.321
SU23-70-117	Uranium-238	2.2	0.650	0.030	02/15/2006			1464190.887	597775.321
SU23-70-118	Actinium-227	4.6	0.440	0.440	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Actinium-228	1.93	0.700	0.310	02/16/2006			1464163.300	597692.046
SU23-70-118	Americium-241	63	0.190	0.190	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Bismuth-207	1.2	0.066	0.066	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Bismuth-210M	8.3	0.099	0.099	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	**Bismuth-214****	**1.17**	**1.190**	**0.140**	**02/16/2006**			**1464163.300**	**597692.046**
SU23-70-118	Cesium-137	3.8	0.082	0.082	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Cobalt-60	0.7	0.088	0.088	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Lead-210	7.4	2.000	2.000	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Lead-212	16.6	0.920	0.120	02/16/2006			1464163.300	597692.046
SU23-70-118	Plutonium-238	55	1.710	0.070	02/16/2006			1464163.300	597692.046
SU23-70-118	Plutonium-239/240	62	0.027	0.027	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Potassium-40	47.8	13.300	0.900	02/16/2006			1464163.300	597692.046
SU23-70-118	Protactinium-231	4	1.700	1.700	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Radium-226	2.9	1.190	0.140	02/16/2006			1464163.300	597692.046
SU23-70-118	Thorium-229	18.9	0.930	0.930	02/16/2006	U	UJ	1464163.300	597692.046
SU23-70-118	Uranium-234	2	0.880	0.030	02/16/2006			1464163.300	597692.046
SU23-70-118	Uranium-235	3.2	0.043	0.039	02/16/2006	J	J	1464163.300	597692.046
SU23-70-118	Uranium-238	2.2	0.830	0.030	02/16/2006			1464163.300	597692.046
SU23-70-119	Actinium-227	4.6	0.340	0.340	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Actinium-228	1.93	0.680	0.200	02/16/2006			1464174.592	597687.207
SU23-70-119	Americium-241	63	0.170	0.170	02/16/2006	U	U	1464174.592	597687.207
SU23-70-119	Bismuth-207	1.2	0.056	0.056	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Bismuth-210M	8.3	0.077	0.077	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Bismuth-214	1.17	0.810	0.150	02/16/2006			1464174.592	597687.207
SU23-70-119	Cesium-137	3.8	0.090	0.090	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Cobalt-60	0.7	0.086	0.086	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Lead-210	7.4	1.900	1.900	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Lead-212	16.6	0.597	0.088	02/16/2006			1464174.592	597687.207
SU23-70-119	Plutonium-238	55	11.700	0.060	02/16/2006			1464174.592	597687.207
SU23-70-119	Plutonium-239/240	62	0.071	0.038	02/16/2006	J	J	1464174.592	597687.207
SU23-70-119	Potassium-40	47.8	9.100	0.900	02/16/2006			1464174.592	597687.207
SU23-70-119	Protactinium-231	4	1.500	1.500	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Radium-226	2.9	0.810	0.150	02/16/2006			1464174.592	597687.207
SU23-70-119	Thorium-229	18.9	0.810	0.810	02/16/2006	U	UJ	1464174.592	597687.207
SU23-70-119	Uranium-234	2	0.840	0.040	02/16/2006			1464174.592	597687.207
SU23-70-119	Uranium-235	3.2	0.031	0.031	02/16/2006	U	UJ	1464174.592	597687.207

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Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-119	Uranium-238	2.2	0.660	0.040	02/16/2006			1464174.592	597687.207
SU23-70-120	Actinium-227	4.6	0.330	0.330	02/16/2006	U	U	1464171.366	597727.266
SU23-70-120	Actinium-228	1.93	0.350	0.350	02/16/2006	U	U	1464171.366	597727.266
SU23-70-120	Americium-241	63	0.300	0.130	02/16/2006			1464171.366	597727.266
SU23-70-120	Bismuth-207	1.2	0.043	0.043	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Bismuth-210M	8.3	0.072	0.072	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Bismuth-214	1.17	0.560	0.300	02/16/2006			1464171.366	597727.266
SU23-70-120	Cesium-137	3.8	0.067	0.067	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Cobalt-60	0.7	0.070	0.070	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Lead-210	7.4	1.800	1.800	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Lead-212	16.6	0.169	0.095	02/16/2006			1464171.366	597727.266
SU23-70-120	Plutonium-238	55	42.900	0.070	02/16/2006			1464171.366	597727.266
SU23-70-120	Plutonium-239/240	62	0.390	0.040	02/16/2006			1464171.366	597727.266
SU23-70-120	Potassium-40	47.8	6.200	0.600	02/16/2006			1464171.366	597727.266
SU23-70-120	Protactinium-231	4	1.200	1.200	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Radium-226	2.9	0.560	0.300	02/16/2006			1464171.366	597727.266
SU23-70-120	Thorium-229	18.9	0.710	0.710	02/16/2006	U	UJ	1464171.366	597727.266
SU23-70-120	Uranium-234	2	0.990	0.030	02/16/2006			1464171.366	597727.266
SU23-70-120	Uranium-235	3.2	0.102	0.035	02/16/2006	J	J	1464171.366	597727.266
SU23-70-120	Uranium-238	2.2	0.720	0.040	02/16/2006			1464171.366	597727.266
SU23-70-121	Actinium-227	4.6	0.990	0.550	02/16/2006			1464161.149	597734.256
SU23-70-121	Actinium-228	1.93	0.450	0.450	02/16/2006	U	U	1464161.149	597734.256
SU23-70-121	Americium-241	63	0.840	0.170	02/16/2006			1464161.149	597734.256
SU23-70-121	Bismuth-207	1.2	0.059	0.059	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Bismuth-210M	8.3	0.088	0.088	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Bismuth-214	1.17	0.670	0.140	02/16/2006			1464161.149	597734.256
SU23-70-121	Cesium-137	3.8	0.096	0.096	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Cobalt-60	0.7	0.089	0.089	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Lead-210	7.4	2.200	2.200	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Lead-212	16.6	0.513	0.099	02/16/2006			1464161.149	597734.256
SU23-70-121	Plutonium-238	55	29.400	0.060	02/16/2006			1464161.149	597734.256
SU23-70-121	Plutonium-239/240	62	0.240	0.030	02/16/2006			1464161.149	597734.256
SU23-70-121	Potassium-40	47.8	9.700	1.000	02/16/2006			1464161.149	597734.256
SU23-70-121	Protactinium-231	4	1.900	1.900	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Radium-226	2.9	0.670	0.140	02/16/2006			1464161.149	597734.256
SU23-70-121	Thorium-229	18.9	0.940	0.940	02/16/2006	U	UJ	1464161.149	597734.256
SU23-70-121	Uranium-234	2	0.770	0.030	02/16/2006			1464161.149	597734.256
SU23-70-121	Uranium-235	3.2	0.076	0.034	02/16/2006	J	J	1464161.149	597734.256
SU23-70-121	Uranium-238	2.2	0.620	0.050	02/16/2006			1464161.149	597734.256
SU23-70-122	Actinium-227	4.6	0.360	0.360	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Actinium-228	1.93	0.440	0.440	02/16/2006	U	U	1464156.310	597668.925
SU23-70-122	Americium-241	63	0.140	0.140	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Bismuth-207	1.2	0.063	0.063	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Bismuth-210M	8.3	0.085	0.085	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Bismuth-214	1.17	0.610	0.130	02/16/2006			1464156.310	597668.925
SU23-70-122	Cesium-137	3.8	0.072	0.072	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Cobalt-60	0.7	0.076	0.076	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Lead-210	7.4	1.700	1.700	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Lead-212	16.6	0.350	0.100	02/16/2006			1464156.310	597668.925
SU23-70-122	Plutonium-238	55	0.850	0.050	02/16/2006			1464156.310	597668.925
SU23-70-122	Plutonium-239/240	62	0.051	0.051	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Potassium-40	47.8	11.000	0.800	02/16/2006			1464156.310	597668.925
SU23-70-122	Protactinium-231	4	1.600	1.600	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Radium-226	2.9	0.610	0.130	02/16/2006			1464156.310	597668.925
SU23-70-122	Thorium-229	18.9	0.860	0.860	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Uranium-234	2	0.550	0.050	02/16/2006			1464156.310	597668.925
SU23-70-122	Uranium-235	3.2	0.054	0.054	02/16/2006	U	UJ	1464156.310	597668.925
SU23-70-122	Uranium-238	2.2	0.660	0.040	02/16/2006			1464156.310	597668.925
SU23-70-123	Actinium-227	4.6	0.430	0.430	02/16/2006	U	U	1464168.704	597739.541

Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-123	Actinium-228	1.93	1.010	0.310	02/16/2006			1464168.704	597739.541
SU23-70-123	Americium-241	63	0.290	0.160	02/16/2006		J	1464168.704	597739.541
SU23-70-123	Bismuth-207	1.2	0.071	0.071	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Bismuth-210M	8.3	0.094	0.094	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	**Bismuth-214****	**1.17**	**1.310**	**0.150**	**02/16/2006**			**1464168.704**	**597739.541**
SU23-70-123	Cesium-137	3.8	0.099	0.099	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Cobalt-60	0.7	0.100	0.100	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Lead-210	7.4	2.000	2.000	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Lead-212	16.6	1.160	0.130	02/16/2006			1464168.704	597739.541
SU23-70-123	Plutonium-238	55	30.300	0.070	02/16/2006			1464168.704	597739.541
SU23-70-123	Plutonium-239/240	62	0.250	0.050	02/16/2006			1464168.704	597739.541
SU23-70-123	Potassium-40	47.8	20.600	0.600	02/16/2006			1464168.704	597739.541
SU23-70-123	Protactinium-231	4	1.700	1.700	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Radium-226	2.9	1.310	0.150	02/16/2006			1464168.704	597739.541
SU23-70-123	Thorium-229	18.9	0.950	0.950	02/16/2006	U	UJ	1464168.704	597739.541
SU23-70-123	Uranium-234	2	0.970	0.030	02/16/2006			1464168.704	597739.541
SU23-70-123	Uranium-235	3.2	0.090	0.035	02/16/2006	J	J	1464168.704	597739.541
SU23-70-123	Uranium-238	2.2	0.910	0.040	02/16/2006			1464168.704	597739.541
SU23-70-124	Actinium-227	4.6	1.360	0.670	03/31/2006			1464183.387	597762.331
SU23-70-124	Actinium-228	1.93	1.020	0.290	03/31/2006			1464183.387	597762.331
SU23-70-124	Americium-241	63	0.200	0.200	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Bismuth-207	1.2	0.076	0.076	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Bismuth-210M	8.3	0.110	0.110	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Bismuth-214	1.17	1.160	0.190	03/31/2006			1464183.387	597762.331
SU23-70-124	Cesium-137	3.8	0.090	0.090	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Cobalt-60	0.7	0.110	0.110	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Lead-210	7.4	2.400	2.400	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Lead-212	16.6	0.880	0.120	03/31/2006			1464183.387	597762.331
SU23-70-124	Plutonium-238	55	0.147	0.074	03/31/2006	J	J	1464183.387	597762.331
SU23-70-124	Plutonium-239/240	62	0.026	0.026	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Potassium-40	47.8	16.700	1.000	03/31/2006			1464183.387	597762.331
SU23-70-124	Protactinium-231	4	2.200	2.200	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Radium-226	2.9	1.160	0.190	03/31/2006			1464183.387	597762.331
SU23-70-124	Thorium-229	18.9	1.100	1.100	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Uranium-234	2	0.750	0.050	03/31/2006			1464183.387	597762.331
SU23-70-124	Uranium-235	3.2	0.061	0.061	03/31/2006	U	UJ	1464183.387	597762.331
SU23-70-124	Uranium-238	2.2	1.020	0.030	03/31/2006			1464183.387	597762.331
SU23-70-125	Actinium-227	4.6	0.550	0.550	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Actinium-228	1.93	0.830	0.330	03/31/2006			1464175.887	597749.341
SU23-70-125	Americium-241	63	0.210	0.210	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Bismuth-207	1.2	0.091	0.091	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Bismuth-210M	8.3	0.130	0.130	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	**Bismuth-214****	**1.17**	**1.210**	**0.490**	**03/31/2006**			**1464175.887**	**597749.341**
SU23-70-125	Cesium-137	3.8	0.110	0.110	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Cobalt-60	0.7	0.110	0.110	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Lead-210	7.4	2.700	2.700	03/31/2006	U	U	1464175.887	597749.341
SU23-70-125	Lead-212	16.6	0.840	0.190	03/31/2006			1464175.887	597749.341
SU23-70-125	Plutonium-238	55	0.610	0.070	03/31/2006			1464175.887	597749.341
SU23-70-125	Plutonium-239/240	62	0.027	0.027	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Potassium-40	47.8	19.100	1.300	03/31/2006			1464175.887	597749.341
SU23-70-125	Protactinium-231	4	2.300	2.300	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Radium-226	2.9	1.210	0.490	03/31/2006			1464175.887	597749.341
SU23-70-125	Thorium-229	18.9	1.200	1.200	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Uranium-234	2	0.850	0.030	03/31/2006			1464175.887	597749.341
SU23-70-125	Uranium-235	3.2	0.053	0.053	03/31/2006	U	UJ	1464175.887	597749.341
SU23-70-125	Uranium-238	2.2	1.420	0.040	03/31/2006			1464175.887	597749.341
SU23-70-126	Actinium-227	4.6	0.370	0.370	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Actinium-228	1.93	1.090	0.180	03/31/2006			1464190.613	597758.715
SU23-70-126	Americium-241	63	0.150	0.150	03/31/2006	U	U	1464190.613	597758.715

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Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-126	Bismuth-207	1.2	0.066	0.066	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Bismuth-210M	8.3	0.076	0.076	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Bismuth-214	1.17	0.740	0.120	03/31/2006			1464190.613	597758.715
SU23-70-126	Cesium-137	3.8	0.110	0.110	03/31/2006	U	U	1464190.613	597758.715
SU23-70-126	Cobalt-60	0.7	0.090	0.090	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Lead-210	7.4	2.200	2.100	03/31/2006			1464190.613	597758.715
SU23-70-126	Lead-212	16.6	0.550	0.130	03/31/2006			1464190.613	597758.715
SU23-70-126	Plutonium-238	55	33.200	0.060	03/31/2006			1464190.613	597758.715
SU23-70-126	Plutonium-239/240	62	0.197	0.040	03/31/2006	J		1464190.613	597758.715
SU23-70-126	Potassium-40	47.8	12.400	0.800	03/31/2006			1464190.613	597758.715
SU23-70-126	Protactinium-231	4	1.400	1.400	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Radium-226	2.9	0.740	0.120	03/31/2006			1464190.613	597758.715
SU23-70-126	Thorium-229	18.9	0.780	0.780	03/31/2006	U	UJ	1464190.613	597758.715
SU23-70-126	Uranium-234	2	0.720	0.060	03/31/2006			1464190.613	597758.715
SU23-70-126	Uranium-235	3.2	0.060	0.053	03/31/2006	J	J	1464190.613	597758.715
SU23-70-126	Uranium-238	2.2	1.180	0.050	03/31/2006			1464190.613	597758.715
SU23-70-127	Actinium-227	4.6	0.420	0.420	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Actinium-228	1.93	0.420	0.340	03/31/2006		J	1464205.428	597752.160
SU23-70-127	Americium-241	63	0.190	0.190	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Bismuth-207	1.2	0.074	0.074	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Bismuth-210M	8.3	0.096	0.096	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Bismuth-214	1.17	0.930	0.130	03/31/2006			1464205.428	597752.160
SU23-70-127	Cesium-137	3.8	0.120	0.120	03/31/2006	U	U	1464205.428	597752.160
SU23-70-127	Cobalt-60	0.7	0.130	0.130	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Lead-210	7.4	2.500	2.100	03/31/2006		J	1464205.428	597752.160
SU23-70-127	Lead-212	16.6	0.590	0.130	03/31/2006			1464205.428	597752.160
SU23-70-127	Plutonium-238	55	15.600	0.070	03/31/2006			1464205.428	597752.160
SU23-70-127	Plutonium-239/240	62	0.170	0.043	03/31/2006	J	J	1464205.428	597752.160
SU23-70-127	Potassium-40	47.8	12.100	0.800	03/31/2006			1464205.428	597752.160
SU23-70-127	Protactinium-231	4	1.800	1.800	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Radium-226	2.9	0.930	0.130	03/31/2006			1464205.428	597752.160
SU23-70-127	Thorium-229	18.9	0.990	0.990	03/31/2006	U	UJ	1464205.428	597752.160
SU23-70-127	Uranium-234	2	0.770	0.040	03/31/2006			1464205.428	597752.160
SU23-70-127	Uranium-235	3.2	0.088	0.034	03/31/2006	J	J	1464205.428	597752.160
SU23-70-127	Uranium-238	2.2	0.970	0.040	03/31/2006			1464205.428	597752.160
SU23-70-128	Actinium-227	4.6	1.000	0.560	03/31/2006			1464219.691	597745.759
SU23-70-128	Actinium-228	1.93	0.810	0.230	03/31/2006			1464219.691	597745.759
SU23-70-128	Americium-241	63	0.170	0.170	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Bismuth-207	1.2	0.054	0.054	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Bismuth-210M	8.3	0.087	0.087	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Bismuth-214	1.17	0.580	0.150	03/31/2006			1464219.691	597745.759
SU23-70-128	Cesium-137	3.8	0.082	0.082	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Cobalt-60	0.7	0.097	0.097	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Lead-210	7.4	2.100	2.100	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Lead-212	16.6	0.577	0.120	03/31/2006			1464219.691	597745.759
SU23-70-128	Plutonium-238	55	14.900	0.080	03/31/2006			1464219.691	597745.759
SU23-70-128	Plutonium-239/240	62	0.114	0.041	03/31/2006	J	J	1464219.691	597745.759
SU23-70-128	Potassium-40	47.8	13.900	0.600	03/31/2006			1464219.691	597745.759
SU23-70-128	Protactinium-231	4	1.700	1.700	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Radium-226	2.9	0.580	0.150	03/31/2006			1464219.691	597745.759
SU23-70-128	Thorium-229	18.9	0.970	0.970	03/31/2006	U	UJ	1464219.691	597745.759
SU23-70-128	Uranium-234	2	0.550	0.050	03/31/2006			1464219.691	597745.759
SU23-70-128	Uranium-235	3.2	0.047	0.032	03/31/2006	J	J	1464219.691	597745.759
SU23-70-128	Uranium-238	2.2	0.760	0.030	03/31/2006			1464219.691	597745.759
SU23-70-129	Actinium-227	4.6	0.350	0.350	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Actinium-228	1.93	0.400	0.240	03/31/2006			1464232.387	597740.816
SU23-70-129	Americium-241	63	0.140	0.140	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Bismuth-207	1.2	0.053	0.053	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Bismuth-210M	8.3	0.071	0.071	03/31/2006	U	UJ	1464232.387	597740.816

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Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-129	Bismuth-214	1.17	0.580	0.290	03/31/2006			1464232.387	597740.816
SU23-70-129	Cesium-137	3.8	0.087	0.087	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Cobalt-60	0.7	0.063	0.063	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Lead-210	7.4	1.400	1.400	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Lead-212	16.6	0.372	0.100	03/31/2006			1464232.387	597740.816
SU23-70-129	Plutonium-238	55	6.890	0.050	03/31/2006			1464232.387	597740.816
SU23-70-129	Plutonium-239/240	62	0.058	0.051	03/31/2006	J	J	1464232.387	597740.816
SU23-70-129	Potassium-40	47.8	10.100	0.500	03/31/2006			1464232.387	597740.816
SU23-70-129	Protactinium-231	4	1.600	1.600	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Radium-226	2.9	0.580	0.290	03/31/2006			1464232.387	597740.816
SU23-70-129	Thorium-229	18.9	0.800	0.800	03/31/2006	U	UJ	1464232.387	597740.816
SU23-70-129	Uranium-234	2	0.760	0.050	03/31/2006			1464232.387	597740.816
SU23-70-129	Uranium-235	3.2	0.090	0.056	03/31/2006	J	J	1464232.387	597740.816
SU23-70-129	Uranium-238	2.2	0.860	0.030	03/31/2006			1464232.387	597740.816
SU23-70-130	Actinium-227	4.6	0.550	0.550	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Actinium-228	1.93	1.000	0.230	04/03/2006			1464193.388	597740.678
SU23-70-130	Americium-241	63	0.220	0.220	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Bismuth-207	1.2	0.088	0.088	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Bismuth-210M	8.3	0.110	0.110	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Bismuth-214	1.17	1.050	0.460	04/03/2006			1464193.388	597740.678
SU23-70-130	Cesium-137	3.8	0.160	0.160	04/03/2006	U	U	1464193.388	597740.678
SU23-70-130	Cobalt-60	0.7	0.140	0.140	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Lead-210	7.4	2.800	2.800	04/03/2006	U	U	1464193.388	597740.678
SU23-70-130	Lead-212	16.6	0.900	0.160	04/03/2006			1464193.388	597740.678
SU23-70-130	Plutonium-238	55	10.500	0.080	04/03/2006			1464193.388	597740.678
SU23-70-130	Plutonium-239/240	62	0.063	0.028	04/03/2006	J	J	1464193.388	597740.678
SU23-70-130	Potassium-40	47.8	20.300	0.900	04/03/2006			1464193.388	597740.678
SU23-70-130	Protactinium-231	4	2.200	2.200	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Radium-226	2.9	1.050	0.460	04/03/2006			1464193.388	597740.678
SU23-70-130	Thorium-229	18.9	0.970	0.970	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Uranium-234	2	0.670	0.020	04/03/2006			1464193.388	597740.678
SU23-70-130	Uranium-235	3.2	0.056	0.056	04/03/2006	U	UJ	1464193.388	597740.678
SU23-70-130	Uranium-238	2.2	0.890	0.050	04/03/2006			1464193.388	597740.678
SU23-70-131	Actinium-227	4.6	0.510	0.510	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Actinium-228	1.93	1.150	0.230	03/31/2006			1464206.334	597737.568
SU23-70-131	Americium-241	63	0.220	0.220	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Bismuth-207	1.2	0.081	0.081	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Bismuth-210M	8.3	0.097	0.097	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Bismuth-214	1.17	0.940	0.420	03/31/2006			1464206.334	597737.568
SU23-70-131	Cesium-137	3.8	0.140	0.140	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Cobalt-60	0.7	0.097	0.097	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Lead-210	7.4	2.300	2.100	03/31/2006		J	1464206.334	597737.568
SU23-70-131	Lead-212	16.6	0.980	0.140	03/31/2006			1464206.334	597737.568
SU23-70-131	Plutonium-238	55	3.080	0.070	03/31/2006			1464206.334	597737.568
SU23-70-131	Plutonium-239/240	62	0.043	0.043	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Potassium-40	47.8	19.200	0.800	03/31/2006			1464206.334	597737.568
SU23-70-131	Protactinium-231	4	1.600	1.600	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Radium-226	2.9	0.940	0.420	03/31/2006			1464206.334	597737.568
SU23-70-131	Thorium-229	18.9	1.100	1.100	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Uranium-234	2	0.650	0.050	03/31/2006			1464206.334	597737.568
SU23-70-131	Uranium-235	3.2	0.053	0.053	03/31/2006	U	UJ	1464206.334	597737.568
SU23-70-131	Uranium-238	2.2	0.760	0.040	03/31/2006			1464206.334	597737.568
SU23-70-132	Actinium-227	4.6	0.660	0.480	03/31/2006			1464220.018	597732.139
SU23-70-132	Actinium-228	1.93	0.350	0.260	03/31/2006		J	1464220.018	597732.139
SU23-70-132	Americium-241	63	0.150	0.150	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Bismuth-207	1.2	0.063	0.063	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Bismuth-210M	8.3	0.082	0.082	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Bismuth-214	1.17	0.650	0.120	03/31/2006			1464220.018	597732.139
SU23-70-132	Cesium-137	3.8	0.084	0.084	03/31/2006	U	UJ	1464220.018	597732.139

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Table 1: Offsite Verification Results (pCi/g)

[bold indicates result > CO and <HS]

Location	Analyte	CO	Result	Detection Limit	Date	Lab Qual	Data Qual	X Coord	Y Coord
SU23-70-132	Cobalt-60	0.7	0.100	0.100	03/31/2006	U	U	1464220.018	597732.139
SU23-70-132	Lead-210	7.4	1.800	1.800	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Lead-212	16.6	0.458	0.093	03/31/2006			1464220.018	597732.139
SU23-70-132	Plutonium-238	55	1.010	0.050	03/31/2006			1464220.018	597732.139
SU23-70-132	Plutonium-239/240	62	0.026	0.026	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Potassium-40	47.8	12.300	0.700	03/31/2006			1464220.018	597732.139
SU23-70-132	Protactinium-231	4	1.600	1.600	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Radium-226	2.9	0.650	0.120	03/31/2006			1464220.018	597732.139
SU23-70-132	Thorium-229	18.9	0.790	0.790	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Uranium-234	2	0.770	0.070	03/31/2006			1464220.018	597732.139
SU23-70-132	Uranium-235	3.2	0.065	0.065	03/31/2006	U	UJ	1464220.018	597732.139
SU23-70-132	Uranium-238	2.2	0.730	0.050	03/31/2006			1464220.018	597732.139

U: not detected

J: estimated

CO: cleanup objective

D: duplicate

A: indicates reverification was required

** Bi-214 is a daughter product in the U-238 decay chain. The CO for U-238 accounts for daughter product activity; therefore these results are not considered significant and not evaluated further

Table 2: SUs and COCs

SU	1-11	12-18	19 & 23	20-22
Pu-238	X	X	X	X
Ac-227			X	
Ra-226			X	
U-238			X	

SU: survey unit

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APPENDIX C

POST-EX SUD EXCERPT

A24/89

Survey Unit Design (SUD)

FINAL

Project: **PRS 70 – Partial for Soils (SU19 and SU23)**

Review & Approval

Project Engineer: Mark Spivey _____

Reviewer: James Fontaine _____

Reviewer: _____

Document	Title
Fact Sheet	PRSs 67, 68, 69, & 70: Site Stormwater Drainage System; March 2004
RP	Site Stormwater Drainage System Removal Plan, Final, August 2004
WP	PRS 69 and 70 Sediment Removal, Cleaning, and Sampling, Draft, March 2005, ER/ST-04-017
VSAP	Standard Verification Sampling & Analysis Plan, Final, August 2004

☐ Pre-Excavation or ☒ Post-Excavation SUD (SU 12 – 18, SU 19, & 23 Only)

Summary of Changes (for Post-Ex SUDs ONLY) (See following pages for details)
1. Did the COC(s) change? **Yes: SU 12 – 18, SU 19, and SU 23 (Added)**
2. Did the grid size or N change? **Yes: SU 19 & SU 23**
3. Did the classification change? **No**
4. Were bias/judgmental samples collected? **Yes**
5. Other significant change? **Yes: SU 19 Size, SU 12 – 18 Removed & SU 23 was Added**

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SUD Worksheet

Acronyms

AM	Action Memorandum
CO	Cleanup Objective
COC	Contaminant of Concern
Chem	Chemical
dev	deviation
Iso	Isotopic
EPA	Environmental Protection Agency
FSS	Final Status Survey
HS	Hot Spot
MARSSIM	Multi – Agency Radiation Survey and Site Investigation Manual
MD	Mound Document
MDC	Minimum Detectable Concentration
MEIMS	Mound Environmental Information Management System
NA or N/A	Non-applicable
NC	No Change
pCi/g	pico -Curie(s) per gram
PRS	Potential Release Site
Pu	Plutonium
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action/Removal Action
RadCon	Radiological Control
RASS	Remedial Action Support Survey
RP	Removal Plan
SPF	Survey Plan Form
RSDS	Radiological Survey Data Sheet
(s) or s	effective standard deviation (MARSSIM)
Std	standard
SU	Survey Unit
SUD	Survey Unit Design
TBD	To Be Determined
Th	Thorium
U	Uranium
VSAP	Verification Sampling and Analysis Plan
VSP	Visual Sample Plan
WP	Work Package/Work Plan

A26/99

SUD Worksheet

Item 1	Summary of historic **information** relevant to SU: PRS 70 is part of the site's storm water runoff system that supports the reduction of suspended solids in runoff. PRS 70 is located at the southwest end of the drainage ditch (PRS 67). It consists of concrete drainage features (the "Missouri Crossing") which directs the flow of storm water (between PRS 69 and the impoundment), an open impoundment with earthen sides and bottom used to control the flow of water and settle sediment, and a concrete channel and weir basin that moderates the flow so that the discharge volume can be measured. The open impoundment is partitioned into three basins by concrete dividers. The Removal Action (RA) associated with this SUD addresses identified contamination areas with Contaminants of Concern (COCs) above the cleanup objective (CO) which was detected in the impoundment sediment.
Item 2	Summary of historic data relevant to SU: See Appendix D

Item 3a

COC	BASIS	(pCi/g) CO	HS	MAX	Offsite Analysis & Compendium Method: Gamma (A-015)	Iso Pu (A-012)	Iso Th (A-012)	Iso U (A-012)
Pu-238	Public Fact Sheet for PRSs 67, 68, 69, & 70: Site Stormwater Drainage System	55	165.13	749		X		
Th-228	PRS 68 Post-Ex SUD (RSDS 04-ER-0532 page 11 of 13), up-gradient	2.6	4.8	4.42			X	
Th-232	PRS 68 Post-Ex SUD (RSDS 04-ER-0532 page 11 of 13), up-gradient	2.1	3.5	3.26			X	

Analyses are to be performed per Mound Methods Compendium and COs (for surface samples/analysis i.e., bedrock, asphalt, concrete) as applicable. Compendium Method A-012 is Isotopic Uranium, Isotopic Plutonium, and Isotopic Thorium by Alpha Spectrometry and Compendium Method A-015 is Gamma Spectrometry. Surface samples/analysis are to be in accordance with MD-80036 OP 30005, 30007, and 30040. Hard surfaces will be swiped and gross alpha and beta measurements will be performed and compared to the most restrictive COC in Mound 2000 Work Plan Appendix A Table 1 (NUREG 1.86 Regulatory Guide). If the location fails to meet the most restrictive criteria then it will be sent to alpha spec for determination of the COC so the applicable, instead of the most restrictive, criteria can be applied.

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Item 3a Cont	Changes if any, from Pre-Ex SUD: Clarification: Per the Fact Sheet cited above; Pu-238 is the only COC in PRS 70. Th-228 and Th-232, in the table above, are being removed as COCs because they were erroneously included in the Pre-Ex SUD from PRS 68 RASS data. However, as noted in Item 10, all samples will be analyzed onsite by gamma spec analysis before being shipped to the offsite lab. Based upon data from RASS sampling within the newly added SU 23 area Ra-226, Ac-227, PU-238, and U-238 are the COCs for SU 23. For SU 23: Ra-226 has a CO=2.9, HS=4.7, and a Maximum RASS Result = 5.79; Ac-227 has a CO=4.6, HS=13.61, and Maximum RASS Result = 8.06; Pu-238 has a CO=55, HS=165, and Maximum RASS Result = 157; and U-238 has a CO=2.2, HS=4.2, and Maximum RASS Result = 2.99. Samples from SU 23 will undergo off site gamma spec (A-015) for Ra-226 and Ac-227, Iso Pu (A-012) for Pu-238, and Iso U (A-012) for U-238.
Item 3b	Chem. basis for std dev, AM COCs/New COCs N/A

Item 4

Classify Areas & provide justification	Class	Scan Coverage guidelines
The areas identified within this SUD are to be considered Class 1 due to a potential for radioactive contamination (based on site operating history) or know contamination (based on previous radiological surveys).	1	100%
Note: Given the geometry of the SUs it is not physically possible to achieve 100% scan coverage (due to intersecting angle of floor to wall, etc.); therefore a best effort will be given.	2	10-90%
	3	Judgmental

Changes if any, from Pre-Ex SUD: None.

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Item 5	Subdivide areas into SUs 22 Class 1 SUs	See Appendix C The SUs determination is based upon size and geometry. Hard Surface (concrete) SUs are limited to an area of 100 m^2 (1076.4 ft^2) Open impoundment and creek inlet (non-hard surface) are SU19 with a combined area of approximately 903.76 m^2 (9,728 ft^2).
	Changes if any, from Pre-Ex SUD: Hard surfaces that comprised SUs 12-18 have been removed and disposed of as waste. Therefore, they will be considered closed. **Areas under removed hard surfaces of the Missouri Crossing (SU 1 through SU 11) compose newly added SU 23. SU 23 has a total area of 167 m^2 (1,799 ft^2).** **The enlarged SU 19 area is now 1,921 m^2 (20,673 ft^2), as shown in Appendix II Figure 1.**	
Item 6a	Calculations / Rad a. Calculate the (s) for each COC listed above b. Number of Samples (N)	See Appendix A & B Hard Surface (All except SU19): s=17% Soil: s=0.36 Hard Surface: N=10 + 20% or nominally 12 per SU SU1 through SU11: **135 Samples** selected by VSP SU12 through SU18: **82 Samples** selected by VSP SU20 through SU22: **36 Samples** selected by VSP Soil: SU19 - MARSSIM Spread N=11, Area Factor N=333, due to Pu-238 being the primary driver the default **15 foot triangular grid shall apply** and therefore the number of samples is dependent upon the random starting point and area. The number of samples selected by VSP based upon a 15-foot triangular grid is 54 (VSP calculated N=54 based upon area). *Note: Due to limited data in PRS 70, Data from PRS 67 was used to simulate as left conditions for the calculations*

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Item 6a Cont	**Changes if any, from Pre-Ex SUD: For SU 19, MARSSIM Spreadsheet N=8, Area Factor N=474 due to Pu-238 as COC, VSP calculated N=107 based upon a 15-foot triangular grid. Hard surfaces within the SU-19 footprint, which were previously designated SUs 12-18, were physically removed as waste and are considered closed (Refer to Photo of PRS 70 Open Impoundment in Attachment II).** **SU 23 was added for areas under removed hard surfaces of the Missouri Crossing (SU 1 through SU 11). Based upon a 15-foot triangular grid VSP determined N=10. An additional 6 sample locations were placed based upon professional judgment to provide proper area coverage for a total of N=16 for SU 23.** **Note: Due to limited data in PRS 70, data from PRS 11 is used in the Post-Ex SUD to simulate as-left conditions. PRS 11 is adjacent to PRS 70 and geographically similar. In addition, these data are from samples that were taken on a 15-foot triangular grid following remediation.**	
Item 6b	Calculations/ Chem., Std dev, Number of Samples	NA
	Changes if any, from Pre-Ex SUD: None.	
Item 7	Grid spacing	Hard Surface: See Appendix A and VSP outputs in Appendix C Soil Area (SU19) 15-foot triangular grid (MARSSIM spreadsheet in Appendix B) per SVSAP Section 3.7. SU19 proposed sampling layout in Appendix C.
	Changes if any, from Pre-Ex SUD: SU 19 proposed sampling layout is shown on Attachment II, Figure 1. Sample coordinates are presented in Attachment II Table 2. **SU 23 grid spacing is based upon a 15-foot triangular grid (MARSSIM spreadsheet in Attachment II) per SVSAP Section 3.7.**	

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Item 8	QA/QC	For Soil Samples: 1/20 via field duplicate in accordance with Mound Methods Compendium. Q-002 Chain-of-Custody Procedures Q-003 Documentation Requirements Q-004 Laboratory Data Reduction Q-006 Validation of Laboratory Data Packages Q-007 Data Assessment Q-008 Data Integrity Verification Q-010 Electronic Data Deliverable Format Specifications – MEIMS Std. ... S-001 General Instructions for Field Personnel S-002 Soil Sampling With a Spade and Scoop S-028 Sample Control and Documentation S-029 Guide to Handling, Packaging, and Shipping of Samples and Method Q-002 For Hard Surfaces: QA/QC aspects are covered between the SUD, the RSDS information/ requirements, and following MD-80036 (Operations 10001, 10002, and 30030) and MD-80043 (Operation 400).
	Changes if any, from Pre-Ex SUD: None.	
Item 9	Bias/ Judgment samples	SU12 has 5 bias locations based upon professional judgment to have adequate coverage SU22 has 4 bias locations based upon professional judgment to have adequate coverage
	Changes if any, from Pre-Ex SUD: Structures representing SU12 through SU 18 have been removed as waste. **Six sample locations were placed based upon professional judgment to provide acceptable area coverage.**	

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Item 10	Not otherwise covered.../ comments	The sediment basins will be dewatered and potentially contaminated sediments removed. The remaining hard surfaces will be cleaned (pressure washed) and allowed to dry such that the verification surveys can be performed. Because the concrete structures will be left in place, the primary concern is surface contamination on the structures; therefore, a large portion of the FSS will be associated with RSDSs. Cracks in the concrete shall be marked and assessed by the RCTs, RCT POC, and project engineer. The crack shall be evaluated for contamination and if it indicates that it has provided for contamination migration, then chipping away concrete for further assessment shall be performed. If the crack is of sufficient width and depth to provide a pathway for contaminated silt through the entire depth of the concrete, a soil sample from the subsurface materials shall be taken. In-process sampling events (Characterization and RASS samples of sediment) will be conducted during the entire PRS remediation. Those samples will undergo gamma spectrometry analysis to guide actions. Surveys of the surface following cleaning will be used to determine when FSS (verification) sampling can be conducted. Site policy requires performance of onsite soil screening (NaI or germanium) on soil verification samples slated for offsite analysis and evaluation of the results prior to shipment. This analysis will generally be performed on a split of the verification sample containerized in an EPA dish (approximately 500 mL) but may be performed on the actual verification sample as long as containerization requirements are maintained for the offsite lab. Count time of the analysis will be sufficient to meet the cleanup objectives (COs) of the contaminants of concern (COCs) requiring verification. On site gamma spec typically provides results for: Co-60, Cs-137, Pb-210, Ra-226, Ac-227 (D), Th-230, Th-232 (D), Pu-238, and Am-241. In addition, any isotopes identified to be greater than their MDA (e.g., U-238, Bi-210m, etc.) will be reported on the analytical results sheet. Any exceedances of the CO associated with any isotope will constitute disposal as contaminated waste and evaluation for inclusion as a COC. If there is an insufficient volume of material to fill an EPA dish within a 1m x 1m square centered on the proposed sample location, due to bedrock or obstruction (such as a structure, foundation, concrete, pavement/asphalt (pond lining), large rock formations, utility bank, etc. which is not to be removed), then sediment/soil analysis will not be performed. In lieu of a sediment/soil analysis result, RadCon will survey the surface per COs and provide documentation thereof in an RSDS. The RSDS(s) will be included as documentation. Any final sample location that does not meet the surface release criteria will be submitted to the Core Team for concurrence or determination of further action.

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Item 10 Cont		Since Building methodology for Final Status Survey on hard surfaces (such as concrete and asphalt) was unable to be duplicated in the outside environment (due to problems encountered during RASS sampling, Reference PRS 68 Post-Ex SUD), the use of the L-2350 instrument and the 43-37 floor probe in an outdoor environment was reevaluated. The information contained in the Survey Planning Form (SPF), from the Building methodology approach, is covered between the SUD, the RSDSs, and following MD-80036 (Operations 10001, 10002, and 30030) and MD-80043 (Operation 400). The plan is to place all facets of the Storm Drainage System back into service upon completion of verification sampling. Most of the plant remediation projects, which supply storm water to this system, will be nearing completion and present a low possibility for recontamination. Those areas, which are not complete, will require monitoring of potential contamination sources and the appropriate storm water pollution prevention plans must be put in place to guard against recontamination.

Changes if any, from Pre-Ex SUD: Sediment from the basins was removed along with any hard surfaces (SUs 12-18). As a result, SUs 12-18 are removed from further consideration and are considered closed. The verification samples for SU 19 will be surface soil samples.

Cracks in SU 1 – 11 concrete were assessed by the RCT, RCT POC, and the project engineer. The evaluation of the cracks resulted in sections of concrete being removed and the addition of SU 23. Additional COCs for SU 23 were developed from the RASS data obtained following concrete removal.

The Open Impoundment is not an integral part of the Site Storm Water Pollution Prevention Plan or any site discharge permit. Restoration of the Open Impoundment will consist of backfilling up to the surrounding grade and maintaining a drainage swale from the Missouri Crossing East Inlet gate to the concrete overflow channel to the West.

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Attachment III

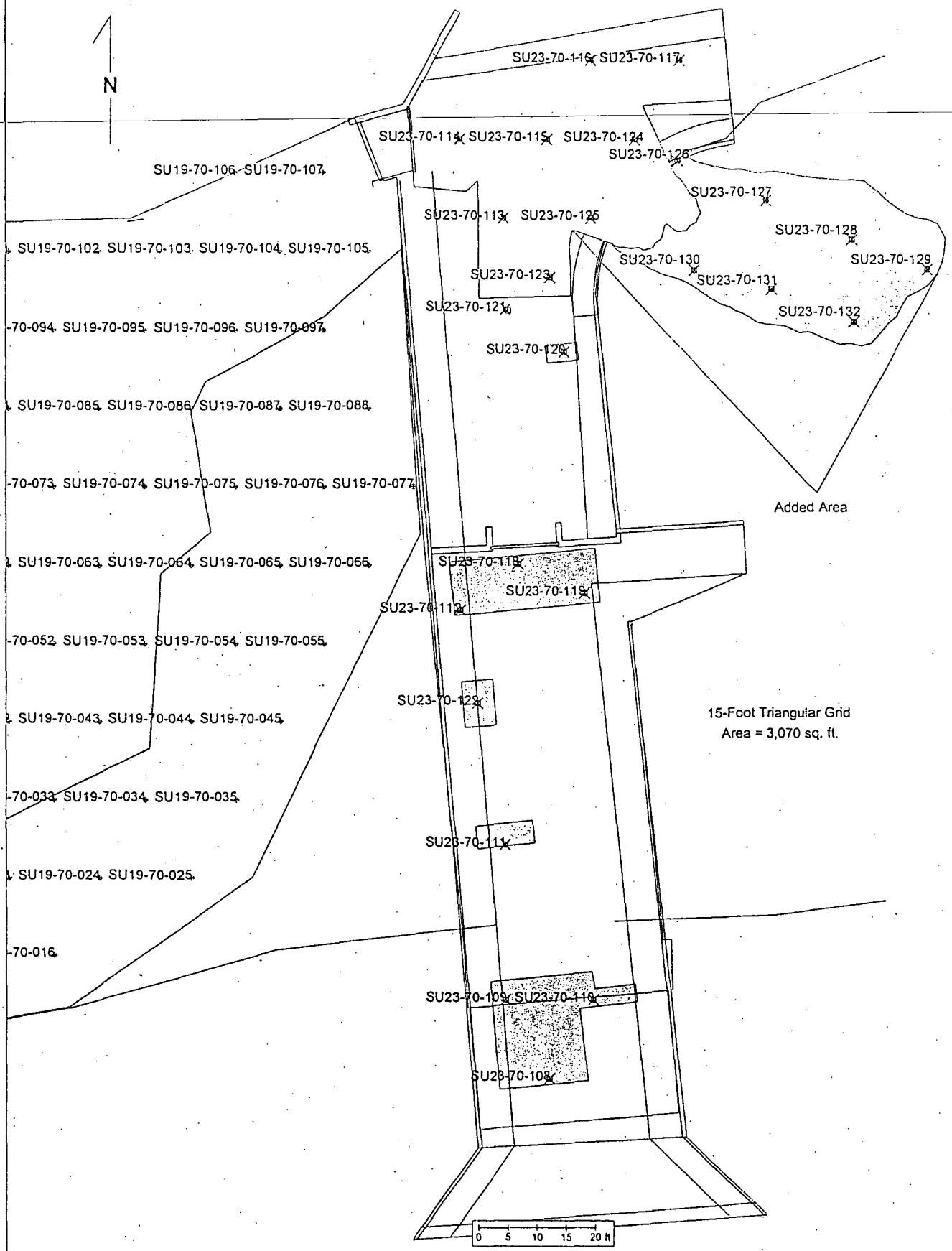
CHANGES FROM PRS 70 Post-EX Partial I Soils SUD that apply to SU23 only

- Explanation for Attachment III
- Figure 1: Attachment III Revised Figure 1 SU23 (expanded area and sample locations)
- Table 1: PRS 70 Attachment III Revised SU19 and 23 (Comparison)
- Table 2: All Sample Coordinates for SU23
- MARSSIM spreadsheet re-calculations for enlarged area of SU23
- PRS 11 Off-Site U-238 Surrogate Data for Standard Deviation Calculation

Explanation for Attachment III

On-site gamma spec results for location SU23-70-115 yielded a U-238 result above CO (2.6 pCi/g, CO: 2.2 pCi/g). Consequently, further remediation occurred proceeding to the southeast. Due to detection of U-238 and further remediation, U-238 was added as a COC and the area of SU23 was expanded to encompass the remedial area as well as the load-out area.

PRS 70 Attachment III Revised Figure 1



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PRS 70 Attachment III Revised SU19 and 23 (Comparison)
Table 1

Pre Ex SUD				Post Ex SUD					Appendix III				
SU#	Location	COC	Proposed Area of Verification (sq ft)	SU#	Location	COC	Off-Site Analysis	Actual Area of Verification (sq ft)	SU#	Location	COC	Off-Site Analysis	Actual Area of Verificati on (sq ft)
TBD	Subsurface (below concrete) Su(s) not developed in the Pre-Ex SUD	TBD	TBD	23	Subsurface (soil) locations where concrete and crack contamination was removed from the Missouri Crossing (influent to PRS 69)	Ac-227 Pu-238 Ra-226	Gamma Spec Iso-Pu	1,799	23	Northeast area of the Missouri Crossing associated with sample location SU23-70-115	Ac-227 Pu-238 Ra-226 U-238	n/c	3,070
19	The open impoundment area in the Southwest section of the plant. West of the Missouri Crossing and prior to Outfall 002	Pu-238 Th-228 Th-232	9,728	19	n/c	Pu-238	Iso-Pu	20,673	n/c	n/c	n/c	n/c	n/c

Location SU23-70-115 yielded a U-238 result above CO (2.6 pCi/g, CO: 2.2 pCi/g). Consequently, further remediation occurred proceeding to the southeast. Due to detection of U-238 and further remediation, U-238 was added as a COC and the area of SU23 was expanded.

TBD - To Be Determined
n/c - no change

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PRS 70 Attachment III
Sample Coordinates
Table 2

Area: SU23

X Coord	Y Coord	Label
1464168.347	597606.448	SU23-70-108
1464160.839	597619.489	SU23-70-109
1464175.911	597619.489	SU23-70-110
1464160.839	597645.461	SU23-70-111
1464153.346	597684.461	SU23-70-112
1464160.839	597749.348	SU23-70-113
1464153.346	597762.376	SU23-70-114
1464168.333	597762.376	SU23-70-115
1464175.826	597775.404	SU23-70-116
1464190.813	597775.404	SU23-70-117
1464163.223	597692.125	SU23-70-118
1464174.549	597687.271	SU23-70-119
1464171.313	597727.293	SU23-70-120
1464161.180	597734.276	SU23-70-121
1464156.241	597668.963	SU23-70-122
1464168.758	597739.555	SU23-70-123
1464183.320	597762.376	SU23-70-124
1464175.826	597749.348	SU23-70-125
1464190.558	597758.800	SU23-70-126
1464205.374	597752.243	SU23-70-127
1464219.680	597745.771	SU23-70-128
1464232.453	597740.832	SU23-70-129
1464193.368	597740.747	SU23-70-130
1464206.311	597737.596	SU23-70-131
1464220.020	597732.147	SU23-70-132

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.108	Ac-227+D	4.6	(pCi/g)
	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
	Cs-137+D	3.8	(pCi/g)
	Co-60	0.7	(pCi/g)
	Cu-244	92	(pCi/g)
	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
1.729	Pu-238	55	(pCi/g)
	Pu-239/240	62	(pCi/g)
	Pa-231+D	4	(pCi/g)
0.190	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
	Th-228+D	2.6	(pCi/g)
	Th-230+D	2.8	(pCi/g)
	Th-232+D	2.1	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	16.11	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	121.2	(pCi/g)
0.178	U-238+D	2.2	(pCi/g)
	Bi-207	1.2	(pCi/g)
	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(pCi/g)
	Sr-90	94.72	(pCi/g)

* = No Change
** = U-238 Added and Area Expanded

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		Estimate (N) - Sign Test	
Type I Error	0.05	DCGL	1
$Z_{1\text{-alpha}}$	1.645	LBGR	0.67
Type II Error	0.2	Delta	0.33
$Z_{1\text{-beta}}$	0.842	*(s)*	0.11
		Rel Shift	2.966
Effective	0.11 *(s)*	*(N)*	8.00
Sign p	0.993790		

Calculate the Total Effective (s)

Area Factor adjusted (N) 105

Due to an unreasonable number of calculated samples, a default 15 foot grid will be used.

Sample Grid Spacing

SU Area	285	m^2	SU Area **	3,070	ft^2
Grid Length	5.6	m	Grid Length	18.2	ft
Grid Height	4.8	m	Grid Height	15.8	ft

PRS	70	**Survey Unit**	23

Surrogate Data

PRS 11 Off-Site (STL)
Final Status Survey Results

PRS 11:
Short

ID	Date Taken	X Coord	Y Coord	Elev.	MDC	Used	Unit	Isotope
1	11/29/2005	1463942.728	597019.783	702.064	0.02	0.491	PCI/G	Uranium-238
2	11/29/2005	1463957.728	597019.783	697.004	0.02	0.700	PCI/G	Uranium-238
3	12/1/2005	1463972.728	597019.783	703.747	0.02	0.780	PCI/G	Uranium-238
4	11/30/2005	1463987.728	597019.783	693.035	0.01	0.580	PCI/G	Uranium-238
5	11/30/2005	1464002.728	597019.783	697.010	0.02	0.417	PCI/G	Uranium-238
6	11/30/2005	1464017.728	597019.783	690.383	0.03	0.850	PCI/G	Uranium-238
7	12/1/2005	1464032.728	597019.783	689.652	0.01	0.790	PCI/G	Uranium-238
8	11/30/2005	1464047.728	597019.783	690.374	0.03	0.680	PCI/G	Uranium-238
9	11/30/2005	1464062.728	597019.783	690.599	0.02	0.650	PCI/G	Uranium-238
10	11/30/2005	1464077.728	597019.783	691.445	0.01	1.000	PCI/G	Uranium-238
11	12/1/2005	1464122.728	597019.783	703.183	0.01	0.700	PCI/G	Uranium-238
12	12/1/2005	1464137.728	597019.783	708.625	0.01	0.810	PCI/G	Uranium-238
13	12/1/2005	1464152.728	597019.783	710.754	0.01	0.710	PCI/G	Uranium-238
14	11/29/2005	1463950.228	597032.774	697.324	0.02	0.940	PCI/G	Uranium-238
15	11/29/2005	1463965.228	597032.774	691.986	0.02	1.120	PCI/G	Uranium-238
16	11/30/2005	1463980.228	597032.774	691.857	0.01	0.700	PCI/G	Uranium-238
17	11/30/2005	1463995.228	597032.774	690.031	0.01	0.580	PCI/G	Uranium-238
18	11/30/2005	1464010.228	597032.774	689.241	0.01	0.750	PCI/G	Uranium-238
19	11/30/2005	1464025.228	597032.774	688.075	0.02	0.740	PCI/G	Uranium-238
20	11/30/2005	1464040.228	597032.774	688.067	0.03	0.660	PCI/G	Uranium-238
21	11/30/2005	1464055.228	597032.774	688.910	0.03	0.580	PCI/G	Uranium-238
22	11/30/2005	1464070.228	597032.774	689.867	0.01	0.690	PCI/G	Uranium-238
24	12/1/2005	1464115.228	597032.774	705.731	0.02	0.710	PCI/G	Uranium-238
25	12/1/2005	1463957.728	597045.764	695.221	0.04	1.040	PCI/G	Uranium-238
26	11/29/2005	1463972.728	597045.764	690.465	0.02	0.850	PCI/G	Uranium-238
27	11/30/2005	1463987.728	597045.764	688.818	0.02	0.630	PCI/G	Uranium-238
28	11/30/2005	1464002.728	597045.764	688.753	0.02	0.740	PCI/G	Uranium-238
29	11/30/2005	1464017.728	597045.764	687.060	0.01	0.730	PCI/G	Uranium-238
30	11/30/2005	1464032.728	597045.764	686.441	0.01	0.910	PCI/G	Uranium-238
31	11/30/2005	1464047.728	597045.764	687.006	0.02	0.780	PCI/G	Uranium-238
32	11/29/2005	1463950.228	597058.754	701.904	0.01	0.730	PCI/G	Uranium-238
33	11/29/2005	1463965.228	597058.754	690.914	0.02	0.690	PCI/G	Uranium-238
34	11/29/2005	1463980.228	597058.754	690.065	0.01	0.533	PCI/G	Uranium-238
35	11/30/2005	1463995.228	597058.754	689.196	0.02	0.720	PCI/G	Uranium-238
36	11/30/2005	1464010.228	597058.754	687.800	0.02	0.670	PCI/G	Uranium-238
38	11/29/2005	1463957.728	597071.745	701.617	0.01	0.890	PCI/G	Uranium-238
39	11/29/2005	1463972.728	597071.745	690.465	0.01	0.850	PCI/G	Uranium-238
40	11/30/2005	1463987.728	597071.745	689.570	0.01	0.620	PCI/G	Uranium-238
41	11/30/2005	1464002.728	597071.745	689.209	0.02	0.860	PCI/G	Uranium-238
43	11/29/2005	1463950.228	597084.735	703.634	0.02	0.710	PCI/G	Uranium-238
44	11/29/2005	1463965.228	597084.735	693.712	0.01	0.880	PCI/G	Uranium-238
45	11/29/2005	1463980.228	597084.735	691.713	0.01	0.690	PCI/G	Uranium-238
46	11/30/2005	1463995.228	597084.735	689.195	0.02	1.050	PCI/G	Uranium-238
47	11/30/2005	1464010.228	597084.735	692.378	0.01	0.720	PCI/G	Uranium-238
48	11/29/2005	1463957.728	597097.726	702.713	0.02	1.000	PCI/G	Uranium-238
49	11/29/2005	1463972.728	597097.726	692.705	0.02	0.600	PCI/G	Uranium-238
50	11/30/2005	1463987.728	597097.726	690.608	0.03	0.510	PCI/G	Uranium-238
51	11/30/2005	1464002.728	597097.726	690.764	0.01	0.770	PCI/G	Uranium-238
53A	1/12/2005	1463965.228	597110.716	699.585	0.05	0.710	PCI/G	Uranium-238
54	12/1/2005	1463980.228	597110.716	689.535	0.04	0.670	PCI/G	Uranium-238
55	11/30/2005	1463995.228	597110.716	691.604	0.03	1.030	PCI/G	Uranium-238
56	11/30/2005	1464010.228	597110.716	693.807	0.02	0.840	PCI/G	Uranium-238
57	12/1/2005	1464025.228	597110.716	702.228	0.03	0.870	PCI/G	Uranium-238
58	11/29/2005	1463957.728	597123.706	704.129	0.01	0.760	PCI/G	Uranium-238
59	11/29/2005	1463972.728	597123.706	699.094	0.01	1.320	PCI/G	Uranium-238
60	12/1/2005	1463987.728	597123.706	696.134	0.02	0.730	PCI/G	Uranium-238
61	12/1/2005	1464002.728	597123.706	703.952	0.01	0.650	PCI/G	Uranium-238
62	11/29/2005	1463980.228	597136.697	707.998	0.01	0.571	PCI/G	Uranium-238
63	11/30/2005	1464093.226	597012.324	696.566	0.03	0.840	PCI/G	Uranium-238
64	12/1/2005	1464108.226	597012.324	705.189	0.02	0.790	PCI/G	Uranium-238
65	11/30/2005	1464100.726	597025.315	695.267	0.01	1.000	PCI/G	Uranium-238
67	11/30/2005	1464091.835	597019.553	692.932	0.02	0.970	PCI/G	Uranium-238
68	11/30/2005	1464109.333	597019.104	698.411	0.01	0.640	PCI/G	Uranium-238
69	11/30/2005	1464100.965	597018.969	692.932	0.03	0.830	PCI/G	Uranium-238
70	11/30/2005	1464092.719	597027.063	695.267	0.02	1.000	PCI/G	Uranium-238
71	11/30/2005	1463968.419	597026.146	697.866	0.02	0.650	PCI/G	Uranium-238
72	11/29/2005	1463972.694	597058.672	690.490	0.01	0.670	PCI/G	Uranium-238
73	11/30/2005	1463976.359	597105.094	691.120	0.03	1.400	PCI/G	Uranium-238
					Max	1.400	PCI/G	
					Std. Dev.	0.178	PCI/G	
					CO	2.200	PCI/G	
					HS	4.200	PCI/G	

APPENDIX D

BACKFILL PACKAGES

A41/89

STD VSAP BACKFILL INFO

This information will be represented in the Data Report.

For: PRS 70 SU19

Checklist:

(per Section 5.6 of Std VSAP, Final, Aug 04)

- ☒ final Graphic
  (show sample locations & note any >CO and/or >HS)
- ☒ sample results
  (show DLs, HS, COs, and COC std deviation(s))
- ☒ recalc of N
- ☒ preliminary data were reviewed
  (Data Review & Validation Report will be submitted with the Data Report)
- NR Sign test & 95%UCL (per SU)
  (not required if all results <CO, see pg 19/21 of VSAP)
- ☒ retro curve

From: (sign/date) Mark R. Spivey

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Summary

- Backfill Package applies to PRS 70 SU 19 only.

- No results were greater than Cleanup Objectives.

- Mound Removal Actions have regulator approved work plans, each of which has a section that addresses runon/runoff controls. In addition, the site Storm Water Pollution Prevention Plan applies to the entire site and is monitored by the Environmental Compliance and Analytical Services group. As a result of the contamination removal and the implementation of runon/runoff protection, spread of contamination is prevented. The Open Impoundment is not an integral part of any site discharge permit or the Site Storm Water Pollution Prevention Plan. Restoration of the Open Impoundment will consist of re-grading to promote proper drainage and the addition of any necessary backfill to ensure the stability of remaining structures. Re-seeding of the near horizontal surfaces, to enhance erosion control, is intended to be accomplished when weather conditions exist for proper seed germination.

- Re-grading/Backfilling is planned to proceed on or after 3/29/2006.

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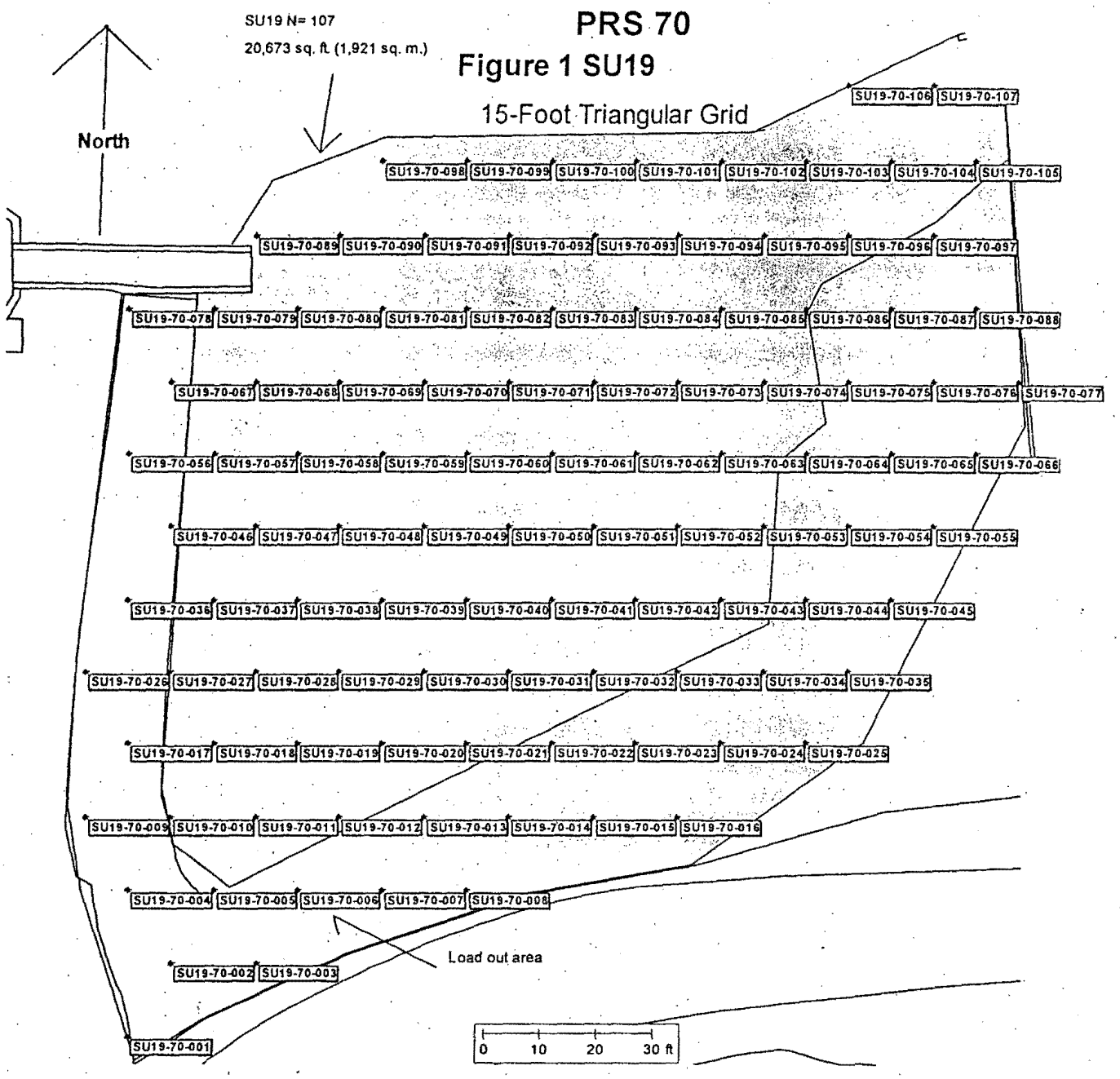
PRS 70

Figure 1 SU19

15-Foot Triangular Grid



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PRS 70 SU19 Off Site Data

Location	X Coordinate	Y Coordinate	Collection Date	Collection Time	Activity	MDC	Units	Isotope
SU19-70-001	1463988.111	597587.940	2/14/2006	1115	0.580	0.030	PCI/G	Plutonium-238
SU19-70-002	1463995.611	597600.931	2/14/2006	1105	1.390	0.040	PCI/G	Plutonium-238
SU19-70-003	1464010.611	597600.931	2/15/2006	1155	0.870	0.040	PCI/G	Plutonium-238
SU19-70-004	1463988.111	597613.921	2/14/2006	1100	2.100	0.040	PCI/G	Plutonium-238
SU19-70-005	1464003.111	597613.921	2/14/2006	1415	1.970	0.050	PCI/G	Plutonium-238
SU19-70-006	1464018.111	597613.921	2/14/2006	1505	1.560	0.040	PCI/G	Plutonium-238
SU19-70-007	1464033.111	597613.921	2/14/2006	1525	0.055	0.060	PCI/G	Plutonium-238
SU19-70-008	1464048.111	597613.921	2/14/2006	1515	0.460	0.030	PCI/G	Plutonium-238
SU19-70-009	1463980.611	597626.911	2/14/2006	1500	0.720	0.050	PCI/G	Plutonium-238
SU19-70-010	1463995.611	597626.911	2/14/2006	1050	1.380	0.050	PCI/G	Plutonium-238
SU19-70-011	1464010.611	597626.911	2/15/2006	858	2.030	0.010	PCI/G	Plutonium-238
SU19-70-012	1464025.611	597626.911	2/15/2006	908	0.790	0.030	PCI/G	Plutonium-238
SU19-70-013	1464040.611	597626.911	2/15/2006	915	0.540	0.050	PCI/G	Plutonium-238
SU19-70-014	1464055.611	597626.911	2/14/2006	1520	0.156	0.051	PCI/G	Plutonium-238
SU19-70-015	1464070.611	597626.911	2/14/2006	1527	1.170	0.050	PCI/G	Plutonium-238
SU19-70-016	1464085.611	597626.911	2/15/2006	928	0.920	0.040	PCI/G	Plutonium-238
SU19-70-017	1463988.111	597639.902	2/14/2006	1045	3.820	0.040	PCI/G	Plutonium-238
SU19-70-018	1464003.111	597639.902	2/15/2006	923	7.140	0.050	PCI/G	Plutonium-238
SU19-70-019	1464018.111	597639.902	2/15/2006	855	4.660	0.040	PCI/G	Plutonium-238
SU19-70-020	1464033.111	597639.902	2/15/2006	915	0.590	0.040	PCI/G	Plutonium-238
SU19-70-021	1464048.111	597639.902	2/15/2006	920	1.880	0.030	PCI/G	Plutonium-238
SU19-70-022	1464063.111	597639.902	2/14/2006	1405	3.140	0.040	PCI/G	Plutonium-238
SU19-70-023	1464078.111	597639.902	2/14/2006	1522	1.030	0.050	PCI/G	Plutonium-238
SU19-70-024	1464093.111	597639.902	2/14/2006	1510	0.320	0.040	PCI/G	Plutonium-238
SU19-70-025	1464108.111	597639.902	2/14/2006	1250	2.290	0.050	PCI/G	Plutonium-238
SU19-70-026	1463980.611	597652.892	2/14/2006	1010	1.900	0.040	PCI/G	Plutonium-238
SU19-70-027	1463995.611	597652.892	2/14/2006	1035	1.120	0.050	PCI/G	Plutonium-238
SU19-70-028	1464010.611	597652.892	2/15/2006	831	0.252	0.032	PCI/G	Plutonium-238
SU19-70-029	1464025.611	597652.892	2/15/2006	835	0.720	0.040	PCI/G	Plutonium-238
SU19-70-030	1464040.611	597652.892	2/15/2006	840	2.860	0.050	PCI/G	Plutonium-238
SU19-70-031	1464055.611	597652.892	2/14/2006	1340	2.020	0.010	PCI/G	Plutonium-238
SU19-70-032	1464070.611	597652.892	2/14/2006	1330	0.030	0.028	PCI/G	Plutonium-238
SU19-70-033	1464085.611	597652.892	2/15/2006	1230	0.146	0.039	PCI/G	Plutonium-238
SU19-70-034	1464100.611	597652.892	2/14/2006	1257	1.350	0.040	PCI/G	Plutonium-238
SU19-70-035	1464115.611	597652.892	2/15/2006	1258	1.000	0.050	PCI/G	Plutonium-238
SU19-70-036	1463988.111	597665.883	2/14/2006	1025	1.100	0.040	PCI/G	Plutonium-238
SU19-70-037	1464003.111	597665.883	2/15/2006	1100	16.800	0.040	PCI/G	Plutonium-238
SU19-70-038	1464018.111	597665.883	2/15/2006	1105	3.900	0.030	PCI/G	Plutonium-238
SU19-70-039	1464033.111	597665.883	2/15/2006	1038	1.560	0.040	PCI/G	Plutonium-238
SU19-70-040	1464048.111	597665.883	2/15/2006	1032	3.320	0.050	PCI/G	Plutonium-238
SU19-70-041	1464063.111	597665.883	2/15/2006	925	0.321	0.033	PCI/G	Plutonium-238
SU19-70-042	1464078.111	597665.883	2/15/2006	1210	1.680	0.050	PCI/G	Plutonium-238
SU19-70-043	1464093.111	597665.883	2/15/2006	1235	2.210	0.040	PCI/G	Plutonium-238
SU19-70-044	1464108.111	597665.883	2/14/2006	1519	1.940	0.040	PCI/G	Plutonium-238
SU19-70-045	1464123.111	597665.883	2/14/2006	1254	2.000	0.050	PCI/G	Plutonium-238
SU19-70-046	1463995.611	597678.873	2/14/2006	950	0.950	0.040	PCI/G	Plutonium-238
SU19-70-047	1464010.611	597678.873	2/15/2006	1145	0.910	0.060	PCI/G	Plutonium-238
SU19-70-048	1464025.611	597678.873	2/15/2006	1035	6.210	0.030	PCI/G	Plutonium-238
SU19-70-049	1464040.611	597678.873	2/15/2006	1021	2.860	0.050	PCI/G	Plutonium-238

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PRS 70 SU19 Off Site Data

Location	X Coordinate	Y Coordinate	Collection Date	Collection Time	Activity	MDC	Units	Isotope
SU19-70-050	1464055.611	597678.873	2/15/2006	935	2.920	0.050	PCI/G	Plutonium-238
SU19-70-051	1464070.611	597678.873	2/15/2006	950	0.032	0.012	PCI/G	Plutonium-238
SU19-70-052	1464085.611	597678.873	2/15/2006	1215	1.510	0.030	PCI/G	Plutonium-238
SU19-70-053	1464100.611	597678.873	2/14/2006	1321	2.860	0.050	PCI/G	Plutonium-238
SU19-70-054	1464115.611	597678.873	2/14/2006	1305	2.100	0.040	PCI/G	Plutonium-238
SU19-70-055	1464130.611	597678.873	2/14/2006	1305	3.820	0.040	PCI/G	Plutonium-238
SU19-70-056	1463988.111	597691.863	2/14/2006	1015	1.260	0.040	PCI/G	Plutonium-238
SU19-70-057	1464003.111	597691.863	2/15/2006	1120	5.420	0.040	PCI/G	Plutonium-238
SU19-70-058	1464018.111	597691.863	2/14/2006	840	7.240	0.040	PCI/G	Plutonium-238
SU19-70-059	1464033.111	597691.863	2/15/2006	1025	6.630	0.040	PCI/G	Plutonium-238
SU19-70-060	1464048.111	597691.863	2/15/2006	1013	6.960	0.040	PCI/G	Plutonium-238
SU19-70-061	1464063.111	597691.863	2/15/2006	1002	2.340	0.050	PCI/G	Plutonium-238
SU19-70-062	1464078.111	597691.863	2/15/2006	958	2.210	0.040	PCI/G	Plutonium-238
SU19-70-063	1464093.111	597691.863	2/15/2006	1046	4.960	0.030	PCI/G	Plutonium-238
SU19-70-064	1464108.111	597691.863	2/14/2006	1329	1.220	0.030	PCI/G	Plutonium-238
SU19-70-065	1464123.111	597691.863	2/14/2006	1308	1.450	0.040	PCI/G	Plutonium-238
SU19-70-066	1464138.111	597691.863	2/14/2006	1408	3.850	0.030	PCI/G	Plutonium-238
SU19-70-067	1463995.611	597704.854	2/14/2006	1000	0.900	0.030	PCI/G	Plutonium-238
SU19-70-068	1464010.611	597704.854	2/15/2006	1140	4.660	0.030	PCI/G	Plutonium-238
SU19-70-069	1464025.611	597704.854	2/15/2006	1044	6.710	0.040	PCI/G	Plutonium-238
SU19-70-070	1464040.611	597704.854	2/15/2006	1015	6.160	0.030	PCI/G	Plutonium-238
SU19-70-071	1464055.611	597704.854	2/15/2006	1008	8.480	0.030	PCI/G	Plutonium-238
SU19-70-072	1464070.611	597704.854	2/15/2006	949	4.590	0.040	PCI/G	Plutonium-238
SU19-70-073	1464085.611	597704.854	2/15/2006	955	4.790	0.030	PCI/G	Plutonium-238
SU19-70-074	1464100.611	597704.854	2/14/2006	1404	12.100	0.020	PCI/G	Plutonium-238
SU19-70-075	1464115.611	597704.854	2/14/2006	1333	1.850	0.030	PCI/G	Plutonium-238
SU19-70-076	1464130.611	597704.854	2/14/2006	1336	4.580	0.040	PCI/G	Plutonium-238
SU19-70-077	1464145.611	597704.854	2/14/2006	1414	17.300	0.020	PCI/G	Plutonium-238
SU19-70-078	1463988.111	597717.844	2/14/2006	945	1.470	0.040	PCI/G	Plutonium-238
SU19-70-079	1464003.111	597717.844	2/15/2006	1125	1.850	0.030	PCI/G	Plutonium-238
SU19-70-080	1464018.111	597717.844	2/14/2006	845	3.160	0.030	PCI/G	Plutonium-238
SU19-70-081	1464033.111	597717.844	2/15/2006	1042	5.310	0.050	PCI/G	Plutonium-238
SU19-70-082	1464048.111	597717.844	2/15/2006	1018	9.500	0.040	PCI/G	Plutonium-238
SU19-70-083	1464063.111	597717.844	2/15/2006	1010	7.100	0.040	PCI/G	Plutonium-238
SU19-70-084	1464078.111	597717.844	2/15/2006	943	6.170	0.030	PCI/G	Plutonium-238
SU19-70-085	1464093.111	597717.844	2/14/2006	1352	3.360	0.030	PCI/G	Plutonium-238
SU19-70-086	1464108.111	597717.844	2/16/2006	1257	0.237	0.033	PCI/G	Plutonium-238
SU19-70-087	1464123.111	597717.844	2/14/2006	1340	6.720	0.030	PCI/G	Plutonium-238
SU19-70-088	1464138.111	597717.844	2/14/2006	1432	11.900	0.030	PCI/G	Plutonium-238
SU19-70-089	1464010.611	597730.834	2/15/2006	1135	3.000	0.030	PCI/G	Plutonium-238
SU19-70-090	1464025.611	597730.834	2/14/2006	847	0.430	0.030	PCI/G	Plutonium-238
SU19-70-091	1464040.611	597730.834	2/14/2006	850	5.550	0.030	PCI/G	Plutonium-238
SU19-70-092	1464055.611	597730.834	2/14/2006	903	4.510	0.030	PCI/G	Plutonium-238
SU19-70-093	1464070.611	597730.834	2/14/2006	900	4.100	0.030	PCI/G	Plutonium-238
SU19-70-094	1464085.611	597730.834	2/15/2006	940	3.750	0.030	PCI/G	Plutonium-238
SU19-70-095	1464100.611	597730.834	2/15/2006	852	14.700	0.030	PCI/G	Plutonium-238
SU19-70-096	1464115.611	597730.834	2/14/2006	1401	11.600	0.040	PCI/G	Plutonium-238
SU19-70-097	1464130.611	597730.834	2/14/2006	1427	11.000	0.020	PCI/G	Plutonium-238
SU19-70-098	1464033.111	597743.825	2/14/2006	855	12.400	0.040	PCI/G	Plutonium-238

PRS 70 SU19 Off Site Data

Location	X Coordinate	Y Coordinate	Collection Date	Collection Time	Activity	MDC	Units	Isotope
SU19-70-099	1464048.111	597743.825	2/14/2006	905	34.800	0.030	PCI/G	Plutonium-238
SU19-70-100	1464063.111	597743.825	3/2/2006	1105	14.600	0.030	PCI/G	Plutonium-238
SU19-70-101	1464078.111	597743.825	2/14/2006	920	12.000	0.050	PCI/G	Plutonium-238
SU19-70-102	1464093.111	597743.825	2/15/2006	850	3.750	0.060	PCI/G	Plutonium-238
SU19-70-103	1464108.111	597743.825	2/15/2006	843	0.520	0.030	PCI/G	Plutonium-238
SU19-70-104	1464123.111	597743.825	2/15/2006	840	1.800	0.050	PCI/G	Plutonium-238
SU19-70-105	1464138.111	597743.825	2/14/2006	1436	9.800	0.050	PCI/G	Plutonium-238
SU19-70-106	1464115.611	597756.815	2/15/2006	845	0.048	0.013	PCI/G	Plutonium-238
SU19-70-107	1464130.611	597756.815	2/15/2006	836	2.910	0.030	PCI/G	Plutonium-238
				Count	107.000			
				Average	4.072		PCI/G	Plutonium-238
				Standard Deviation	4.895		PCI/G	Plutonium-238
				Minimum	0.030		PCI/G	Plutonium-238
				Maximum	34.800		PCI/G	Plutonium-238
				CO	55.000		PCI/G	Plutonium-238
				HS	165.130		PCI/G	Plutonium-238

Duplicates:

SU19-70-031D	1464055.611	597652.892	2/14/2006	1340	2.900	0.050	PCI/G	Plutonium-238
SU19-70-033D	1464085.611	597652.892	2/15/2006	1230	0.115	0.044	PCI/G	Plutonium-238
SU19-70-048D	1464025.611	597678.873	2/15/2006	1035	4.800	0.050	PCI/G	Plutonium-238
SU19-70-053D	1464100.611	597678.873	2/14/2006	1321	3.830	0.040	PCI/G	Plutonium-238
SU19-70-060D	1464048.111	597691.863	2/15/2006	1013	5.860	0.040	PCI/G	Plutonium-238
SU19-70-072D	1464070.611	597704.854	2/15/2006	949	3.660	0.040	PCI/G	Plutonium-238

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PRS 70 SU19 Off Site Data

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
	Ac-227+D	4.6	(pCi/g)
	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
	Cs-137+D	3.8	(pCi/g)
	Co-60	0.7	(pCi/g)
	Cu-244	92	(pCi/g)
	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
4.895	Pu-238	55	(pCi/g)
	Pu-239/240	62	(pCi/g)
	Pa-231+D	4	(pCi/g)
	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
	Th-228+D	2.6	(pCi/g)
	Th-230+D	2.8	(pCi/g)
	Th-232+D	2.1	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	16.11	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	121.2	(pCi/g)
	U-238+D	2.2	(pCi/g)
	Bi-207	1.2	(pCi/g)
	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(pCi/g)
	Sr-90	94.72	(pCi/g)

Type I Error	0.05	*Estimate (N) - Sign Test*	
$Z_{1\text{-alpha}}$	1.645	DCGL	55
Type II Error	0.2	LBGR	40.32
$Z_{1\text{-beta}}$	0.842	Delta	14.68
		(s)	4.90
		Rel Shift	2.999
Effective	4.90 *(s)*	*(N)*	8.00
Sign p	0.993790		

Calculate the Total Effective (s)

Area Factor adjusted (N) 709

Due to an unreasonable number of calculated samples, a default 15 foot triangular grid will be used.

Sample Grid Spacing

SU Area	1,921 m^2	SU Area	20,673 ft^2
Grid Length	14.4 m	Grid Length	47.3 ft
Grid Height	12.5 m	Grid Height	41.0 ft

PRS	70	**Survey Unit**	19

RE-Calculation with Off Site FSS Results

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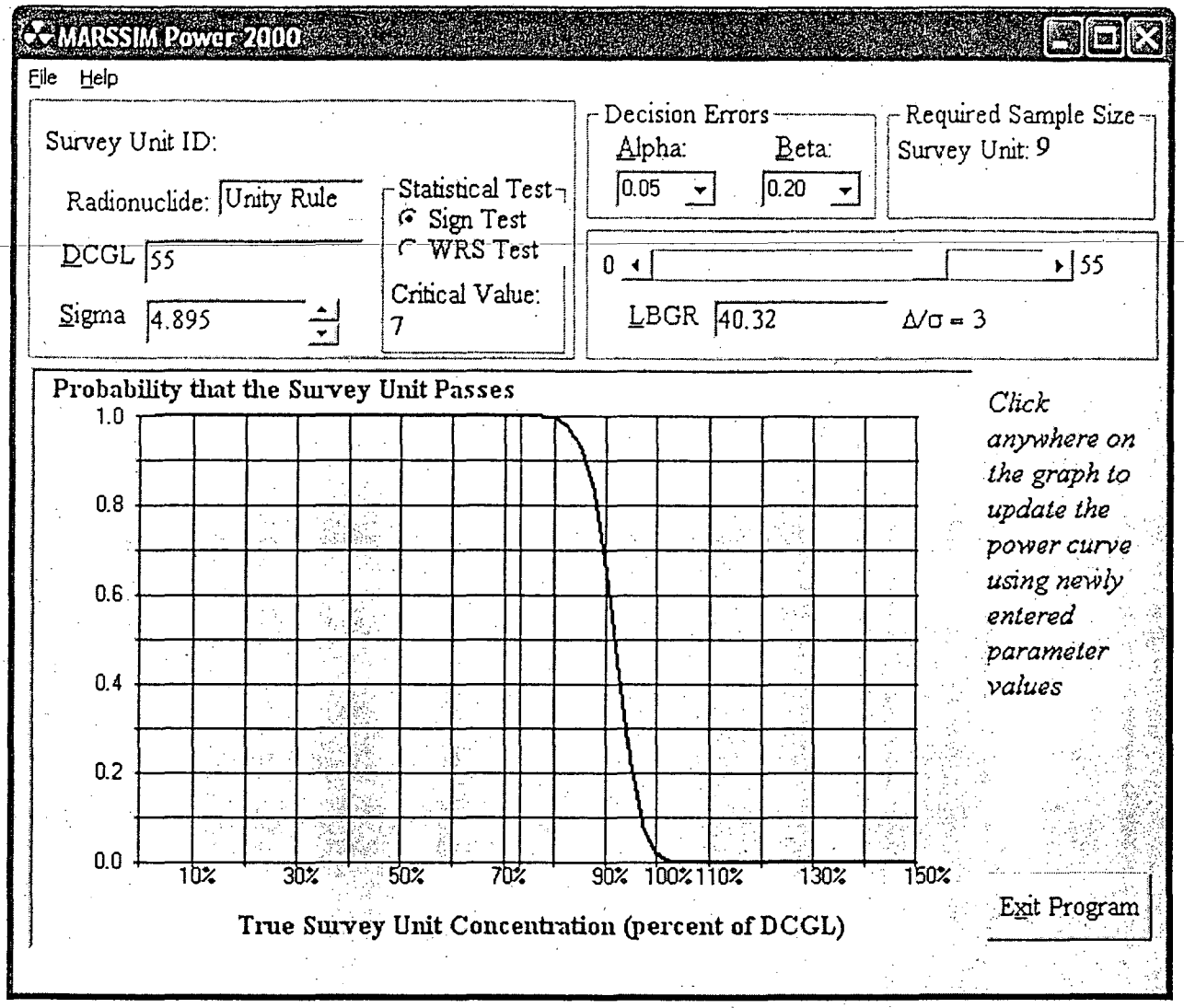
PRS 70 SU19 Off Site Data Retrospective Power Curve



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STD VSAP BACKFILL INFO

This information will be represented in the Data Report.

For: PRS 70 (SU 23 only)

Checklist:

(per Section 5.6 of Std VSAP, Final, Aug 04)

- ☑ final Graphic EXHIBIT 1
  (show sample locations & note any >CO and/or >HS)
- ☑ COC sample results Ac/Pv/Ra/U238 EXHIBIT 2
  (show DLs, HS, COs, and COC std deviation(s))
- ☑ recalc of N & retro curve EXHIBIT 3
- ☑ preliminary data were reviewed
  (Data Review & Validation Report will be submitted with the Data Report)
- NA Sign test & 95%UCL (per SU)
  (not required if all results <CO, see pg 19/21 of VSAP)
- ☑ backfill is planned to begin on 5-8-06

ALL RESULTS < CO

From: (sign/date) 1 May 06

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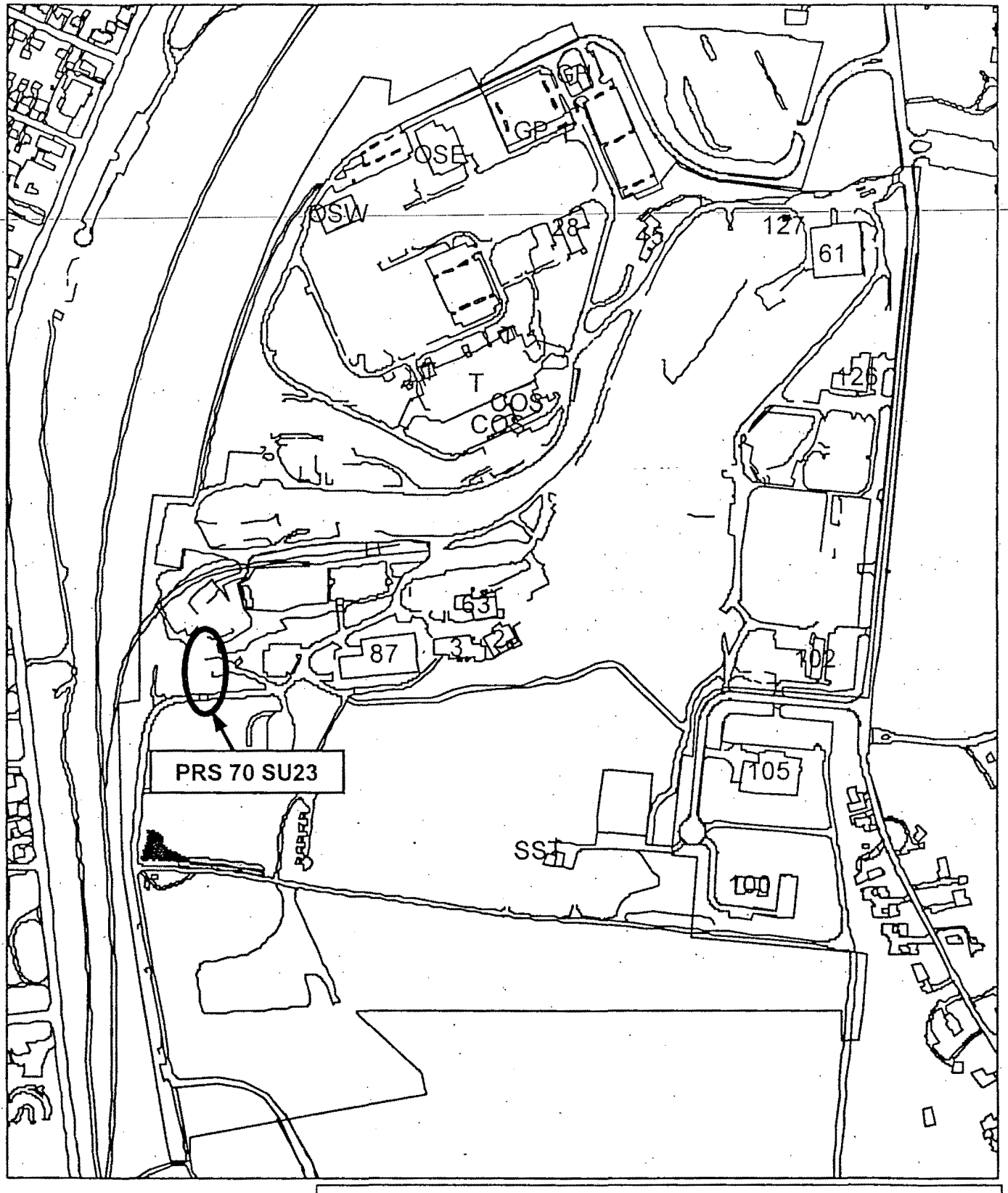


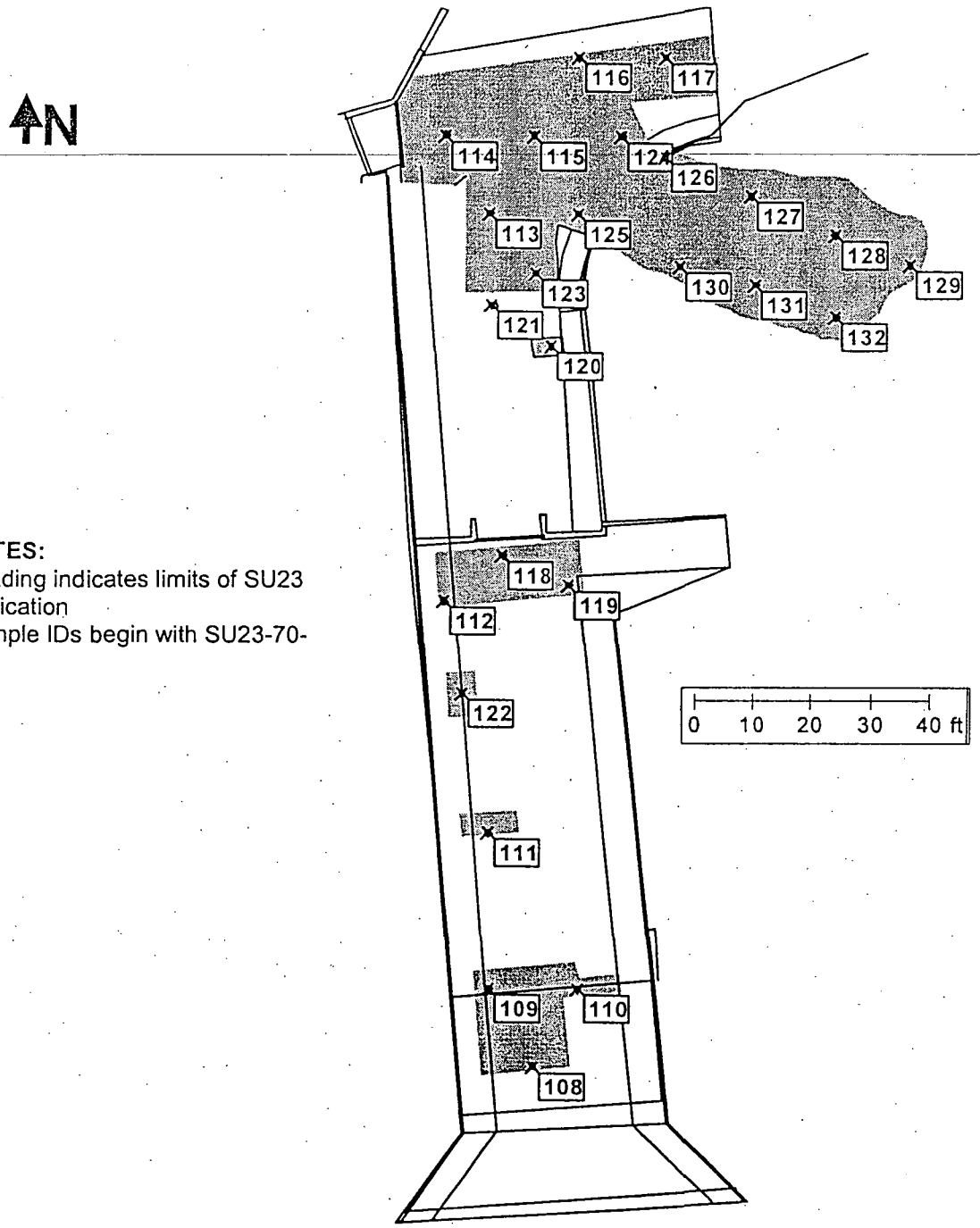
Scale in feet

0 200400 600 8001000

N

Figure 1:
Location of PRS 70 SU23

A51/89



NOTES:
-shading indicates limits of SU23 verification
-sample IDs begin with SU23-70-

Figure 2: Verification Locations

A52/89

OFFSITE COC VERIFICATION RESULTS (pCi/g)

Location	Result	Isotope	MDA	Value Used
SU23-70-108	0.16	Actinium 227	0.28	0.16
SU23-70-109	0.78	Actinium 227	0.57	0.78
SU23-70-110	0.04	Actinium 227	0.28	0.04
SU23-70-111	0.18	Actinium 227	0.28	0.18
SU23-70-112	0.5	Actinium 227	0.43	0.5
SU23-70-113	0.01	Actinium 227	0.36	0.01
SU23-70-114	0.33	Actinium 227	0.4	0.33
SU23-70-115A	1.3	Actinium 227	0.67	1.3
SU23-70-116	0.02	Actinium 227	0.33	0.02
SU23-70-117	0.7	Actinium 227	0.44	0.7
SU23-70-118	0.17	Actinium 227	0.44	0.17
SU23-70-119	-0.03	Actinium 227	0.34	0.17
SU23-70-120	0.26	Actinium 227	0.33	0.26
SU23-70-121	0.99	Actinium 227	0.55	0.99
SU23-70-122	0.07	Actinium 227	0.36	0.07
SU23-70-123	0.27	Actinium 227	0.43	0.27
SU23-70-124	1.36	Actinium 227	0.67	1.36
SU23-70-125	0.13	Actinium 227	0.55	0.13
SU23-70-126	0.21	Actinium 227	0.37	0.21
SU23-70-127	-0.15	Actinium 227	0.42	0.21
SU23-70-128	1	Actinium 227	0.56	1
SU23-70-129	0.03	Actinium 227	0.35	0.03
SU23-70-130	0.17	Actinium 227	0.55	0.17
SU23-70-131	0.14	Actinium 227	0.51	0.14
SU23-70-132	0.66	Actinium 227	0.48	0.66

SU23 Ac-227

Standard Deviaiton	**0.405**
Max Result	**1.36**
Cleanup Objective	**4.6**
Hot Spot Criteria	**13.61**

Location	Result	Isotope	MDA	Value Used
SU23-70-108	12.6	Plutonium-238	0.07	12.6
SU23-70-109	15.8	Plutonium-238	0.06	15.8
SU23-70-110	11.6	Plutonium-238	0.05	11.6
SU23-70-111	1.53	Plutonium-238	0.05	1.53
SU23-70-112	19.4	Plutonium-238	0.05	19.4
SU23-70-113	51.3	Plutonium-238	0.04	51.3
SU23-70-114	25.5	Plutonium-238	0.06	25.5
SU23-70-115A	0.84	Plutonium-238	0.08	0.84
SU23-70-116	12.9	Plutonium-238	0.08	12.9
SU23-70-117	24.4	Plutonium-238	0.04	24.4
SU23-70-118	1.71	Plutonium-238	0.07	1.71
SU23-70-119	11.7	Plutonium-238	0.06	11.7
SU23-70-120	42.9	Plutonium-238	0.07	42.9
SU23-70-121	29.4	Plutonium-238	0.06	29.4
SU23-70-122	0.85	Plutonium-238	0.05	0.85
SU23-70-123	30.3	Plutonium-238	0.07	30.3
SU23-70-124	0.147	Plutonium-238	0.074	0.147
SU23-70-125	0.61	Plutonium-238	0.07	0.61
SU23-70-126	33.2	Plutonium-238	0.06	33.2
SU23-70-127	15.6	Plutonium-238	0.07	15.6
SU23-70-128	14.9	Plutonium-238	0.08	14.9
SU23-70-129	6.89	Plutonium-238	0.05	6.89
SU23-70-130	10.5	Plutonium-238	0.08	10.5
SU23-70-131	3.08	Plutonium-238	0.07	3.08
SU23-70-132	1.01	Plutonium-238	0.05	1.01

SU23 Pu-238

Standard Deviaiton	**14.039**
Max Result	**51.3**
Cleanup Objective	**55**
Hot Spot Criteria	**165**

A53/89

MDA: minimum detectable activity

OFFSITE COC VERIFICATION RESULTS (pCi/g)

Location	Result	Isotope	MDA	Value Used
SU23-70-108	0.33	Radium (226)	0.25	0.33
SU23-70-109	0.96	Radium (226)	0.14	0.96
SU23-70-110	0.5	Radium (226)	0.11	0.5
SU23-70-111	0.32	Radium (226)	0.22	0.32
SU23-70-112	0.66	Radium (226)	0.29	0.66
SU23-70-113	0.57	Radium (226)	0.32	0.57
SU23-70-114	0.67	Radium (226)	0.15	0.67
SU23-70-115A	0.99	Radium (226)	0.18	0.99
SU23-70-116	0.47	Radium (226)	0.28	0.47
SU23-70-117	0.51	Radium (226)	0.25	0.51
SU23-70-118	1.19	Radium (226)	0.14	1.19
SU23-70-119	0.81	Radium (226)	0.15	0.81
SU23-70-120	0.56	Radium (226)	0.3	0.56
SU23-70-121	0.67	Radium (226)	0.14	0.67
SU23-70-122	0.61	Radium (226)	0.13	0.61
SU23-70-123	1.31	Radium (226)	0.15	1.31
SU23-70-124	1.16	Radium (226)	0.19	1.16
SU23-70-125	1.21	Radium (226)	0.49	1.21
SU23-70-126	0.74	Radium (226)	0.12	0.74
SU23-70-127	0.93	Radium (226)	0.13	0.93
SU23-70-128	0.58	Radium (226)	0.15	0.58
SU23-70-129	0.58	Radium (226)	0.29	0.58
SU23-70-130	1.05	Radium (226)	0.46	1.05
SU23-70-131	0.94	Radium (226)	0.42	0.94
SU23-70-132	0.65	Radium (226)	0.12	0.65

SU23 Ra-226

Standard Deviaiton	**0.280**
Max Result	**1.31**
Cleanup Objective	**2.9**
Hot Spot Criteria	**4.7**

Location	Result	Isotope	MDA	Value Used
SU23-70-108	0.43	Uranium 238	1.1	0.43
SU23-70-109	0.4	Uranium 238	1.9	0.4
SU23-70-110	0.26	Uranium 238	1.2	0.26
SU23-70-111	-0.09	Uranium 238	0.97	0.485
SU23-70-112	0.94	Uranium 238	1.3	0.94
SU23-70-113	1.04	Uranium 238	1.5	1.04
SU23-70-114	0.7	Uranium 238	1.4	0.7
SU23-70-115A	1.45	Uranium 238	0.04	1.45
SU23-70-116	0.44	Uranium 238	1.2	0.44
SU23-70-117	0.82	Uranium 238	1.3	0.82
SU23-70-118	1.1	Uranium 238	1.6	1.1
SU23-70-119	0.8	Uranium 238	1.5	0.8
SU23-70-120	1.01	Uranium 238	1.3	1.01
SU23-70-121	1.43	Uranium 238	1.7	1.43
SU23-70-122	0.73	Uranium 238	1.4	0.73
SU23-70-123	1.2	Uranium 238	1.7	1.2
SU23-70-124	1.02	Uranium 238	0.03	1.02
SU23-70-125	1.42	Uranium 238	0.04	1.42
SU23-70-126	1.18	Uranium 238	0.05	1.18
SU23-70-127	0.97	Uranium 238	0.04	0.97
SU23-70-128	0.76	Uranium 238	0.03	0.76
SU23-70-129	0.86	Uranium 238	0.03	0.86
SU23-70-130	0.89	Uranium 238	0.05	0.89
SU23-70-131	0.76	Uranium 238	0.04	0.76
SU23-70-132	0.73	Uranium 238	0.05	0.73

SU23 U-238

Standard Deviaiton	**0.324**
Max Result	**1.45**
Cleanup Objective	**2.2**
Hot Spot Criteria	**4.2**

A54/89

MDA: minimum detectable activity

Recalculation of N for SU23

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.405	Ac-227+D	4.6	(pCi/g)
	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
	Cs-137+D	3.8	(pCi/g)
	Co-60	0.7	(pCi/g)
	Cu-244	92	(pCi/g)
	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
14.039	Pu-238	55	(pCi/g)
	Pu-239/240	62	(pCi/g)
	Pa-231+D	4	(pCi/g)
0.28	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
	Th-228+D	2.6	(pCi/g)
	Th-230+D	2.8	(pCi/g)
	Th-232+D	2.1	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	16.11	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	121.2	(pCi/g)
0.324	U-238+D	2.2	(pCi/g)
	Bi-207	1.2	(pCi/g)
	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(pCi/g)
	tritium	7580	(pCi/g)
	Sr-90	94.72	(pCi/g)

Type I Error	0.05		
$Z_{1\text{-alpha}}$	1.645		
Type II Error	0.2		
$Z_{1\text{-beta}}$	0.842		
Effective	0.32 (s)		
Sign p	0.884930		

Calculate the Total Effective (s)

Estimate (N) - Sign Test

DCGL	1
LBGR	0.60
Delta	0.40
(s)	0.32
Rel Shift	1.241
(N)	12.00

Pu-238 Area Factor (N) 165

Sample Grid Spacing

SU Area	285.51	m^2
Grid Length	4.5	m
Grid Height	3.9	m

Sample Grid Spacing

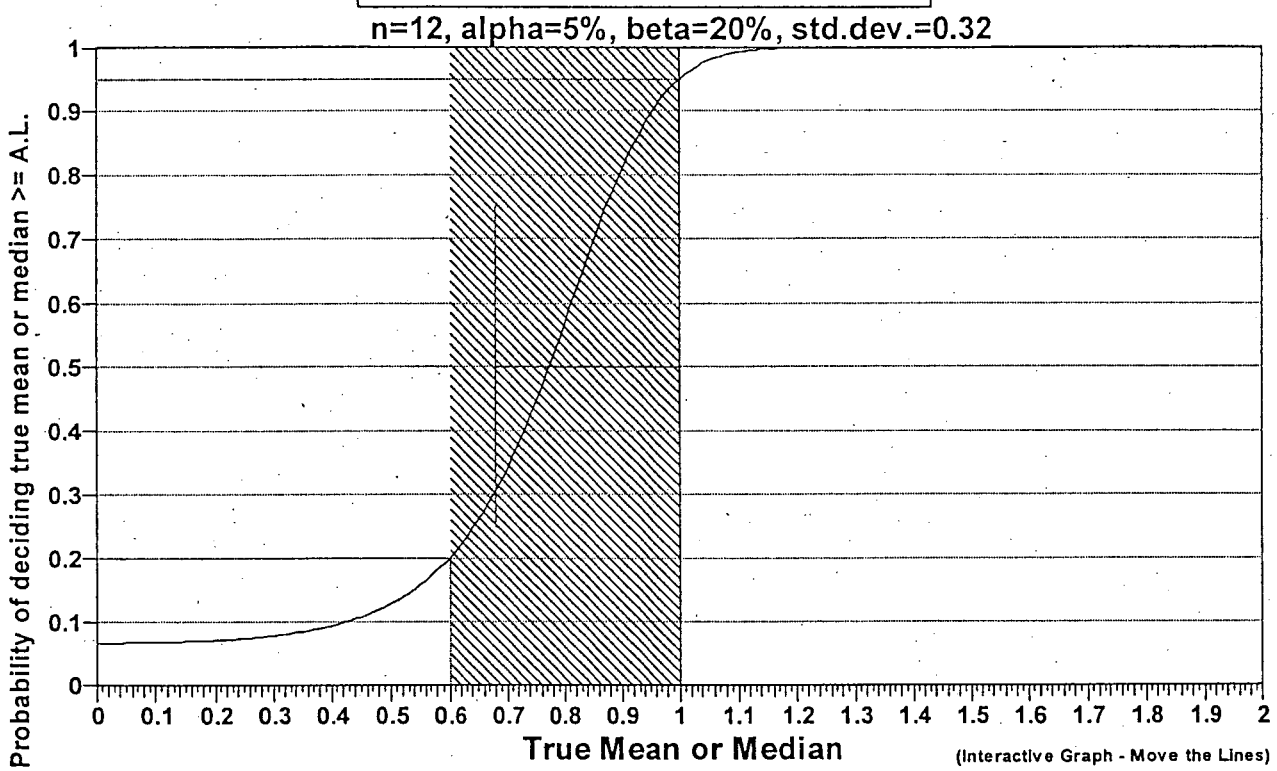
SU Area	3070	ft^2
Grid Length	14.9	ft
Grid Height	12.9	ft

PRSs 70 Survey Unit 23

455/89

5/1/06 10:53 AM

SU23 Power Curve



A56/89

APPENDIX E

WALKOVER DOCUMENTATION

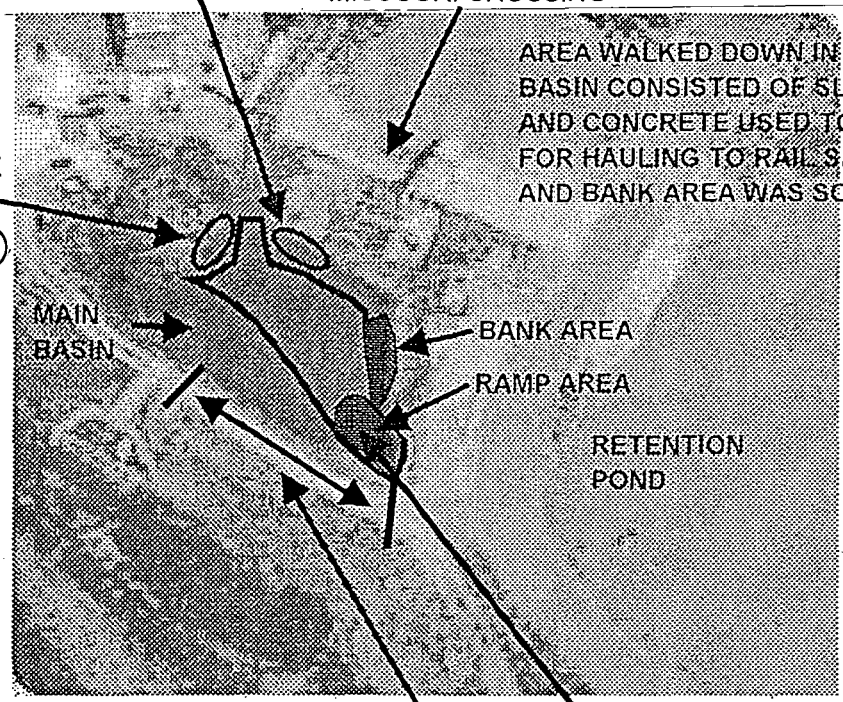
A57/89

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) PRS 70	SURVEY NO. 06-ER-078
PURPOSE: SURVEY OF CONCRETE DEBRIS AND WALL FOR DOWNSIZING AND REMOVAL TO RAIL SPUR	RWP NO. NA
	DATE: 01/26/2006
	TIME: 8:00

MAP / DRAWING

SU19



LEGEND:

- # = mrem/hr (γ) whole body
- #E = mrem/hr (β+η+γ) extremity on contact
- K = factor of 1000
- —·—·—·· = radiological boundary

△ # - mrem/hr neutron

(#) - swipe number

[#] - air sample number

(#/α) or /β - direct contamination measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360 / 43-89	5749 / 5799	11/09/2006
FIDLER	4116 / 3974	06/06/2006
3030	5822	07/19/2006
3030	5819	05/31/2006

[redacted]

HP# 6012	Date: 1-26-06
[redacted]	
HP# 6012	Date: 1-26-06
[redacted]	
HP# 5416	Date: 2-6-06

ML-9620 (2-98)

COPY

A58/89

Survey No.
06-ER-078

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm^2)				
Sample #	β/γ	Alpha	Tritium	Comments
1	18	4	NA	INSIDE PIECE PIPE
2	0	0	↓	CONCRETE DEBRIS
3	0	0	↓	CONCRETE DEBRIS
4	18	0	↓	CONCRETE DEBRIS
5	0	0	↓	CONCRETE DEBRIS
6	6	0	↓	CONCRETE DEBRIS
7	12	0	↓	CONCRETE DEBRIS
8	10	0	↓	CONCRETE DEBRIS
9	6	0	↓	CONCRETE DEBRIS
10	18	0	↓	CONCRETE DEBRIS

N/A

Removable Contamination				
Swipes (dpm/100cm^2)				
Sample #	β/γ	Alpha	Tritium	Comments

N/A

COMMENTS: NONE

COPY

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-9620A (4-98)

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) Survey Unit 23 (PRS 70 Area)	SURVEY NO. 06-ER-319
PURPOSE: Survey Unit 23 FIDLER Walk-over	RWP NO. N/A
	DATE: 5-02-06
	TIME: 0800 hrs

The Bicron FIDLER or Sodium Iodine is used as an indicator only.

N/A = not applicable N/D = Non detectable

MAP/DRAWING

SU23 [illegible] 24 May 06

Walk-over

This is a summary report of FIDLER readings taken during and following daily field excavation activities at Survey Unit 23 and represents the as-left surfaces prior to verification sampling for the areas shown on Figure 1 and includes the limits of verification. This report only applies to the shaded areas indicated on the figure.

100% walkover of all surfaces within verification limits and slopeback areas occurred as a matter of course throughout the excavation process. Walkovers entailed surveying in overlapping rows as per the VSAP

Walkover surveys are indicators of the presence or absence of gross contamination only. FIDLER readings on all soil surfaces were at background levels for channel one and out.

COPY

LEGEND:
= mrem/hr (γ) whole body
E = mrem/hr (β+n+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct contamination measurement in dpm/100cm2

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
	N/A	

[redacted]

IP# 6520 / 6012	Date: 5-2-06
[redacted]	
IP#	Date:
IP# 5416	Date: 5-2-06

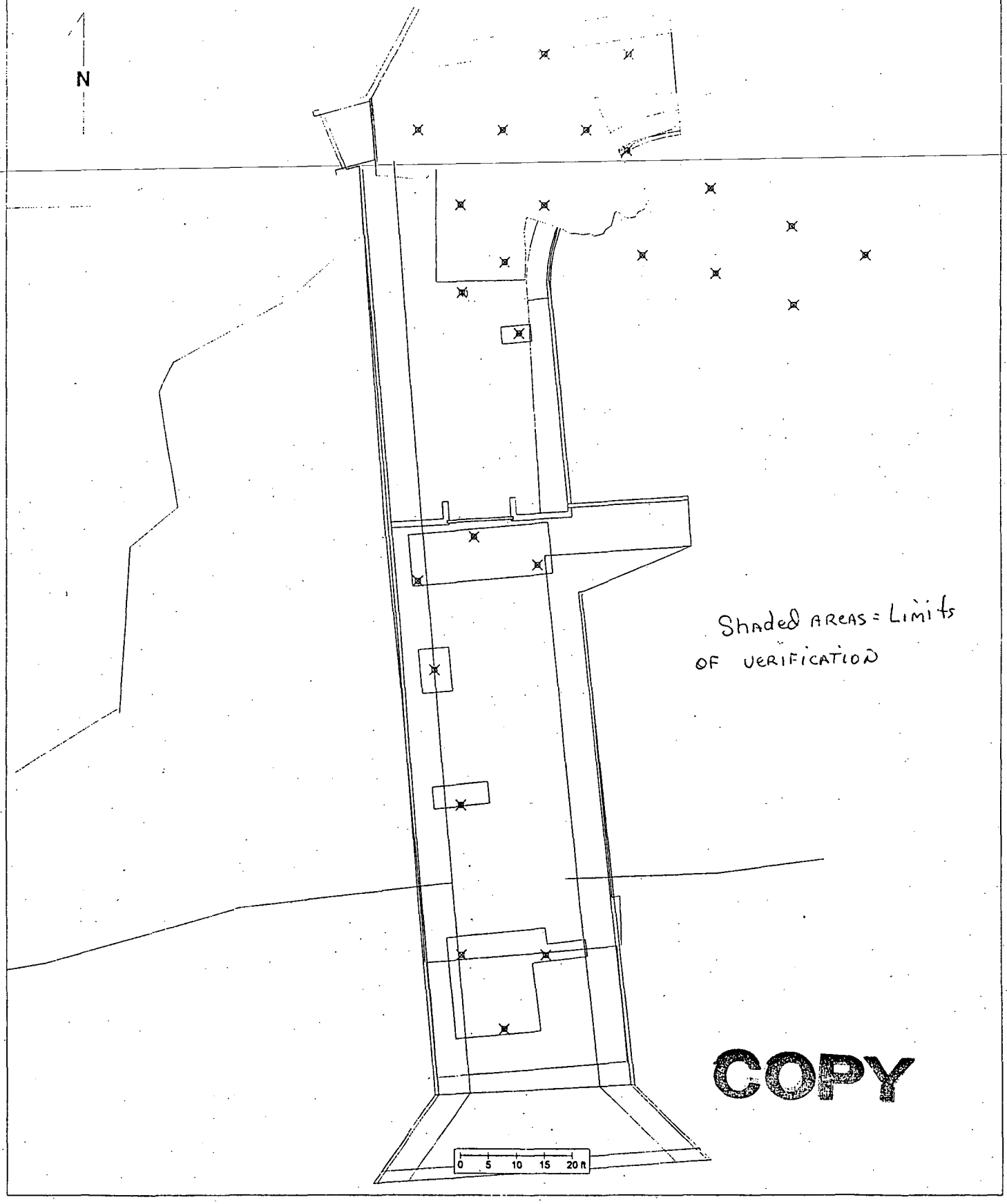
[redacted]

ML-9620 (2/98)

A00/01

06-ER-319
p2 of 2
RIM

PRS 70 Appendix III Revised Figure 1



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A61/89

APPENDIX F

REVIEW AND VALIDATION REPORT

A62/89

Review & Validation (R&V) Report

for

PRS 70 Soil

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Acronyms

%	percent
%D	percent difference
LCS	laboratory control spike
NAD	normalized absolute difference
MB	method blank
MDA	minimum detectable activity
NC	non-calculable
pCi/g	picoCurie/gram
PQL	project quantitation limit
PRS	potential release site
RPD	relative percent difference
RSD	relative standard deviation
SDG	sample delivery group
SOW	Statement of Work
VSAP	Verification Sampling and Analysis Plan

1.0 Introduction and Summary

1.1 Introduction

This data assessment has been prepared to describe the data quality for the PRS 70 Retention Basin and Missouri Crossing verification samples. The work was generally performed in compliance with the Statement of Work (SOW) issued November 23, 2005; the Mound Verification Sampling and Analysis Plan (VSAP) dated August 2004; sample maps and target parameters issued by CH2M Hill Mound for each sample event; and the Mound Methods Compendium. Data assessment encompasses two types of quality control reviews on the data: data review and data validation. Data review involves a review of the basic quality control data included in the laboratory data package, e.g., laboratory blanks, surrogate recoveries, matrix spike recoveries, and field duplicates. All (100%) of the data are reviewed. Data validation is a detailed review of the laboratory data packages that includes all of the data review elements plus verification of such things as proper instrument calibration, instrument calibration validity during sample analysis, identification of target analytes, and proper treatment and quantification of the data. The results of the data validation are assessed to identify whether any systemic problems are apparent. Suspect values are flagged to assure the validity of the data to the user. While only 10% of the data is required to be validated, data validation was performed on 100% of the samples. Both data review and validation are combined and discussed below.

2.0 Data Review / Validation

The quality control data submitted with the analytical data packages were reviewed and validated. The results of the assessment are presented in this section. The following qualifications were used to indicate data quality problems identified during the data validation process.

Table 1 — Data Validation Qualifications	
Qualification	**Qualification Description**
=	The sample result is positively identified and quantified.
J	The associated positive sample result is estimated.
J/UJ	The associated positive or non-detected sample result is qualified estimated.
UJ	The associated not-detected sample result is qualified estimated.
U	The associated sample result is qualified not detected.
R	The associated sample result is rejected and unusable.

Reason Codes are used to assign meaning to the qualifiers used. The following are the reason codes that were applied to this project.

Table 2 – Validation Reason Codes	
Reason Code	**Reason Code Description**
N02	MDAs reported by the laboratory exceeded corresponding PQLs.
T04	Professional judgment was used to qualify the data.
T05	Analytical result is less than the associated MDA, but greater than the counting uncertainty.
T06	Analytical result is less than both the associated counting uncertainty and MDA.
T15	Activity may be biased low due to lack of ingrowth.

This sampling effort is discussed in four sections: field quality assurance (QA) frequency, gamma spectroscopy, isotopic plutonium and isotopic uranium. The data validation of each of these is discussed in the following subsections. The validated results are provided in the R&V Table that follows this report.

2.1 Field QA Frequency

The field team is responsible for introducing or specifying field quality control samples. The frequency of these samples is discussed below.

2.1.1 Equipment Rinsates

Equipment rinsate samples were not required for this sampling effort. The field team used a dry decontamination method and equipment along with the dry wipes that were used during the decontamination process that were scanned in the field to monitor the decontamination process.

2.1.2 Field Duplicates

Field duplicates demonstrate that the collection technique was adequately precise. Seven (7) field duplicates were collected for one hundred thirty-two (132) regular field samples for a frequency of 5.0%. This meets the planned collection goal of five percent. The field duplicate samples were evaluated by calculating the relative percent differences (RPD). Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the minimum detectable activity (MDA). If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the relative percent difference was calculated. For six pairs, two analytes were compared, and for one pair, twenty-one analytes were compared, making a total of thirty-three (33) comparisons. One comparison (3.0%) exceeded an RPD of 35%. The field collection efforts were sufficiently precise. No qualification of the data is necessary.

2.1.3 Matrix Spikes

Matrix spikes and matrix spike duplicates are prepared to verify that the sample matrix is not interfering with the accurate and precise determination of target parameters in non-radiological fractions. This effort included only radiological fractions; therefore, matrix spikes/matrix spike duplicates were not analyzed.

2.1.4 Trip Blanks

Trip blanks are included in each shipping container used to transport samples for volatile analysis. This sampling effort did not include volatile samples. Therefore, trip blanks were not analyzed.

2.2 Gamma Spectroscopy

The field team submitted twenty-six (26) samples for gamma spectroscopy analysis. The associated quality control result assessments are discussed in the following subsections.

2.2.1 Laboratory Blanks

Laboratory blanks are used to verify that laboratory handling and procedures are not cross-contaminating samples with target isotopes. Each sample delivery group (SDG) had one laboratory blank per analytical run. All laboratory blanks were non-detect. No blank contamination of the samples was detected.

2.2.2 Laboratory Duplicates

Laboratory duplicates are used to assess the sample analytical precision. The laboratory duplicate samples were evaluated by calculating the relative percent differences (RPD). Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the minimum detectable concentration (MDC). If one result was greater than 2x the MDC and the other result was detected at less than 2x the MDC, the relative percent difference was calculated. The laboratory analyzed one duplicate pair for each analytical run. All RPDs were within control limits. No samples required qualification due to sample analytical precision.

2.2.3 Laboratory Control Spike

Laboratory control spikes (LCS) are prepared to verify the sample analytical accuracy. A LCS is a control sample of known composition. A percent recovery within control limits demonstrates that the laboratory method is acceptable. All LCS recoveries are within control limits and no qualifications to the data are required.

2.2.4 Radionuclide Quantitation

Project Quantitation Limits (PQLs) establish the MDAs required to properly quantify non-detected analytes. One hundred twenty (28.8%) gamma spec results were non-detect, but the MDA did not meet the PQL of 0.1 (pCi/g). These results that were non-detect but did not meet the PQL are qualified with the reason code N02.

Radium-226 is reported via the 609.31 (keV) line of Bismuth-214. Because the sample has not had the required twenty-one day ingrowth, the reported Radium-226 activities are estimated and may be biased low. All (100%) Radium-226 sample results are qualified as estimated (J/UJ) with a reason code T15.

2.2.5 Overall Assessment of Data

Sample results that were quantified greater than the MDC with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Sixteen (16) records (3.8% of the gamma spec records) had results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDC, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Forty (40) records (9.6% of the gamma spec records) had results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDC and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Two hundred thirty (230) records (55.3% of the gamma spec records) had results qualified as non-detect, estimated (UJ) with a reason code T06.

2.3 *Isotopic Plutonium*

The field team submitted one hundred thirty-nine (139) samples for isotopic plutonium analysis. The associated quality control result assessments are discussed in the following subsections.

2.3.1 Yields

Non-target isotopes are added to samples just prior to digestion and separation. The non-target isotopes are used to determine the digestion, separation, and analysis efficiencies. These non-target isotope recoveries are expressed as yields and used to calculate the target isotope activities. All yields for plutonium analysis were within control limits. No qualifications to the usability of the data are required based on the yield recoveries.

2.3.2 Laboratory Blanks

Laboratory blanks are used to verify that laboratory handling and procedures are not cross-contaminating samples with target isotopes. Each sample delivery group (SDG) had one laboratory blank per analytical run. All laboratory blanks were non-detect for plutonium. No blank contamination of the samples was detected.

2.3.3 Laboratory Duplicates

Laboratory duplicates are used to assess the sample analysis precision. The laboratory duplicate samples were evaluated by calculating the relative percent differences (RPD). Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the MDC. If one result was greater than 2x the MDC and the other result was detected at less than 2x the MDC, the relative percent difference was calculated. The laboratory analyzed one duplicate pair for each analytical run. All RPDs were within control limits. No samples required qualification due to sample analytical precision.

2.3.4 Laboratory Control Spike

Laboratory control spikes (LCS) are prepared to verify the sample analysis accuracy. A LCS is a control sample of known composition. A percent recovery within control limits demonstrates that the laboratory method is acceptable. All LCS recoveries are within control limits and no qualifications to the data are required.

2.3.5 Radionuclide Quantitation

Project Quantitation Limits (PQLs) establish the MDAs required to properly quantify non-detected analytes. All results that were non-detect met the PQL. None of the isotopic plutonium results required qualification with the reason code N02.

2.3.6 Overall Assessment of Data

Sample results that were quantified greater than the MDC with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Four samples (2.9% of the samples) had Plutonium-238 results qualified as estimated (J) with a reason code T04. Forty-six of the samples (33.1% of the samples) had Plutonium-239/240 results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDC, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. One of the samples (0.7% of the samples) had Plutonium-238 results qualified non-detect (U) with a reason code T05. Three samples (2.2% of the samples) had Plutonium-239/240 results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDC and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. None of the samples had Plutonium-238 results qualified as non-detect, estimated (UJ) with a reason code T06. Seventy-five samples (54.0% of the samples) had Plutonium-239/240 results qualified as non-detect, estimated (UJ) with a reason code T06.

2.4 Isotopic Uranium

The field team submitted twenty-six (26) samples for isotopic uranium analysis. The associated quality control result assessments are discussed in the following subsections.

2.4.1 Yields

Non-target isotopes are added to samples just prior to digestion and separation. The non-target isotopes are used to determine the digestion, separation, and analysis efficiencies. These non-target isotope recoveries are expressed as yields and used to calculate the target isotope activities. All yields for isotopic uranium analysis were within control limits. No qualifications to the usability of the data are required based on the yield recoveries.

2.4.2 Laboratory Blanks

Laboratory blanks are used to verify that laboratory handling and procedures are not cross-contaminating samples with target isotopes. Each SDG had one laboratory blank per analytical run. Each laboratory blank was non-detect. No qualification of the isotopic uranium data is required.

2.4.3 Laboratory Duplicates

Laboratory duplicates are used to assess the sample analysis precision. The laboratory duplicate samples were evaluated by calculating the relative percent differences. Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the MDC. If one result was greater than 2x the MDC and the other result was detected at less than 2x the MDC, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. All RPDs were within control limits. The sample data does not require qualification for sample analytical precision.

2.4.4 Laboratory Control Spike

Laboratory control spikes (LCS) are prepared to verify the sample analysis accuracy. A LCS is a control sample of known composition. A percent recovery within control limits demonstrates that the laboratory method is acceptable. All LCS recoveries are within control limits and no qualifications to the data are required.

2.4.5 Radionuclide Quantitation

Project Quantitation Limits (PQLs) establish the MDAs required to properly quantify non-detected analytes. All (100%) of the isotopic uranium results met the PQL of 0.1 (pCi/g). None of the isotopic thorium required qualification with the reason code N02.

2.4.6 Overall Assessment of Data

Sample results that were quantified greater than the MDC with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Fourteen samples (53.9% of the samples) had Uranium 235/236 results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDC, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Two samples (7.7% of the samples) had Uranium 235/236 results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDC and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Ten samples (38.5% of the samples) had Uranium 235/236 results qualified as non-detect, estimated (UJ) with a reason code T06.

3.0 References

Reference 1: *Methods Compendium*. Mound Plant, Miamisburg OH. Technical Manual MD-80045, Issue 2, January 2002.

Reference 2: *Data Validation*. Science Application International Corporation. Technical Procedure-Data Management-300-7, Revision 5, February 2004.

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU19-70-001	F6C030190	EML A-01-R	Plutonium-238	0.58	0.14	0.03	PCI/G	=	
SU19-70-001	F6C030190	EML A-01-R	Plutonium-239/240	-0.002	0.013	0.028	PCI/G	UJ	T06
SU19-70-002	F6C030190	EML A-01-R	Plutonium-238	1.39	0.23	0.04	PCI/G	=	
SU19-70-002	F6C030190	EML A-01-R	Plutonium-239/240	0.008	0.016	0.025	PCI/G	UJ	T06
SU19-70-003	F6C030190	EML A-01-R	Plutonium-238	0.87	0.17	0.04	PCI/G	=	
SU19-70-003	F6C030190	EML A-01-R	Plutonium-239/240	0.009	0.015	0.021	PCI/G	UJ	T06
SU19-70-004	F6C030190	EML A-01-R	Plutonium-238	2.1	0.33	0.04	PCI/G	=	
SU19-70-004	F6C030190	EML A-01-R	Plutonium-239/240	0.024	0.025	0.026	PCI/G	UJ	T06
SU19-70-005	F6C030190	EML A-01-R	Plutonium-238	1.97	0.33	0.05	PCI/G	=	
SU19-70-005	F6C030190	EML A-01-R	Plutonium-239/240	-0.0004	0.023	0.045	PCI/G	UJ	T06
SU19-70-006	F6C030190	EML A-01-R	Plutonium-238	1.56	0.26	0.04	PCI/G	=	
SU19-70-006	F6C030190	EML A-01-R	Plutonium-239/240	-0.002	0.017	0.037	PCI/G	UJ	T06
SU19-70-007	F6C030190	EML A-01-R	Plutonium-238	0.055	0.05	0.06	PCI/G	U	T05
SU19-70-007	F6C030190	EML A-01-R	Plutonium-239/240	0.001	0.025	0.045	PCI/G	UJ	T06
SU19-70-008	F6C030190	EML A-01-R	Plutonium-238	0.46	0.11	0.03	PCI/G	=	
SU19-70-008	F6C030190	EML A-01-R	Plutonium-239/240	0.005	0.016	0.029	PCI/G	UJ	T06
SU19-70-009	F6C030190	EML A-01-R	Plutonium-238	0.72	0.16	0.05	PCI/G	=	
SU19-70-009	F6C030190	EML A-01-R	Plutonium-239/240	0.013	0.022	0.032	PCI/G	UJ	T06
SU19-70-010	F6C030190	EML A-01-R	Plutonium-238	1.38	0.23	0.05	PCI/G	=	
SU19-70-010	F6C030190	EML A-01-R	Plutonium-239/240	0.03	0.027	0.013	PCI/G	J	T04
SU19-70-011	F6C030190	EML A-01-R	Plutonium-238	2.03	0.31	0.01	PCI/G	=	
SU19-70-011	F6C030190	EML A-01-R	Plutonium-239/240	0.014	0.018	0.022	PCI/G	UJ	T06
SU19-70-012	F6C030190	EML A-01-R	Plutonium-238	0.79	0.15	0.03	PCI/G	=	
SU19-70-012	F6C030190	EML A-01-R	Plutonium-239/240	0.008	0.015	0.024	PCI/G	UJ	T06
SU19-70-013	F6C030190	EML A-01-R	Plutonium-238	0.54	0.13	0.05	PCI/G	=	
SU19-70-013	F6C030190	EML A-01-R	Plutonium-239/240	-0.004	0.014	0.031	PCI/G	UJ	T06
SU19-70-014	F6C030190	EML A-01-R	Plutonium-238	0.156	0.068	0.051	PCI/G	=	
SU19-70-014	F6C030190	EML A-01-R	Plutonium-239/240	0.001	0.015	0.033	PCI/G	UJ	T06
SU19-70-015	F6C030190	EML A-01-R	Plutonium-238	1.17	0.21	0.05	PCI/G	=	
SU19-70-015	F6C030190	EML A-01-R	Plutonium-239/240	0.024	0.025	0.029	PCI/G	UJ	T06
SU19-70-016	F6C030190	EML A-01-R	Plutonium-238	0.92	0.18	0.04	PCI/G	=	
SU19-70-016	F6C030190	EML A-01-R	Plutonium-239/240	0.021	0.023	0.014	PCI/G	J	T04
SU19-70-017	F6C030190	EML A-01-R	Plutonium-238	3.82	0.53	0.04	PCI/G	=	
SU19-70-017	F6C030190	EML A-01-R	Plutonium-239/240	0.018	0.022	0.028	PCI/G	UJ	T06
SU19-70-018	F6C030190	EML A-01-R	Plutonium-238	7.14	0.94	0.05	PCI/G	=	
SU19-70-018	F6C030190	EML A-01-R	Plutonium-239/240	0.034	0.034	0.04	PCI/G	U	T05
SU19-70-019	F6C030190	EML A-01-R	Plutonium-238	4.66	0.63	0.04	PCI/G	=	
SU19-70-019	F6C030190	EML A-01-R	Plutonium-239/240	0.026	0.026	0.014	PCI/G	J	T04
SU19-70-020	F6C030190	EML A-01-R	Plutonium-238	0.59	0.13	0.04	PCI/G	=	
SU19-70-020	F6C030190	EML A-01-R	Plutonium-239/240	0.0003	0.014	0.031	PCI/G	UJ	T06
SU19-70-021	F6C030206	EML A-01-R	Plutonium-238	1.88	0.29	0.03	PCI/G	=	
SU19-70-021	F6C030206	EML A-01-R	Plutonium-239/240	0.019	0.022	0.025	PCI/G	UJ	T06
SU19-70-022	F6C030206	EML A-01-R	Plutonium-238	3.14	0.44	0.04	PCI/G	=	
SU19-70-022	F6C030206	EML A-01-R	Plutonium-239/240	0.028	0.026	0.025	PCI/G	J	T04
SU19-70-023	F6C030206	EML A-01-R	Plutonium-238	1.03	0.19	0.05	PCI/G	=	
SU19-70-023	F6C030206	EML A-01-R	Plutonium-239/240	0.004	0.011	0.022	PCI/G	UJ	T06
SU19-70-024	F6C030206	EML A-01-R	Plutonium-238	0.32	0.1	0.04	PCI/G	=	
SU19-70-024	F6C030206	EML A-01-R	Plutonium-239/240	0.016	0.022	0.03	PCI/G	UJ	T06
SU19-70-025	F6C030206	EML A-01-R	Plutonium-238	2.29	0.35	0.05	PCI/G	=	
SU19-70-025	F6C030206	EML A-01-R	Plutonium-239/240	0.005	0.024	0.041	PCI/G	UJ	T06
SU19-70-026	F6C030206	EML A-01-R	Plutonium-238	1.9	0.3	0.04	PCI/G	=	
SU19-70-026	F6C030206	EML A-01-R	Plutonium-239/240	-0.002	0.016	0.035	PCI/G	UJ	T06
SU19-70-027	F6C030206	EML A-01-R	Plutonium-238	1.12	0.19	0.05	PCI/G	=	

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU19-70-027	F6C030206	EML A-01-R	Plutonium-239/240	-0.008	0.017	0.038	PCI/G	UJ	T06
SU19-70-028	F6C030206	EML A-01-R	Plutonium-238	0.252	0.079	0.032	PCI/G	=	
SU19-70-028	F6C030206	EML A-01-R	Plutonium-239/240	0.005	0.018	0.032	PCI/G	UJ	T06
SU19-70-029	F6C030206	EML A-01-R	Plutonium-238	0.72	0.14	0.04	PCI/G	=	
SU19-70-029	F6C030206	EML A-01-R	Plutonium-239/240	0.001	0.012	0.027	PCI/G	UJ	T06
SU19-70-030	F6C030206	EML A-01-R	Plutonium-238	2.86	0.42	0.05	PCI/G	=	
SU19-70-030	F6C030206	EML A-01-R	Plutonium-239/240	0.005	0.015	0.014	PCI/G	UJ	T06
SU19-70-031	F6C030206	EML A-01-R	Plutonium-238	2.02	0.31	0.01	PCI/G	=	
SU19-70-031	F6C030206	EML A-01-R	Plutonium-239/240	0.009	0.015	0.021	PCI/G	UJ	T06
SU19-70-031D	F6C030235	EML A-01-R	Plutonium-238	2.9	0.42	0.05	PCI/G	=	
SU19-70-031D	F6C030235	EML A-01-R	Plutonium-239/240	0.017	0.023	0.03	PCI/G	UJ	T06
SU19-70-032	F6C030206	EML A-01-R	Plutonium-238	0.03	0.027	0.028	PCI/G	J	T04
SU19-70-032	F6C030206	EML A-01-R	Plutonium-239/240	0.003	0.011	0.023	PCI/G	UJ	T06
SU19-70-033	F6C030206	EML A-01-R	Plutonium-238	0.146	0.057	0.039	PCI/G	=	
SU19-70-033	F6C030206	EML A-01-R	Plutonium-239/240	0.001	0.011	0.025	PCI/G	UJ	T06
SU19-70-033D	F6C030235	EML A-01-R	Plutonium-238	0.115	0.054	0.044	PCI/G	=	
SU19-70-033D	F6C030235	EML A-01-R	Plutonium-239/240	0.001	0.013	0.028	PCI/G	UJ	T06
SU19-70-034	F6C030206	EML A-01-R	Plutonium-238	1.35	0.22	0.04	PCI/G	=	
SU19-70-034	F6C030206	EML A-01-R	Plutonium-239/240	0.006	0.015	0.027	PCI/G	UJ	T06
SU19-70-035	F6C030206	EML A-01-R	Plutonium-238	1	0.19	0.05	PCI/G	=	
SU19-70-035	F6C030206	EML A-01-R	Plutonium-239/240	-0.003	0.013	0.028	PCI/G	UJ	T06
SU19-70-036	F6C030206	EML A-01-R	Plutonium-238	1.1	0.2	0.04	PCI/G	=	
SU19-70-036	F6C030206	EML A-01-R	Plutonium-239/240	0.005	0.015	0.014	PCI/G	UJ	T06
SU19-70-037	F6C030206	EML A-01-R	Plutonium-238	16.8	2	0.04	PCI/G	=	
SU19-70-037	F6C030206	EML A-01-R	Plutonium-239/240	0.092	0.044	0.025	PCI/G	=	
SU19-70-038	F6C030206	EML A-01-R	Plutonium-238	3.9	0.53	0.03	PCI/G	=	
SU19-70-038	F6C030206	EML A-01-R	Plutonium-239/240	0.049	0.033	0.013	PCI/G	J	T04
SU19-70-039	F6C030206	EML A-01-R	Plutonium-238	1.56	0.26	0.04	PCI/G	=	
SU19-70-039	F6C030206	EML A-01-R	Plutonium-239/240	0.005	0.015	0.014	PCI/G	UJ	T06
SU19-70-040	F6C030206	EML A-01-R	Plutonium-238	3.32	0.48	0.05	PCI/G	=	
SU19-70-040	F6C030206	EML A-01-R	Plutonium-239/240	0.011	0.022	0.034	PCI/G	UJ	T06
SU19-70-041	F6C030211	EML A-01-R	Plutonium-238	0.321	0.092	0.033	PCI/G	=	
SU19-70-041	F6C030211	EML A-01-R	Plutonium-239/240	-0.002	0.013	0.026	PCI/G	UJ	T06
SU19-70-042	F6C030211	EML A-01-R	Plutonium-238	1.68	0.28	0.05	PCI/G	=	
SU19-70-042	F6C030211	EML A-01-R	Plutonium-239/240	0.02	0.024	0.027	PCI/G	UJ	T06
SU19-70-043	F6C030211	EML A-01-R	Plutonium-238	2.21	0.33	0.04	PCI/G	=	
SU19-70-043	F6C030211	EML A-01-R	Plutonium-239/240	0.019	0.021	0.021	PCI/G	UJ	T06
SU19-70-044	F6C030211	EML A-01-R	Plutonium-238	1.94	0.3	0.04	PCI/G	=	
SU19-70-044	F6C030211	EML A-01-R	Plutonium-239/240	0.014	0.019	0.026	PCI/G	UJ	T06
SU19-70-045	F6C030211	EML A-01-R	Plutonium-238	2	0.33	0.05	PCI/G	=	
SU19-70-045	F6C030211	EML A-01-R	Plutonium-239/240	-0.0004	0.023	0.045	PCI/G	UJ	T06
SU19-70-046	F6C030211	EML A-01-R	Plutonium-238	0.95	0.18	0.04	PCI/G	=	
SU19-70-046	F6C030211	EML A-01-R	Plutonium-239/240	0.009	0.022	0.037	PCI/G	UJ	T06
SU19-70-047	F6C030211	EML A-01-R	Plutonium-238	0.91	0.18	0.06	PCI/G	=	
SU19-70-047	F6C030211	EML A-01-R	Plutonium-239/240	-0.004	0.024	0.047	PCI/G	UJ	T06
SU19-70-048	F6C030211	EML A-01-R	Plutonium-238	6.21	0.85	0.03	PCI/G	=	
SU19-70-048	F6C030211	EML A-01-R	Plutonium-239/240	0.04	0.034	0.035	PCI/G	J	T04
SU19-70-048D	F6C030235	EML A-01-R	Plutonium-238	4.8	0.64	0.05	PCI/G	=	
SU19-70-048D	F6C030235	EML A-01-R	Plutonium-239/240	0.017	0.022	0.027	PCI/G	UJ	T06
SU19-70-049	F6C030211	EML A-01-R	Plutonium-238	2.86	0.42	0.05	PCI/G	=	
SU19-70-049	F6C030211	EML A-01-R	Plutonium-239/240	0.033	0.029	0.03	PCI/G	J	T04
SU19-70-050	F6C030211	EML A-01-R	Plutonium-238	2.92	0.43	0.05	PCI/G	=	
SU19-70-050	F6C030211	EML A-01-R	Plutonium-239/240	0.033	0.029	0.015	PCI/G	J	T04

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU19-70-051	F6C030211	EML A-01-R	Plutonium-238	0.032	0.026	0.012	PCI/G	J	T04
SU19-70-051	F6C030211	EML A-01-R	Plutonium-239/240	-0.0009	0.01	0.02	PCI/G	UJ	T06
SU19-70-052	F6C030211	EML A-01-R	Plutonium-238	1.51	0.24	0.03	PCI/G	=	
SU19-70-052	F6C030211	EML A-01-R	Plutonium-239/240	-0.002	0.011	0.024	PCI/G	UJ	T06
SU19-70-053	F6C030211	EML A-01-R	Plutonium-238	2.86	0.43	0.05	PCI/G	=	
SU19-70-053	F6C030211	EML A-01-R	Plutonium-239/240	0.001	0.014	0.032	PCI/G	UJ	T06
SU19-70-053D	F6C030235	EML A-01-R	Plutonium-238	3.83	0.54	0.04	PCI/G	=	
SU19-70-053D	F6C030235	EML A-01-R	Plutonium-239/240	0.058	0.037	0.014	PCI/G	J	T04
SU19-70-054	F6C030211	EML A-01-R	Plutonium-238	2.1	0.3	0.04	PCI/G	=	
SU19-70-054	F6C030211	EML A-01-R	Plutonium-239/240	0.019	0.021	0.026	PCI/G	UJ	T06
SU19-70-055	F6C030211	EML A-01-R	Plutonium-238	3.82	0.52	0.04	PCI/G	=	
SU19-70-055	F6C030211	EML A-01-R	Plutonium-239/240	0.012	0.019	0.027	PCI/G	UJ	T06
SU19-70-056	F6C030211	EML A-01-R	Plutonium-238	1.26	0.22	0.04	PCI/G	=	
SU19-70-056	F6C030211	EML A-01-R	Plutonium-239/240	0.043	0.033	0.015	PCI/G	J	T04
SU19-70-057	F6C030211	EML A-01-R	Plutonium-238	5.42	0.7	0.04	PCI/G	=	
SU19-70-057	F6C030211	EML A-01-R	Plutonium-239/240	0.026	0.025	0.026	PCI/G	U	T05
SU19-70-058	F6C030211	EML A-01-R	Plutonium-238	7.24	0.94	0.04	PCI/G	=	
SU19-70-058	F6C030211	EML A-01-R	Plutonium-239/240	0.038	0.035	0.039	PCI/G	U	T05
SU19-70-059	F6C030211	EML A-01-R	Plutonium-238	6.63	0.81	0.04	PCI/G	=	
SU19-70-059	F6C030211	EML A-01-R	Plutonium-239/240	0.037	0.028	0.013	PCI/G	J	T04
SU19-70-060	F6C030211	EML A-01-R	Plutonium-238	6.96	0.91	0.04	PCI/G	=	
SU19-70-060	F6C030211	EML A-01-R	Plutonium-239/240	0.027	0.028	0.033	PCI/G	UJ	T06
SU19-70-060D	F6C030235	EML A-01-R	Plutonium-238	5.86	0.75	0.04	PCI/G	=	
SU19-70-060D	F6C030235	EML A-01-R	Plutonium-239/240	0.037	0.029	0.027	PCI/G	J	T04
SU19-70-061	F6C030215	EML A-01-R	Plutonium-238	2.34	0.35	0.05	PCI/G	=	
SU19-70-061	F6C030215	EML A-01-R	Plutonium-239/240	0.025	0.027	0.031	PCI/G	UJ	T06
SU19-70-062	F6C030215	EML A-01-R	Plutonium-238	2.21	0.34	0.04	PCI/G	=	
SU19-70-062	F6C030215	EML A-01-R	Plutonium-239/240	0.04	0.031	0.026	PCI/G	J	T04
SU19-70-063	F6C030215	EML A-01-R	Plutonium-238	4.96	0.67	0.03	PCI/G	=	
SU19-70-063	F6C030215	EML A-01-R	Plutonium-239/240	0.062	0.038	0.026	PCI/G	J	T04
SU19-70-064	F6C030215	EML A-01-R	Plutonium-238	1.22	0.21	0.03	PCI/G	=	
SU19-70-064	F6C030215	EML A-01-R	Plutonium-239/240	0.013	0.018	0.024	PCI/G	UJ	T06
SU19-70-065	F6C030215	EML A-01-R	Plutonium-238	1.45	0.25	0.04	PCI/G	=	
SU19-70-065	F6C030215	EML A-01-R	Plutonium-239/240	0.001	0.014	0.031	PCI/G	UJ	T06
SU19-70-066	F6C030215	EML A-01-R	Plutonium-238	3.85	0.52	0.03	PCI/G	=	
SU19-70-066	F6C030215	EML A-01-R	Plutonium-239/240	0.052	0.033	0.024	PCI/G	J	T04
SU19-70-067	F6C030215	EML A-01-R	Plutonium-238	0.9	0.17	0.03	PCI/G	=	
SU19-70-067	F6C030215	EML A-01-R	Plutonium-239/240	0.009	0.014	0.02	PCI/G	UJ	T06
SU19-70-068	F6C030215	EML A-01-R	Plutonium-238	4.66	0.63	0.03	PCI/G	=	
SU19-70-068	F6C030215	EML A-01-R	Plutonium-239/240	0.041	0.03	0.022	PCI/G	J	T04
SU19-70-069	F6C030215	EML A-01-R	Plutonium-238	6.71	0.87	0.04	PCI/G	=	
SU19-70-069	F6C030215	EML A-01-R	Plutonium-239/240	0.042	0.033	0.032	PCI/G	J	T04
SU19-70-070	F6C030215	EML A-01-R	Plutonium-238	6.16	0.79	0.03	PCI/G	=	
SU19-70-070	F6C030215	EML A-01-R	Plutonium-239/240	0.049	0.032	0.021	PCI/G	J	T04
SU19-70-071	F6C030215	EML A-01-R	Plutonium-238	8.48	0.98	0.03	PCI/G	=	
SU19-70-071	F6C030215	EML A-01-R	Plutonium-239/240	0.124	0.048	0.018	PCI/G	=	
SU19-70-072	F6C030215	EML A-01-R	Plutonium-238	4.59	0.63	0.04	PCI/G	=	
SU19-70-072	F6C030215	EML A-01-R	Plutonium-239/240	0.04	0.032	0.029	PCI/G	J	T04
SU19-70-072D	F6C030235	EML A-01-R	Plutonium-238	3.66	0.5	0.04	PCI/G	=	
SU19-70-072D	F6C030235	EML A-01-R	Plutonium-239/240	0.012	0.024	0.037	PCI/G	UJ	T06
SU19-70-073	F6C030215	EML A-01-R	Plutonium-238	4.79	0.66	0.03	PCI/G	=	
SU19-70-073	F6C030215	EML A-01-R	Plutonium-239/240	0.031	0.028	0.027	PCI/G	J	T04
SU19-70-074	F6C030215	EML A-01-R	Plutonium-238	12.1	1.5	0.02	PCI/G	=	

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU19-70-074	F6C030215	EML A-01-R	Plutonium-239/240	0.048	0.033	0.025	PCI/G	J	T04
SU19-70-075	F6C030215	EML A-01-R	Plutonium-238	1.85	0.29	0.03	PCI/G	=	
SU19-70-075	F6C030215	EML A-01-R	Plutonium-239/240	0.009	0.015	0.021	PCI/G	UJ	T06
SU19-70-076	F6C030215	EML A-01-R	Plutonium-238	4.58	0.61	0.04	PCI/G	=	
SU19-70-076	F6C030215	EML A-01-R	Plutonium-239/240	0.045	0.031	0.022	PCI/G	J	T04
SU19-70-077	F6C030215	EML A-01-R	Plutonium-238	17.3	2.1	0.02	PCI/G	=	
SU19-70-077	F6C030215	EML A-01-R	Plutonium-239/240	0.223	0.072	0.024	PCI/G	=	
SU19-70-078	F6C030215	EML A-01-R	Plutonium-238	1.47	0.25	0.04	PCI/G	=	
SU19-70-078	F6C030215	EML A-01-R	Plutonium-239/240	0.015	0.019	0.022	PCI/G	UJ	T06
SU19-70-079	F6C030215	EML A-01-R	Plutonium-238	1.85	0.3	0.03	PCI/G	=	
SU19-70-079	F6C030215	EML A-01-R	Plutonium-239/240	0.03	0.027	0.026	PCI/G	J	T04
SU19-70-080	F6C030215	EML A-01-R	Plutonium-238	3.16	0.43	0.03	PCI/G	=	
SU19-70-080	F6C030215	EML A-01-R	Plutonium-239/240	0.024	0.024	0.013	PCI/G	J	T04
SU19-70-081	F6C030229	EML A-01-R	Plutonium-238	5.31	0.69	0.05	PCI/G	=	
SU19-70-081	F6C030229	EML A-01-R	Plutonium-239/240	0.01	0.02	0.031	PCI/G	UJ	T06
SU19-70-082	F6C030229	EML A-01-R	Plutonium-238	9.5	1.2	0.04	PCI/G	=	
SU19-70-082	F6C030229	EML A-01-R	Plutonium-239/240	0.042	0.031	0.023	PCI/G	J	T04
SU19-70-083	F6C030229	EML A-01-R	Plutonium-238	7.1	0.92	0.04	PCI/G	=	
SU19-70-083	F6C030229	EML A-01-R	Plutonium-239/240	0.077	0.042	0.026	PCI/G	J	T04
SU19-70-084	F6C030229	EML A-01-R	Plutonium-238	6.17	0.78	0.03	PCI/G	=	
SU19-70-084	F6C030229	EML A-01-R	Plutonium-239/240	0.046	0.031	0.024	PCI/G	J	T04
SU19-70-085	F6C030229	EML A-01-R	Plutonium-238	3.36	0.46	0.03	PCI/G	=	
SU19-70-085	F6C030229	EML A-01-R	Plutonium-239/240	0.027	0.024	0.023	PCI/G	J	T04
SU19-70-086	F6C030229	EML A-01-R	Plutonium-238	0.237	0.075	0.033	PCI/G	=	
SU19-70-086	F6C030229	EML A-01-R	Plutonium-239/240	-0.004	0.013	0.028	PCI/G	UJ	T06
SU19-70-087	F6C030229	EML A-01-R	Plutonium-238	6.72	0.87	0.03	PCI/G	=	
SU19-70-087	F6C030229	EML A-01-R	Plutonium-239/240	0.019	0.022	0.025	PCI/G	UJ	T06
SU19-70-088	F6C030229	EML A-01-R	Plutonium-238	11.9	1.5	0.03	PCI/G	=	
SU19-70-088	F6C030229	EML A-01-R	Plutonium-239/240	0.088	0.044	0.022	PCI/G	J	T04
SU19-70-089	F6C030229	EML A-01-R	Plutonium-238	3	0.42	0.03	PCI/G	=	
SU19-70-089	F6C030229	EML A-01-R	Plutonium-239/240	0.018	0.02	0.021	PCI/G	UJ	T06
SU19-70-090	F6C030229	EML A-01-R	Plutonium-238	0.43	0.1	0.03	PCI/G	=	
SU19-70-090	F6C030229	EML A-01-R	Plutonium-239/240	-0.004	0.012	0.027	PCI/G	UJ	T06
SU19-70-091	F6C030229	EML A-01-R	Plutonium-238	5.55	0.71	0.03	PCI/G	=	
SU19-70-091	F6C030229	EML A-01-R	Plutonium-239/240	0.024	0.022	0.021	PCI/G	J	T04
SU19-70-092	F6C030229	EML A-01-R	Plutonium-238	4.51	0.58	0.03	PCI/G	=	
SU19-70-092	F6C030229	EML A-01-R	Plutonium-239/240	0.041	0.028	0.02	PCI/G	J	T04
SU19-70-093	F6C030229	EML A-01-R	Plutonium-238	4.1	0.56	0.03	PCI/G	=	
SU19-70-093	F6C030229	EML A-01-R	Plutonium-239/240	0.023	0.025	0.028	PCI/G	UJ	T06
SU19-70-094	F6C030229	EML A-01-R	Plutonium-238	3.75	0.52	0.03	PCI/G	=	
SU19-70-094	F6C030229	EML A-01-R	Plutonium-239/240	0.008	0.016	0.025	PCI/G	UJ	T06
SU19-70-095	F6C030229	EML A-01-R	Plutonium-238	14.7	1.8	0.03	PCI/G	=	
SU19-70-095	F6C030229	EML A-01-R	Plutonium-239/240	0.084	0.043	0.021	PCI/G	J	T04
SU19-70-096	F6C030229	EML A-01-R	Plutonium-238	11.6	1.4	0.04	PCI/G	=	
SU19-70-096	F6C030229	EML A-01-R	Plutonium-239/240	0.078	0.041	0.021	PCI/G	J	T04
SU19-70-097	F6C030229	EML A-01-R	Plutonium-238	11	1.4	0.02	PCI/G	=	
SU19-70-097	F6C030229	EML A-01-R	Plutonium-239/240	0.054	0.035	0.025	PCI/G	J	T04
SU19-70-098	F6C030229	EML A-01-R	Plutonium-238	12.4	1.5	0.04	PCI/G	=	
SU19-70-098	F6C030229	EML A-01-R	Plutonium-239/240	0.104	0.046	0.02	PCI/G	=	
SU19-70-099	F6C030229	EML A-01-R	Plutonium-238	34.8	4.2	0.03	PCI/G	=	
SU19-70-099	F6C030229	EML A-01-R	Plutonium-239/240	0.29	0.086	0.026	PCI/G	=	
SU19-70-100	F6C030229	EML A-01-R	Plutonium-238	14.6	1.7	0.03	PCI/G	=	
SU19-70-100	F6C030229	EML A-01-R	Plutonium-239/240	0.121	0.051	0.013	PCI/G	=	

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU19-70-101	F6C030235	EML A-01-R	Plutonium-238	12	1.5	0.05	PCI/G	=	
SU19-70-101	F6C030235	EML A-01-R	Plutonium-239/240	0.055	0.039	0.039	PCI/G	J	T04
SU19-70-102	F6C030235	EML A-01-R	Plutonium-238	3.75	0.52	0.06	PCI/G	=	
SU19-70-102	F6C030235	EML A-01-R	Plutonium-239/240	0.021	0.032	0.044	PCI/G	UJ	T06
SU19-70-103	F6C030235	EML A-01-R	Plutonium-238	0.52	0.12	0.03	PCI/G	=	
SU19-70-103	F6C030235	EML A-01-R	Plutonium-239/240	-0.005	0.014	0.031	PCI/G	UJ	T06
SU19-70-104	F6C030235	EML A-01-R	Plutonium-238	1.8	0.29	0.05	PCI/G	=	
SU19-70-104	F6C030235	EML A-01-R	Plutonium-239/240	0.012	0.021	0.031	PCI/G	UJ	T06
SU19-70-105	F6C030235	EML A-01-R	Plutonium-238	9.8	1.2	0.05	PCI/G	=	
SU19-70-105	F6C030235	EML A-01-R	Plutonium-239/240	0.052	0.035	0.014	PCI/G	J	T04
SU19-70-106	F6C030235	EML A-01-R	Plutonium-238	0.048	0.032	0.013	PCI/G	J	T04
SU19-70-106	F6C030235	EML A-01-R	Plutonium-239/240	-0.0009	0.01	0.02	PCI/G	UJ	T06
SU19-70-107	F6C030235	EML A-01-R	Plutonium-238	2.91	0.44	0.03	PCI/G	=	
SU19-70-107	F6C030235	EML A-01-R	Plutonium-239/240	0.038	0.032	0.028	PCI/G	J	T04
SU23-70-108	F6C310409	EML A-01-R	Plutonium-238	12.6	1.6	0.07	PCI/G	=	
SU23-70-108	F6C310409	EML A-01-R	Plutonium-239/240	0.172	0.085	0.041	PCI/G	=	
SU23-70-108	F6E090199	EML A-01-R	Uranium 233/234	0.58	0.18	0.04	PCI/G	=	
SU23-70-108	F6E090199	EML A-01-R	Uranium 235/236	0.011	0.028	0.055	PCI/G	UJ	T06
SU23-70-108	F6E090199	EML A-01-R	Uranium 238	0.41	0.14	0.06	PCI/G	=	
SU23-70-108	F6C310409	GAMMA	Actinium 227	0.16	0.16	0.28	PCI/G	U	T05, N02
SU23-70-108	F6C310409	GAMMA	Actinium 228	0.29	0.18	0.37	PCI/G	U	T05
SU23-70-108	F6C310409	GAMMA	Americium 241	0.18	0.1	0.12	PCI/G	J	T04
SU23-70-108	F6C310409	GAMMA	Bismuth 214	0.33	0.14	0.25	PCI/G	=	
SU23-70-108	F6C310409	GAMMA	Bismuth-207	-0.009	0.028	0.049	PCI/G	UJ	T06
SU23-70-108	F6C310409	GAMMA	Bismuth-210M	0.002	0.037	0.068	PCI/G	UJ	T06
SU23-70-108	F6C310409	GAMMA	Cesium 137	0.004	0.037	0.07	PCI/G	UJ	T06
SU23-70-108	F6C310409	GAMMA	Cobalt 60	0.01	0.028	0.064	PCI/G	UJ	T06
SU23-70-108	F6C310409	GAMMA	Lead 210	0.26	0.78	1.5	PCI/G	UJ	T06, N02
SU23-70-108	F6C310409	GAMMA	Lead 212	0.227	0.088	0.093	PCI/G	=	
SU23-70-108	F6C310409	GAMMA	Potassium 40	7	1.2	0.5	PCI/G	=	
SU23-70-108	F6C310409	GAMMA	Protactinium 231	0.07	0.7	1.3	PCI/G	UJ	T06, N02
SU23-70-108	F6C310409	GAMMA	Radium (226)	0.33	0.14	0.25	PCI/G	=	T15
SU23-70-108	F6C310409	GAMMA	Thorium 229	-0.21	0.38	0.63	PCI/G	UJ	T06, N02
SU23-70-108	F6C310409	GAMMA	Uranium 235	-0.11	0.33	0.59	PCI/G	UJ	T06
SU23-70-108	F6C310409	GAMMA	Uranium 238	0.43	0.61	1.1	PCI/G	UJ	T06
SU23-70-109	F6C310409	EML A-01-R	Plutonium-238	15.8	1.9	0.06	PCI/G	=	
SU23-70-109	F6C310409	EML A-01-R	Plutonium-239/240	0.123	0.071	0.041	PCI/G	J	T04
SU23-70-109	F6E090199	EML A-01-R	Uranium 233/234	0.94	0.24	0.04	PCI/G	=	
SU23-70-109	F6E090199	EML A-01-R	Uranium 235/236	0.039	0.053	0.036	PCI/G	J	T04
SU23-70-109	F6E090199	EML A-01-R	Uranium 238	0.71	0.2	0.03	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Actinium 227	0.78	0.33	0.57	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Actinium 228	0.67	0.3	0.29	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Americium 241	0.061	0.048	0.17	PCI/G	U	T05, N02
SU23-70-109	F6C310409	GAMMA	Bismuth 214	0.96	0.24	0.14	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Bismuth-207	-0.031	0.038	0.061	PCI/G	UJ	T06
SU23-70-109	F6C310409	GAMMA	Bismuth-210M	-0.067	0.057	0.092	PCI/G	UJ	T06
SU23-70-109	F6C310409	GAMMA	Cesium 137	0.038	0.054	0.1	PCI/G	UJ	T06
SU23-70-109	F6C310409	GAMMA	Cobalt 60	-0.006	0.044	0.085	PCI/G	UJ	T06
SU23-70-109	F6C310409	GAMMA	Lead 210	0.8	1.3	2.3	PCI/G	UJ	T06, N02
SU23-70-109	F6C310409	GAMMA	Lead 212	0.64	0.11	0.13	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Potassium 40	11.8	1.9	1	PCI/G	=	
SU23-70-109	F6C310409	GAMMA	Protactinium 231	0.06	1.1	1.9	PCI/G	UJ	T06, N02
SU23-70-109	F6C310409	GAMMA	Radium (226)	0.96	0.24	0.14	PCI/G	=	T15

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU23-70-109	F6C310409	GAMMA	Thorium 229	0.12	0.59	1	PCI/G	UJ	T06, N02
SU23-70-109	F6C310409	GAMMA	Uranium 235	-0.07	0.65	0.94	PCI/G	UJ	T06
SU23-70-109	F6C310409	GAMMA	Uranium 238	0.4	1.2	1.9	PCI/G	UJ	T06
SU23-70-110	F6C310409	EML A-01-R	Plutonium-238	11.6	1.5	0.05	PCI/G	=	
SU23-70-110	F6C310409	EML A-01-R	Plutonium-239/240	0.128	0.073	0.046	PCI/G	J	T04
SU23-70-110	F6E090199	EML A-01-R	Uranium 233/234	0.46	0.15	0.05	PCI/G	=	
SU23-70-110	F6E090199	EML A-01-R	Uranium 235/236	0	0	0.03	PCI/G	U	T05
SU23-70-110	F6E090199	EML A-01-R	Uranium 238	0.54	0.16	0.04	PCI/G	=	
SU23-70-110	F6C310409	GAMMA	Actinium 227	0.04	0.18	0.28	PCI/G	UJ	T06, N02
SU23-70-110	F6C310409	GAMMA	Actinium 228	0.33	0.17	0.34	PCI/G	U	T05
SU23-70-110	F6C310409	GAMMA	Americium 241	0.076	0.076	0.14	PCI/G	U	T05, N02
SU23-70-110	F6C310409	GAMMA	Bismuth 214	0.5	0.15	0.11	PCI/G	=	
SU23-70-110	F6C310409	GAMMA	Bismuth-207	0.009	0.023	0.046	PCI/G	UJ	T06
SU23-70-110	F6C310409	GAMMA	Bismuth-210M	-0.02	0.036	0.063	PCI/G	UJ	T06
SU23-70-110	F6C310409	GAMMA	Cesium 137	0.035	0.036	0.063	PCI/G	UJ	T06
SU23-70-110	F6C310409	GAMMA	Cobalt 60	0.032	0.046	0.099	PCI/G	UJ	T06
SU23-70-110	F6C310409	GAMMA	Lead 210	1.16	0.81	1.6	PCI/G	U	T05, N02
SU23-70-110	F6C310409	GAMMA	Lead 212	0.33	0.094	0.092	PCI/G	=	
SU23-70-110	F6C310409	GAMMA	Potassium 40	10.8	1.6	0.5	PCI/G	=	
SU23-70-110	F6C310409	GAMMA	Protactinium 231	-0.67	0.67	1.1	PCI/G	UJ	T06, N02
SU23-70-110	F6C310409	GAMMA	Radium (226)	0.5	0.15	0.11	PCI/G	=	T15
SU23-70-110	F6C310409	GAMMA	Thorium 229	-0.31	0.36	0.59	PCI/G	UJ	T06, N02
SU23-70-110	F6C310409	GAMMA	Uranium 235	-0.07	0.34	0.58	PCI/G	UJ	T06
SU23-70-110	F6C310409	GAMMA	Uranium 238	0.26	0.65	1.2	PCI/G	UJ	T06
SU23-70-110D	F6C310409	EML A-01-R	Plutonium-238	14	1.7	0.08	PCI/G	=	
SU23-70-110D	F6C310409	EML A-01-R	Plutonium-239/240	0.135	0.076	0.026	PCI/G	J	T04
SU23-70-110D	F6E090199	EML A-01-R	Uranium 233/234	0.51	0.16	0.05	PCI/G	=	
SU23-70-110D	F6E090199	EML A-01-R	Uranium 235/236	0.013	0.037	0.036	PCI/G	UJ	T06
SU23-70-110D	F6E090199	EML A-01-R	Uranium 238	0.6	0.18	0.05	PCI/G	=	
SU23-70-110D	F6C310409	GAMMA	Actinium 227	0.04	0.25	0.38	PCI/G	UJ	T06, N02
SU23-70-110D	F6C310409	GAMMA	Actinium 228	0.45	0.3	0.28	PCI/G	J	T04
SU23-70-110D	F6C310409	GAMMA	Americium 241	0.199	0.098	0.19	PCI/G	=	
SU23-70-110D	F6C310409	GAMMA	Bismuth 214	0.58	0.17	0.33	PCI/G	=	
SU23-70-110D	F6C310409	GAMMA	Bismuth-207	0.019	0.032	0.066	PCI/G	UJ	T06
SU23-70-110D	F6C310409	GAMMA	Bismuth-210M	0.041	0.045	0.089	PCI/G	UJ	T06
SU23-70-110D	F6C310409	GAMMA	Cesium 137	0.057	0.044	0.097	PCI/G	U	T05
SU23-70-110D	F6C310409	GAMMA	Cobalt 60	-0.026	0.04	0.069	PCI/G	UJ	T06
SU23-70-110D	F6C310409	GAMMA	Lead 210	0.04	0.97	1.8	PCI/G	UJ	T06, N02
SU23-70-110D	F6C310409	GAMMA	Lead 212	0.36	0.11	0.13	PCI/G	=	
SU23-70-110D	F6C310409	GAMMA	Potassium 40	9.1	1.6	0.4	PCI/G	=	
SU23-70-110D	F6C310409	GAMMA	Protactinium 231	-0.42	0.97	1.7	PCI/G	UJ	T06, N02
SU23-70-110D	F6C310409	GAMMA	Radium (226)	0.58	0.17	0.33	PCI/G	=	T15
SU23-70-110D	F6C310409	GAMMA	Thorium 229	-0.08	0.51	0.87	PCI/G	UJ	T06, N02
SU23-70-110D	F6C310409	GAMMA	Uranium 235	0.16	0.46	0.85	PCI/G	UJ	T06
SU23-70-110D	F6C310409	GAMMA	Uranium 238	0.54	0.81	1.5	PCI/G	UJ	T06
SU23-70-111	F6C310409	EML A-01-R	Plutonium-238	1.53	0.29	0.05	PCI/G	=	
SU23-70-111	F6C310409	EML A-01-R	Plutonium-239/240	0.007	0.019	0.037	PCI/G	UJ	T06
SU23-70-111	F6E090199	EML A-01-R	Uranium 233/234	0.39	0.14	0.04	PCI/G	=	
SU23-70-111	F6E090199	EML A-01-R	Uranium 235/236	0.07	0.061	0.051	PCI/G	J	T04
SU23-70-111	F6E090199	EML A-01-R	Uranium 238	0.3	0.12	0.03	PCI/G	=	
SU23-70-111	F6C310409	GAMMA	Actinium 227	0.18	0.16	0.28	PCI/G	U	T05, N02
SU23-70-111	F6C310409	GAMMA	Actinium 228	0.14	0.13	0.27	PCI/G	U	T05
SU23-70-111	F6C310409	GAMMA	Americium 241	0.017	0.059	0.1	PCI/G	UJ	T06

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU23-70-111	F6C310409	GAMMA	Bismuth 214	0.32	0.12	0.22	PCI/G	=	
SU23-70-111	F6C310409	GAMMA	Bismuth-207	8E-05	0.023	0.044	PCI/G	UJ	T06
SU23-70-111	F6C310409	GAMMA	Bismuth-210M	-0.013	0.03	0.051	PCI/G	UJ	T06
SU23-70-111	F6C310409	GAMMA	Cesium 137	-0.003	0.027	0.05	PCI/G	UJ	T06
SU23-70-111	F6C310409	GAMMA	Cobalt 60	-0.007	0.025	0.049	PCI/G	UJ	T06
SU23-70-111	F6C310409	GAMMA	Lead 210	0.07	0.65	1.3	PCI/G	UJ	T06, N02
SU23-70-111	F6C310409	GAMMA	Lead 212	0.138	0.048	0.087	PCI/G	=	
SU23-70-111	F6C310409	GAMMA	Potassium 40	5.27	1	0.44	PCI/G	=	
SU23-70-111	F6C310409	GAMMA	Protactinium 231	1.01	0.62	1.3	PCI/G	U	T05, N02
SU23-70-111	F6C310409	GAMMA	Radium (226)	0.32	0.12	0.22	PCI/G	=	T15
SU23-70-111	F6C310409	GAMMA	Thorium 229	0.07	0.3	0.54	PCI/G	UJ	T06, N02
SU23-70-111	F6C310409	GAMMA	Uranium 235	0.07	0.3	0.56	PCI/G	UJ	T06
SU23-70-111	F6C310409	GAMMA	Uranium 238	-0.09	0.55	0.97	PCI/G	UJ	T06
SU23-70-112	F6C310409	EML A-01-R	Plutonium-238	19.4	2.4	0.05	PCI/G	=	
SU23-70-112	F6C310409	EML A-01-R	Plutonium-239/240	0.219	0.098	0.053	PCI/G	=	
SU23-70-112	F6E090199	EML A-01-R	Uranium 233/234	1.05	0.25	0.04	PCI/G	=	
SU23-70-112	F6E090199	EML A-01-R	Uranium 235/236	0.057	0.057	0.06	PCI/G	U	T05
SU23-70-112	F6E090199	EML A-01-R	Uranium 238	1.1	0.26	0.03	PCI/G	=	
SU23-70-112	F6C310409	GAMMA	Actinium 227	0.5	0.25	0.43	PCI/G	J	T04
SU23-70-112	F6C310409	GAMMA	Actinium 228	0.35	0.24	0.27	PCI/G	J	T04
SU23-70-112	F6C310409	GAMMA	Americium 241	0.099	0.049	0.13	PCI/G	U	T05, N02
SU23-70-112	F6C310409	GAMMA	Bismuth 214	0.66	0.18	0.29	PCI/G	=	
SU23-70-112	F6C310409	GAMMA	Bismuth-207	0.0003	0.029	0.053	PCI/G	UJ	T06
SU23-70-112	F6C310409	GAMMA	Bismuth-210M	-0.019	0.047	0.08	PCI/G	UJ	T06
SU23-70-112	F6C310409	GAMMA	Cesium 137	0.024	0.042	0.082	PCI/G	UJ	T06
SU23-70-112	F6C310409	GAMMA	Cobalt 60	0.042	0.036	0.084	PCI/G	U	T05
SU23-70-112	F6C310409	GAMMA	Lead 210	1.2	1	1.5	PCI/G	U	T05, N02
SU23-70-112	F6C310409	GAMMA	Lead 212	0.4	0.075	0.098	PCI/G	=	
SU23-70-112	F6C310409	GAMMA	Potassium 40	7.7	1.4	0.8	PCI/G	=	
SU23-70-112	F6C310409	GAMMA	Protactinium 231	0.43	0.92	1.6	PCI/G	UJ	T06, N02
SU23-70-112	F6C310409	GAMMA	Radium (226)	0.66	0.18	0.29	PCI/G	=	T15
SU23-70-112	F6C310409	GAMMA	Thorium 229	-0.01	0.53	0.77	PCI/G	UJ	T06, N02
SU23-70-112	F6C310409	GAMMA	Uranium 235	0.002	0.45	0.77	PCI/G	UJ	T06
SU23-70-112	F6C310409	GAMMA	Uranium 238	0.94	0.5	1.3	PCI/G	U	T05
SU23-70-113	F6C310409	EML A-01-R	Plutonium-238	51.3	5.6	0.04	PCI/G	=	
SU23-70-113	F6C310409	EML A-01-R	Plutonium-239/240	0.45	0.13	0.02	PCI/G	=	
SU23-70-113	F6E090199	EML A-01-R	Uranium 233/234	0.98	0.24	0.05	PCI/G	=	
SU23-70-113	F6E090199	EML A-01-R	Uranium 235/236	0.012	0.034	0.032	PCI/G	UJ	T06
SU23-70-113	F6E090199	EML A-01-R	Uranium 238	0.86	0.22	0.05	PCI/G	=	
SU23-70-113	F6C310409	GAMMA	Actinium 227	0.01	0.24	0.36	PCI/G	UJ	T06, N02
SU23-70-113	F6C310409	GAMMA	Actinium 228	0.51	0.26	0.26	PCI/G	J	T04
SU23-70-113	F6C310409	GAMMA	Americium 241	0.74	0.21	0.16	PCI/G	=	
SU23-70-113	F6C310409	GAMMA	Bismuth 214	0.57	0.18	0.32	PCI/G	=	
SU23-70-113	F6C310409	GAMMA	Bismuth-207	-0.007	0.031	0.056	PCI/G	UJ	T06
SU23-70-113	F6C310409	GAMMA	Bismuth-210M	-0.022	0.048	0.083	PCI/G	UJ	T06
SU23-70-113	F6C310409	GAMMA	Cesium 137	0.04	0.039	0.084	PCI/G	U	T05
SU23-70-113	F6C310409	GAMMA	Cobalt 60	0.044	0.046	0.11	PCI/G	UJ	T06, N02
SU23-70-113	F6C310409	GAMMA	Lead 210	0.68	0.99	1.9	PCI/G	UJ	T06, N02
SU23-70-113	F6C310409	GAMMA	Lead 212	0.37	0.11	0.14	PCI/G	=	
SU23-70-113	F6C310409	GAMMA	Potassium 40	9.7	1.6	0.7	PCI/G	=	
SU23-70-113	F6C310409	GAMMA	Protactinium 231	-0.09	0.93	1.6	PCI/G	UJ	T06, N02
SU23-70-113	F6C310409	GAMMA	Radium (226)	0.57	0.18	0.32	PCI/G	=	T15
SU23-70-113	F6C310409	GAMMA	Thorium 229	-0.13	0.45	0.78	PCI/G	UJ	T06, N02

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-113	F6C310409	GAMMA	Uranium 235	-0.1	0.44	0.78	PCI/G	UJ	T06
SU23-70-113	F6C310409	GAMMA	Uranium 238	1.04	0.9	1.5	PCI/G	U	T05
SU23-70-114	F6C310409	EML A-01-R	Plutonium-238	25.5	3	0.06	PCI/G	=	
SU23-70-114	F6C310409	EML A-01-R	Plutonium-239/240	0.58	0.16	0.06	PCI/G	=	
SU23-70-114	F6E090199	EML A-01-R	Uranium 233/234	0.72	0.19	0.05	PCI/G	=	
SU23-70-114	F6E090199	EML A-01-R	Uranium 235/236	0.047	0.054	0.032	PCI/G	J	T04
SU23-70-114	F6E090199	EML A-01-R	Uranium 238	0.51	0.16	0.04	PCI/G	=	
SU23-70-114	F6C310409	GAMMA	Actinium 227	0.33	0.23	0.4	PCI/G	U	T05, N02
SU23-70-114	F6C310409	GAMMA	Actinium 228	0.48	0.27	0.3	PCI/G	J	T04
SU23-70-114	F6C310409	GAMMA	Americium 241	0.61	0.16	0.14	PCI/G	=	
SU23-70-114	F6C310409	GAMMA	Bismuth 214	0.67	0.18	0.15	PCI/G	=	
SU23-70-114	F6C310409	GAMMA	Bismuth-207	-0.005	0.035	0.062	PCI/G	UJ	T06
SU23-70-114	F6C310409	GAMMA	Bismuth-210M	0.0007	0.049	0.089	PCI/G	UJ	T06
SU23-70-114	F6C310409	GAMMA	Cesium 137	0.01	0.053	0.1	PCI/G	UJ	T06
SU23-70-114	F6C310409	GAMMA	Cobalt 60	0.047	0.047	0.11	PCI/G	U	T05, N02
SU23-70-114	F6C310409	GAMMA	Lead 210	0.83	0.96	1.8	PCI/G	UJ	T06, N02
SU23-70-114	F6C310409	GAMMA	Lead 212	0.57	0.12	0.13	PCI/G	=	
SU23-70-114	F6C310409	GAMMA	Potassium 40	14.9	2	0.6	PCI/G	=	
SU23-70-114	F6C310409	GAMMA	Protactinium 231	-0.88	0.97	1.6	PCI/G	UJ	T06, N02
SU23-70-114	F6C310409	GAMMA	Radium (226)	0.67	0.18	0.15	PCI/G	=	T15
SU23-70-114	F6C310409	GAMMA	Thorium 229	0.06	0.45	0.8	PCI/G	UJ	T06, N02
SU23-70-114	F6C310409	GAMMA	Uranium 235	0.21	0.42	0.77	PCI/G	UJ	T06
SU23-70-114	F6C310409	GAMMA	Uranium 238	0.7	0.75	1.4	PCI/G	UJ	T06
SU23-70-115A	F6D060305	EML A-01-R	Plutonium-238	0.84	0.21	0.08	PCI/G	=	
SU23-70-115A	F6D060305	EML A-01-R	Plutonium-239/240	0.004	0.024	0.052	PCI/G	UJ	T06
SU23-70-115A	F6D060305	EML A-01-R	Uranium 233/234	1.16	0.25	0.05	PCI/G	=	
SU23-70-115A	F6D060305	EML A-01-R	Uranium 235/236	0.074	0.064	0.054	PCI/G	J	T04
SU23-70-115A	F6D060305	EML A-01-R	Uranium 238	1.45	0.28	0.04	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Actinium 227	1.3	0.38	0.67	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Actinium 228	0.89	0.42	0.38	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Americium 241	0.12	0.13	0.2	PCI/G	UJ	T06, N02
SU23-70-115A	F6D060305	GAMMA	Bismuth 214	0.99	0.23	0.18	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Bismuth-207	0.003	0.045	0.081	PCI/G	UJ	T06
SU23-70-115A	F6D060305	GAMMA	Bismuth-210M	-0.031	0.062	0.11	PCI/G	UJ	T06, N02
SU23-70-115A	F6D060305	GAMMA	Cesium 137	0.004	0.052	0.095	PCI/G	UJ	T06
SU23-70-115A	F6D060305	GAMMA	Cobalt 60	0.019	0.053	0.11	PCI/G	UJ	T06, N02
SU23-70-115A	F6D060305	GAMMA	Lead 210	0.7	1.4	2.5	PCI/G	UJ	T06, N02
SU23-70-115A	F6D060305	GAMMA	Lead 212	0.87	0.13	0.15	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Potassium 40	18	2.6	0.9	PCI/G	=	
SU23-70-115A	F6D060305	GAMMA	Protactinium 231	1.8	1.4	2.3	PCI/G	U	T05, N02
SU23-70-115A	F6D060305	GAMMA	Radium (226)	0.99	0.23	0.18	PCI/G	=	T15
SU23-70-115A	F6D060305	GAMMA	Thorium 229	0.43	0.65	1.2	PCI/G	UJ	T06, N02
SU23-70-115A	F6D060305	GAMMA	Uranium 235	-0.09	0.71	1	PCI/G	UJ	T06
SU23-70-115A	F6D060305	GAMMA	Uranium 238	2.2	1.8	1.8	PCI/G	J	T04
SU23-70-116	F6C310409	EML A-01-R	Plutonium-238	12.9	1.6	0.08	PCI/G	=	
SU23-70-116	F6C310409	EML A-01-R	Plutonium-239/240	0.141	0.076	0.041	PCI/G	J	T04
SU23-70-116	F6E090199	EML A-01-R	Uranium 233/234	0.69	0.19	0.05	PCI/G	=	
SU23-70-116	F6E090199	EML A-01-R	Uranium 235/236	0.06	0.059	0.032	PCI/G	J	T04
SU23-70-116	F6E090199	EML A-01-R	Uranium 238	0.59	0.17	0.03	PCI/G	=	
SU23-70-116	F6C310409	GAMMA	Actinium 227	0.02	0.21	0.33	PCI/G	UJ	T06, N02
SU23-70-116	F6C310409	GAMMA	Actinium 228	0.15	0.15	0.32	PCI/G	U	T05
SU23-70-116	F6C310409	GAMMA	Americium 241	0.32	0.13	0.12	PCI/G	=	
SU23-70-116	F6C310409	GAMMA	Bismuth 214	0.47	0.14	0.28	PCI/G	=	

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-116	F6C310409	GAMMA	Bismuth-207	-0.006	0.027	0.049	PCI/G	UJ	T06
SU23-70-116	F6C310409	GAMMA	Bismuth-210M	0.018	0.039	0.075	PCI/G	UJ	T06
SU23-70-116	F6C310409	GAMMA	Cesium 137	0.016	0.032	0.067	PCI/G	UJ	T06
SU23-70-116	F6C310409	GAMMA	Cobalt 60	0.031	0.037	0.088	PCI/G	UJ	T06
SU23-70-116	F6C310409	GAMMA	Lead 210	0.42	0.94	1.8	PCI/G	UJ	T06, N02
SU23-70-116	F6C310409	GAMMA	Lead 212	0.128	0.088	0.093	PCI/G	J	T04
SU23-70-116	F6C310409	GAMMA	Potassium 40	4.7	1.2	0.7	PCI/G	=	
SU23-70-116	F6C310409	GAMMA	Protactinium 231	0.3	0.73	1.4	PCI/G	UJ	T06, N02
SU23-70-116	F6C310409	GAMMA	Radium (226)	0.47	0.14	0.28	PCI/G	=	T15
SU23-70-116	F6C310409	GAMMA	Thorium 229	0.002	0.41	0.72	PCI/G	UJ	T06, N02
SU23-70-116	F6C310409	GAMMA	Uranium 235	-0.06	0.36	0.64	PCI/G	UJ	T06
SU23-70-116	F6C310409	GAMMA	Uranium 238	0.44	0.72	1.2	PCI/G	UJ	T06
SU23-70-117	F6C310409	EML A-01-R	Plutonium-238	24.4	2.8	0.04	PCI/G	=	
SU23-70-117	F6C310409	EML A-01-R	Plutonium-239/240	0.167	0.079	0.042	PCI/G	=	
SU23-70-117	F6E090199	EML A-01-R	Uranium 233/234	0.69	0.2	0.06	PCI/G	=	
SU23-70-117	F6E090199	EML A-01-R	Uranium 235/236	0.038	0.05	0.034	PCI/G	J	T04
SU23-70-117	F6E090199	EML A-01-R	Uranium 238	0.65	0.19	0.03	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Actinium 227	0.7	0.25	0.44	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Actinium 228	0.41	0.23	0.24	PCI/G	J	T04
SU23-70-117	F6C310409	GAMMA	Americium 241	0.422	0.086	0.13	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Bismuth 214	0.51	0.14	0.25	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Bismuth-207	-0.016	0.029	0.049	PCI/G	UJ	T06
SU23-70-117	F6C310409	GAMMA	Bismuth-210M	-0.022	0.044	0.076	PCI/G	UJ	T06
SU23-70-117	F6C310409	GAMMA	Cesium 137	0.012	0.039	0.073	PCI/G	UJ	T06
SU23-70-117	F6C310409	GAMMA	Cobalt 60	0.003	0.035	0.068	PCI/G	UJ	T06
SU23-70-117	F6C310409	GAMMA	Lead 210	0.4	1	1.8	PCI/G	UJ	T06, N02
SU23-70-117	F6C310409	GAMMA	Lead 212	0.347	0.068	0.09	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Potassium 40	8.8	1.6	0.5	PCI/G	=	
SU23-70-117	F6C310409	GAMMA	Protactinium 231	-0.09	0.93	1.5	PCI/G	UJ	T06, N02
SU23-70-117	F6C310409	GAMMA	Radium (226)	0.51	0.14	0.25	PCI/G	=	T15
SU23-70-117	F6C310409	GAMMA	Thorium 229	-0.1	0.43	0.72	PCI/G	UJ	T06, N02
SU23-70-117	F6C310409	GAMMA	Uranium 235	0.05	0.43	0.75	PCI/G	UJ	T06
SU23-70-117	F6C310409	GAMMA	Uranium 238	0.82	0.72	1.3	PCI/G	U	T05
SU23-70-118	F6C310409	EML A-01-R	Plutonium-238	1.71	0.33	0.07	PCI/G	=	
SU23-70-118	F6C310409	EML A-01-R	Plutonium-239/240	0.02	0.034	0.027	PCI/G	UJ	T06
SU23-70-118	F6E090199	EML A-01-R	Uranium 233/234	0.88	0.24	0.03	PCI/G	=	
SU23-70-118	F6E090199	EML A-01-R	Uranium 235/236	0.043	0.057	0.039	PCI/G	J	T04
SU23-70-118	F6E090199	EML A-01-R	Uranium 238	0.83	0.23	0.03	PCI/G	=	
SU23-70-118	F6C310409	GAMMA	Actinium 227	0.17	0.28	0.44	PCI/G	UJ	T06, N02
SU23-70-118	F6C310409	GAMMA	Actinium 228	0.7	0.33	0.31	PCI/G	=	
SU23-70-118	F6C310409	GAMMA	Americium 241	0.08	0.11	0.19	PCI/G	UJ	T06, N02
SU23-70-118	F6C310409	GAMMA	Bismuth 214	1.19	0.21	0.14	PCI/G	=	
SU23-70-118	F6C310409	GAMMA	Bismuth-207	-0.013	0.038	0.066	PCI/G	UJ	T06
SU23-70-118	F6C310409	GAMMA	Bismuth-210M	-0.05	0.06	0.099	PCI/G	UJ	T06
SU23-70-118	F6C310409	GAMMA	Cesium 137	-0.008	0.046	0.082	PCI/G	UJ	T06
SU23-70-118	F6C310409	GAMMA	Cobalt 60	0.01	0.042	0.088	PCI/G	UJ	T06
SU23-70-118	F6C310409	GAMMA	Lead 210	0.7	1.1	2	PCI/G	UJ	T06, N02
SU23-70-118	F6C310409	GAMMA	Lead 212	0.92	0.13	0.12	PCI/G	=	
SU23-70-118	F6C310409	GAMMA	Potassium 40	13.3	2	0.9	PCI/G	=	
SU23-70-118	F6C310409	GAMMA	Protactinium 231	0.04	1.1	1.7	PCI/G	UJ	T06, N02
SU23-70-118	F6C310409	GAMMA	Radium (226)	1.19	0.21	0.14	PCI/G	=	T15
SU23-70-118	F6C310409	GAMMA	Thorium 229	-0.08	0.53	0.93	PCI/G	UJ	T06, N02
SU23-70-118	F6C310409	GAMMA	Uranium 235	-0.31	0.57	0.96	PCI/G	UJ	T06

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R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-118	F6C310409	GAMMA	Uranium 238	1.1	1.1	1.6	PCI/G	U	T05
SU23-70-119	F6C310409	EML A-01-R	Plutonium-238	11.7	1.4	0.06	PCI/G	=	
SU23-70-119	F6C310409	EML A-01-R	Plutonium-239/240	0.071	0.052	0.038	PCI/G	J	T04
SU23-70-119	F6E090199	EML A-01-R	Uranium 233/234	0.84	0.21	0.04	PCI/G	=	
SU23-70-119	F6E090199	EML A-01-R	Uranium 235/236	0.011	0.033	0.031	PCI/G	UJ	T06
SU23-70-119	F6E090199	EML A-01-R	Uranium 238	0.66	0.18	0.04	PCI/G	=	
SU23-70-119	F6C310409	GAMMA	Actinium 227	-0.03	0.23	0.34	PCI/G	UJ	T06, N02
SU23-70-119	F6C310409	GAMMA	Actinium 228	0.68	0.28	0.2	PCI/G	=	
SU23-70-119	F6C310409	GAMMA	Americium 241	0.162	0.088	0.17	PCI/G	U	T05, N02
SU23-70-119	F6C310409	GAMMA	Bismuth 214	0.81	0.19	0.15	PCI/G	=	
SU23-70-119	F6C310409	GAMMA	Bismuth-207	-0.005	0.031	0.056	PCI/G	UJ	T06
SU23-70-119	F6C310409	GAMMA	Bismuth-210M	-0.02	0.044	0.077	PCI/G	UJ	T06
SU23-70-119	F6C310409	GAMMA	Cesium 137	-0.003	0.046	0.09	PCI/G	UJ	T06
SU23-70-119	F6C310409	GAMMA	Cobalt 60	-0.017	0.044	0.086	PCI/G	UJ	T06
SU23-70-119	F6C310409	GAMMA	Lead 210	0.9	1	1.9	PCI/G	UJ	T06, N02
SU23-70-119	F6C310409	GAMMA	Lead 212	0.597	0.099	0.088	PCI/G	=	
SU23-70-119	F6C310409	GAMMA	Potassium 40	9.1	1.6	0.9	PCI/G	=	
SU23-70-119	F6C310409	GAMMA	Protactinium 231	-0.5	0.9	1.5	PCI/G	UJ	T06, N02
SU23-70-119	F6C310409	GAMMA	Radium (226)	0.81	0.19	0.15	PCI/G	=	T15
SU23-70-119	F6C310409	GAMMA	Thorium 229	-0.21	0.47	0.81	PCI/G	UJ	T06, N02
SU23-70-119	F6C310409	GAMMA	Uranium 235	0.55	0.43	0.82	PCI/G	U	T05
SU23-70-119	F6C310409	GAMMA	Uranium 238	0.8	0.76	1.5	PCI/G	U	T05
SU23-70-120	F6C310409	EML A-01-R	Plutonium-238	42.9	4.8	0.07	PCI/G	=	
SU23-70-120	F6C310409	EML A-01-R	Plutonium-239/240	0.39	0.12	0.04	PCI/G	=	
SU23-70-120	F6E090199	EML A-01-R	Uranium 233/234	0.99	0.25	0.03	PCI/G	=	
SU23-70-120	F6E090199	EML A-01-R	Uranium 235/236	0.102	0.078	0.035	PCI/G	J	T04
SU23-70-120	F6E090199	EML A-01-R	Uranium 238	0.72	0.2	0.04	PCI/G	=	
SU23-70-120	F6C310409	GAMMA	Actinium 227	0.26	0.18	0.33	PCI/G	U	T05, N02
SU23-70-120	F6C310409	GAMMA	Actinium 228	0.26	0.17	0.35	PCI/G	U	T05
SU23-70-120	F6C310409	GAMMA	Americium 241	0.3	0.12	0.13	PCI/G	=	
SU23-70-120	F6C310409	GAMMA	Bismuth 214	0.56	0.16	0.3	PCI/G	=	
SU23-70-120	F6C310409	GAMMA	Bismuth-207	-0.007	0.024	0.043	PCI/G	UJ	T06
SU23-70-120	F6C310409	GAMMA	Bismuth-210M	0.008	0.039	0.072	PCI/G	UJ	T06
SU23-70-120	F6C310409	GAMMA	Cesium 137	0.022	0.031	0.067	PCI/G	UJ	T06
SU23-70-120	F6C310409	GAMMA	Cobalt 60	-0.008	0.037	0.07	PCI/G	UJ	T06
SU23-70-120	F6C310409	GAMMA	Lead 210	0.34	0.96	1.8	PCI/G	UJ	T06, N02
SU23-70-120	F6C310409	GAMMA	Lead 212	0.169	0.084	0.095	PCI/G	=	
SU23-70-120	F6C310409	GAMMA	Potassium 40	6.2	1.3	0.6	PCI/G	=	
SU23-70-120	F6C310409	GAMMA	Protactinium 231	-0.67	0.76	1.2	PCI/G	UJ	T06, N02
SU23-70-120	F6C310409	GAMMA	Radium (226)	0.56	0.16	0.3	PCI/G	=	T15
SU23-70-120	F6C310409	GAMMA	Thorium 229	0.21	0.38	0.71	PCI/G	UJ	T06, N02
SU23-70-120	F6C310409	GAMMA	Uranium 235	-0.1	0.37	0.65	PCI/G	UJ	T06
SU23-70-120	F6C310409	GAMMA	Uranium 238	1.01	0.72	1.3	PCI/G	U	T05
SU23-70-121	F6C310409	EML A-01-R	Plutonium-238	29.4	3.5	0.06	PCI/G	=	
SU23-70-121	F6C310409	EML A-01-R	Plutonium-239/240	0.24	0.1	0.03	PCI/G	=	
SU23-70-121	F6E090199	EML A-01-R	Uranium 233/234	0.77	0.21	0.03	PCI/G	=	
SU23-70-121	F6E090199	EML A-01-R	Uranium 235/236	0.076	0.068	0.034	PCI/G	J	T04
SU23-70-121	F6E090199	EML A-01-R	Uranium 238	0.62	0.18	0.05	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Actinium 227	0.99	0.3	0.55	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Actinium 228	0.4	0.24	0.45	PCI/G	U	T05
SU23-70-121	F6C310409	GAMMA	Americium 241	0.84	0.14	0.17	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Bismuth 214	0.67	0.21	0.14	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Bismuth-207	-0.008	0.033	0.059	PCI/G	UJ	T06

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Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-121	F6C310409	GAMMA	Bismuth-210M	-0.069	0.055	0.088	PCI/G	UJ	T06
SU23-70-121	F6C310409	GAMMA	Cesium 137	0.045	0.048	0.096	PCI/G	UJ	T06
SU23-70-121	F6C310409	GAMMA	Cobalt 60	-0.026	0.052	0.089	PCI/G	UJ	T06
SU23-70-121	F6C310409	GAMMA	Lead 210	-0.7	1.2	2.2	PCI/G	UJ	T06, N02
SU23-70-121	F6C310409	GAMMA	Lead 212	0.513	0.095	0.099	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Potassium 40	9.7	1.7	1	PCI/G	=	
SU23-70-121	F6C310409	GAMMA	Protactinium 231	0.7	1.1	1.9	PCI/G	UJ	T06, N02
SU23-70-121	F6C310409	GAMMA	Radium (226)	0.67	0.21	0.14	PCI/G	=	T15
SU23-70-121	F6C310409	GAMMA	Thorium 229	0.07	0.53	0.94	PCI/G	UJ	T06, N02
SU23-70-121	F6C310409	GAMMA	Uranium 235	-0.02	0.53	0.92	PCI/G	UJ	T06
SU23-70-121	F6C310409	GAMMA	Uranium 238	1.43	0.6	1.7	PCI/G	U	T05
SU23-70-122	F6C310409	EML A-01-R	Plutonium-238	0.85	0.21	0.05	PCI/G	=	
SU23-70-122	F6C310409	EML A-01-R	Plutonium-239/240	-0.004	0.024	0.051	PCI/G	UJ	T06
SU23-70-122	F6E090199	EML A-01-R	Uranium 233/234	0.55	0.17	0.05	PCI/G	=	
SU23-70-122	F6E090199	EML A-01-R	Uranium 235/236	0.023	0.038	0.054	PCI/G	UJ	T06
SU23-70-122	F6E090199	EML A-01-R	Uranium 238	0.66	0.19	0.04	PCI/G	=	
SU23-70-122	F6C310409	GAMMA	Actinium 227	0.07	0.23	0.36	PCI/G	UJ	T06, N02
SU23-70-122	F6C310409	GAMMA	Actinium 228	0.27	0.21	0.44	PCI/G	U	T05
SU23-70-122	F6C310409	GAMMA	Americium 241	-0.017	0.079	0.14	PCI/G	UJ	T06, N02
SU23-70-122	F6C310409	GAMMA	Bismuth 214	0.61	0.16	0.13	PCI/G	=	
SU23-70-122	F6C310409	GAMMA	Bismuth-207	0.02	0.031	0.063	PCI/G	UJ	T06
SU23-70-122	F6C310409	GAMMA	Bismuth-210M	0.013	0.046	0.085	PCI/G	UJ	T06
SU23-70-122	F6C310409	GAMMA	Cesium 137	0.004	0.039	0.072	PCI/G	UJ	T06
SU23-70-122	F6C310409	GAMMA	Cobalt 60	-0.01	0.04	0.076	PCI/G	UJ	T06
SU23-70-122	F6C310409	GAMMA	Lead 210	0.49	0.94	1.7	PCI/G	UJ	T06, N02
SU23-70-122	F6C310409	GAMMA	Lead 212	0.35	0.077	0.1	PCI/G	=	
SU23-70-122	F6C310409	GAMMA	Potassium 40	11	1.7	0.8	PCI/G	=	
SU23-70-122	F6C310409	GAMMA	Protactinium 231	0.21	0.9	1.6	PCI/G	UJ	T06, N02
SU23-70-122	F6C310409	GAMMA	Radium (226)	0.61	0.16	0.13	PCI/G	=	T15
SU23-70-122	F6C310409	GAMMA	Thorium 229	0.1	0.47	0.86	PCI/G	UJ	T06, N02
SU23-70-122	F6C310409	GAMMA	Uranium 235	-0.26	0.43	0.72	PCI/G	UJ	T06
SU23-70-122	F6C310409	GAMMA	Uranium 238	0.73	0.77	1.4	PCI/G	UJ	T06
SU23-70-123	F6C310409	EML A-01-R	Plutonium-238	30.3	3.8	0.07	PCI/G	=	
SU23-70-123	F6C310409	EML A-01-R	Plutonium-239/240	0.25	0.11	0.05	PCI/G	=	
SU23-70-123	F6E090199	EML A-01-R	Uranium 233/234	0.97	0.24	0.03	PCI/G	=	
SU23-70-123	F6E090199	EML A-01-R	Uranium 235/236	0.09	0.074	0.035	PCI/G	J	T04
SU23-70-123	F6E090199	EML A-01-R	Uranium 238	0.91	0.23	0.04	PCI/G	=	
SU23-70-123	F6C310409	GAMMA	Actinium 227	0.27	0.26	0.43	PCI/G	U	T05, N02
SU23-70-123	F6C310409	GAMMA	Actinium 228	1.01	0.37	0.31	PCI/G	=	
SU23-70-123	F6C310409	GAMMA	Americium 241	0.29	0.16	0.16	PCI/G	J	T04
SU23-70-123	F6C310409	GAMMA	Bismuth 214	1.31	0.23	0.15	PCI/G	=	
SU23-70-123	F6C310409	GAMMA	Bismuth-207	-0.026	0.043	0.071	PCI/G	UJ	T06
SU23-70-123	F6C310409	GAMMA	Bismuth-210M	-0.029	0.055	0.094	PCI/G	UJ	T06
SU23-70-123	F6C310409	GAMMA	Cesium 137	0.008	0.05	0.099	PCI/G	UJ	T06
SU23-70-123	F6C310409	GAMMA	Cobalt 60	-0.013	0.052	0.1	PCI/G	UJ	T06
SU23-70-123	F6C310409	GAMMA	Lead 210	0.6	1.1	2	PCI/G	UJ	T06, N02
SU23-70-123	F6C310409	GAMMA	Lead 212	1.16	0.16	0.13	PCI/G	=	
SU23-70-123	F6C310409	GAMMA	Potassium 40	20.6	2.6	0.6	PCI/G	=	
SU23-70-123	F6C310409	GAMMA	Protactinium 231	-1.6	1.1	1.7	PCI/G	UJ	T06, N02
SU23-70-123	F6C310409	GAMMA	Radium (226)	1.31	0.23	0.15	PCI/G	=	T15
SU23-70-123	F6C310409	GAMMA	Thorium 229	-0.18	0.56	0.95	PCI/G	UJ	T06, N02
SU23-70-123	F6C310409	GAMMA	Uranium 235	0.002	0.52	0.91	PCI/G	UJ	T06
SU23-70-123	F6C310409	GAMMA	Uranium 238	1.2	1.3	1.7	PCI/G	UJ	T06

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-124	F6D060305	EML A-01-R	Plutonium-238	0.147	0.086	0.074	PCI/G	J	T04
SU23-70-124	F6D060305	EML A-01-R	Plutonium-239/240	0.01	0.028	0.026	PCI/G	UJ	T06
SU23-70-124	F6D060305	EML A-01-R	Uranium 233/234	0.75	0.19	0.05	PCI/G	=	
SU23-70-124	F6D060305	EML A-01-R	Uranium 235/236	0.032	0.046	0.061	PCI/G	UJ	T06
SU23-70-124	F6D060305	EML A-01-R	Uranium 238	1.02	0.23	0.03	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Actinium 227	1.36	0.38	0.67	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Actinium 228	1.02	0.47	0.29	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Americium 241	-0.14	0.12	0.2	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Bismuth 214	1.16	0.24	0.19	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Bismuth-207	0.017	0.041	0.076	PCI/G	UJ	T06
SU23-70-124	F6D060305	GAMMA	Bismuth-210M	-0.024	0.065	0.11	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Cesium 137	-0.043	0.055	0.09	PCI/G	UJ	T06
SU23-70-124	F6D060305	GAMMA	Cobalt 60	-0.009	0.059	0.11	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Lead 210	0.6	1.3	2.4	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Lead 212	0.88	0.13	0.12	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Potassium 40	16.7	2.3	1	PCI/G	=	
SU23-70-124	F6D060305	GAMMA	Protactinium 231	0.6	1.3	2.2	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Radium (226)	1.16	0.24	0.19	PCI/G	=	T15
SU23-70-124	F6D060305	GAMMA	Thorium 229	0.03	0.62	1.1	PCI/G	UJ	T06, N02
SU23-70-124	F6D060305	GAMMA	Uranium 235	-0.88	0.67	1	PCI/G	UJ	T06
SU23-70-124	F6D060305	GAMMA	Uranium 238	1.4	1.1	2.1	PCI/G	U	T05
SU23-70-125	F6D060305	EML A-01-R	Plutonium-238	0.61	0.17	0.07	PCI/G	=	
SU23-70-125	F6D060305	EML A-01-R	Plutonium-239/240	0.01	0.028	0.027	PCI/G	UJ	T06
SU23-70-125	F6D060305	EML A-01-R	Uranium 233/234	0.85	0.2	0.03	PCI/G	=	
SU23-70-125	F6D060305	EML A-01-R	Uranium 235/236	0.035	0.045	0.053	PCI/G	UJ	T06
SU23-70-125	F6D060305	EML A-01-R	Uranium 238	1.42	0.28	0.04	PCI/G	=	
SU23-70-125	F6D060305	GAMMA	Actinium 227	0.13	0.35	0.55	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Actinium 228	0.83	0.36	0.33	PCI/G	=	
SU23-70-125	F6D060305	GAMMA	Americium 241	0.02	0.12	0.21	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Bismuth 214	1.21	0.26	0.49	PCI/G	=	
SU23-70-125	F6D060305	GAMMA	Bismuth-207	0.005	0.049	0.091	PCI/G	UJ	T06
SU23-70-125	F6D060305	GAMMA	Bismuth-210M	-0.016	0.075	0.13	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Cesium 137	-0.025	0.066	0.11	PCI/G	UJ	T06
SU23-70-125	F6D060305	GAMMA	Cobalt 60	-0.007	0.059	0.11	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Lead 210	2.6	1.4	2.7	PCI/G	U	T05, N02
SU23-70-125	F6D060305	GAMMA	Lead 212	0.84	0.19	0.19	PCI/G	=	
SU23-70-125	F6D060305	GAMMA	Potassium 40	19.1	2.7	1.3	PCI/G	=	
SU23-70-125	F6D060305	GAMMA	Protactinium 231	-0.6	1.4	2.3	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Radium (226)	1.21	0.26	0.49	PCI/G	=	T15
SU23-70-125	F6D060305	GAMMA	Thorium 229	0.07	0.68	1.2	PCI/G	UJ	T06, N02
SU23-70-125	F6D060305	GAMMA	Uranium 235	-0.14	0.69	1.2	PCI/G	UJ	T06
SU23-70-125	F6D060305	GAMMA	Uranium 238	0.4	1.2	2.1	PCI/G	UJ	T06
SU23-70-126	F6D060305	EML A-01-R	Plutonium-238	33.2	3.9	0.06	PCI/G	=	
SU23-70-126	F6D060305	EML A-01-R	Plutonium-239/240	0.197	0.09	0.04	PCI/G	=	
SU23-70-126	F6D060305	EML A-01-R	Uranium 233/234	0.72	0.19	0.06	PCI/G	=	
SU23-70-126	F6D060305	EML A-01-R	Uranium 235/236	0.06	0.057	0.053	PCI/G	J	T04
SU23-70-126	F6D060305	EML A-01-R	Uranium 238	1.18	0.25	0.05	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Actinium 227	0.21	0.22	0.37	PCI/G	UJ	T06, N02
SU23-70-126	F6D060305	GAMMA	Actinium 228	1.09	0.33	0.18	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Americium 241	0.091	0.09	0.15	PCI/G	U	T05, N02
SU23-70-126	F6D060305	GAMMA	Bismuth 214	0.74	0.17	0.12	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Bismuth-207	0.018	0.034	0.066	PCI/G	UJ	T06
SU23-70-126	F6D060305	GAMMA	Bismuth-210M	-0.036	0.045	0.076	PCI/G	UJ	T06

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-126	F6D060305	GAMMA	Cesium 137	0.072	0.054	0.11	PCI/G	U	T05
SU23-70-126	F6D060305	GAMMA	Cobalt 60	0.016	0.04	0.09	PCI/G	UJ	T06
SU23-70-126	F6D060305	GAMMA	Lead 210	2.2	1	2.1	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Lead 212	0.55	0.14	0.13	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Potassium 40	12.4	1.9	0.8	PCI/G	=	
SU23-70-126	F6D060305	GAMMA	Protactinium 231	-1.4	0.91	1.4	PCI/G	UJ	T06, N02
SU23-70-126	F6D060305	GAMMA	Radium (226)	0.74	0.17	0.12	PCI/G	=	T15
SU23-70-126	F6D060305	GAMMA	Thorium 229	0.18	0.43	0.78	PCI/G	UJ	T06, N02
SU23-70-126	F6D060305	GAMMA	Uranium 235	0.002	0.41	0.72	PCI/G	UJ	T06
SU23-70-126	F6D060305	GAMMA	Uranium 238	1.8	1.2	1.6	PCI/G	J	T04
SU23-70-127	F6D060305	EML A-01-R	Plutonium-238	15.6	2	0.07	PCI/G	=	
SU23-70-127	F6D060305	EML A-01-R	Plutonium-239/240	0.17	0.086	0.043	PCI/G	J	T04
SU23-70-127	F6D060305	EML A-01-R	Uranium 233/234	0.77	0.19	0.04	PCI/G	=	
SU23-70-127	F6D060305	EML A-01-R	Uranium 235/236	0.088	0.072	0.034	PCI/G	J	T04
SU23-70-127	F6D060305	EML A-01-R	Uranium 238	0.97	0.22	0.04	PCI/G	=	
SU23-70-127	F6D060305	GAMMA	Actinium 227	-0.15	0.29	0.42	PCI/G	UJ	T06, N02
SU23-70-127	F6D060305	GAMMA	Actinium 228	0.42	0.35	0.34	PCI/G	J	T04
SU23-70-127	F6D060305	GAMMA	Americium 241	0.09	0.1	0.19	PCI/G	UJ	T06, N02
SU23-70-127	F6D060305	GAMMA	Bismuth 214	0.93	0.22	0.13	PCI/G	=	
SU23-70-127	F6D060305	GAMMA	Bismuth-207	-0.018	0.043	0.074	PCI/G	UJ	T06
SU23-70-127	F6D060305	GAMMA	Bismuth-210M	-0.06	0.06	0.096	PCI/G	UJ	T06
SU23-70-127	F6D060305	GAMMA	Cesium 137	0.067	0.057	0.12	PCI/G	U	T05
SU23-70-127	F6D060305	GAMMA	Cobalt 60	0.053	0.054	0.13	PCI/G	UJ	T06, N02
SU23-70-127	F6D060305	GAMMA	Lead 210	2.5	1.9	2.1	PCI/G	J	T04
SU23-70-127	F6D060305	GAMMA	Lead 212	0.59	0.15	0.13	PCI/G	=	
SU23-70-127	F6D060305	GAMMA	Potassium 40	12.1	2	0.8	PCI/G	=	
SU23-70-127	F6D060305	GAMMA	Protactinium 231	-0.5	1.1	1.8	PCI/G	UJ	T06, N02
SU23-70-127	F6D060305	GAMMA	Radium (226)	0.93	0.22	0.13	PCI/G	=	T15
SU23-70-127	F6D060305	GAMMA	Thorium 229	0.03	0.57	0.99	PCI/G	UJ	T06, N02
SU23-70-127	F6D060305	GAMMA	Uranium 235	0.23	0.53	0.99	PCI/G	UJ	T06
SU23-70-127	F6D060305	GAMMA	Uranium 238	0.3	1	1.8	PCI/G	UJ	T06
SU23-70-128	F6D060305	EML A-01-R	Plutonium-238	14.9	1.9	0.08	PCI/G	=	
SU23-70-128	F6D060305	EML A-01-R	Plutonium-239/240	0.114	0.069	0.041	PCI/G	J	T04
SU23-70-128	F6D060305	EML A-01-R	Uranium 233/234	0.55	0.15	0.05	PCI/G	=	
SU23-70-128	F6D060305	EML A-01-R	Uranium 235/236	0.047	0.053	0.032	PCI/G	J	T04
SU23-70-128	F6D060305	EML A-01-R	Uranium 238	0.76	0.18	0.03	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Actinium 227	1	0.33	0.56	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Actinium 228	0.81	0.31	0.23	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Americium 241	0.011	0.099	0.17	PCI/G	UJ	T06, N02
SU23-70-128	F6D060305	GAMMA	Bismuth 214	0.58	0.16	0.15	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Bismuth-207	-0.017	0.032	0.054	PCI/G	UJ	T06
SU23-70-128	F6D060305	GAMMA	Bismuth-210M	0.014	0.057	0.087	PCI/G	UJ	T06
SU23-70-128	F6D060305	GAMMA	Cesium 137	0.026	0.042	0.082	PCI/G	UJ	T06
SU23-70-128	F6D060305	GAMMA	Cobalt 60	0.023	0.048	0.097	PCI/G	UJ	T06
SU23-70-128	F6D060305	GAMMA	Lead 210	0.6	1.2	2.1	PCI/G	UJ	T06, N02
SU23-70-128	F6D060305	GAMMA	Lead 212	0.577	0.098	0.12	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Potassium 40	13.9	1.8	0.6	PCI/G	=	
SU23-70-128	F6D060305	GAMMA	Protactinium 231	0.3	1	1.7	PCI/G	UJ	T06, N02
SU23-70-128	F6D060305	GAMMA	Radium (226)	0.58	0.16	0.15	PCI/G	=	T15
SU23-70-128	F6D060305	GAMMA	Thorium 229	0.25	0.59	0.97	PCI/G	UJ	T06, N02
SU23-70-128	F6D060305	GAMMA	Uranium 235	-0.79	0.53	0.8	PCI/G	UJ	T06
SU23-70-128	F6D060305	GAMMA	Uranium 238	-0.16	0.92	1.6	PCI/G	UJ	T06
SU23-70-129	F6D060305	EML A-01-R	Plutonium-238	6.89	0.96	0.05	PCI/G	=	

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid. Qualifier	Reason Code
SU23-70-129	F6D060305	EML A-01-R	Plutonium-239/240	0.058	0.052	0.051	PCI/G	J	T04
SU23-70-129	F6D060305	EML A-01-R	Uranium 233/234	0.76	0.2	0.05	PCI/G	=	
SU23-70-129	F6D060305	EML A-01-R	Uranium 235/236	0.09	0.071	0.056	PCI/G	J	T04
SU23-70-129	F6D060305	EML A-01-R	Uranium 238	0.86	0.21	0.03	PCI/G	=	
SU23-70-129	F6D060305	GAMMA	Actinium 227	0.03	0.23	0.35	PCI/G	UJ	T06, N02
SU23-70-129	F6D060305	GAMMA	Actinium 228	0.4	0.19	0.24	PCI/G	=	
SU23-70-129	F6D060305	GAMMA	Americium 241	-0.021	0.081	0.14	PCI/G	UJ	T06, N02
SU23-70-129	F6D060305	GAMMA	Bismuth 214	0.58	0.13	0.29	PCI/G	=	
SU23-70-129	F6D060305	GAMMA	Bismuth-207	-0.004	0.029	0.053	PCI/G	UJ	T06
SU23-70-129	F6D060305	GAMMA	Bismuth-210M	-0.059	0.046	0.071	PCI/G	UJ	T06
SU23-70-129	F6D060305	GAMMA	Cesium 137	0.026	0.045	0.087	PCI/G	UJ	T06
SU23-70-129	F6D060305	GAMMA	Cobalt 60	-0.013	0.033	0.063	PCI/G	UJ	T06
SU23-70-129	F6D060305	GAMMA	Lead 210	0.64	0.8	1.4	PCI/G	UJ	T06, N02
SU23-70-129	F6D060305	GAMMA	Lead 212	0.372	0.076	0.1	PCI/G	=	
SU23-70-129	F6D060305	GAMMA	Potassium 40	10.1	1.6	0.5	PCI/G	=	
SU23-70-129	F6D060305	GAMMA	Protactinium 231	-0.6	0.97	1.6	PCI/G	UJ	T06, N02
SU23-70-129	F6D060305	GAMMA	Radium (226)	0.58	0.13	0.29	PCI/G	=	T15
SU23-70-129	F6D060305	GAMMA	Thorium 229	0.06	0.44	0.8	PCI/G	UJ	T06, N02
SU23-70-129	F6D060305	GAMMA	Uranium 235	0.04	0.4	0.73	PCI/G	UJ	T06
SU23-70-129	F6D060305	GAMMA	Uranium 238	0.51	0.75	1.4	PCI/G	UJ	T06
SU23-70-130	F6D060305	EML A-01-R	Plutonium-238	10.5	1.4	0.08	PCI/G	=	
SU23-70-130	F6D060305	EML A-01-R	Plutonium-239/240	0.063	0.056	0.028	PCI/G	J	T04
SU23-70-130	F6D060305	EML A-01-R	Uranium 233/234	0.67	0.17	0.02	PCI/G	=	
SU23-70-130	F6D060305	EML A-01-R	Uranium 235/236	0.042	0.048	0.056	PCI/G	UJ	T06
SU23-70-130	F6D060305	EML A-01-R	Uranium 238	0.89	0.2	0.05	PCI/G	=	
SU23-70-130	F6D060305	GAMMA	Actinium 227	0.17	0.35	0.55	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Actinium 228	1	0.38	0.23	PCI/G	=	
SU23-70-130	F6D060305	GAMMA	Americium 241	0.1	0.13	0.22	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Bismuth 214	1.05	0.25	0.46	PCI/G	=	
SU23-70-130	F6D060305	GAMMA	Bismuth-207	0.015	0.046	0.088	PCI/G	UJ	T06
SU23-70-130	F6D060305	GAMMA	Bismuth-210M	-0.041	0.065	0.11	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Cesium 137	0.08	0.078	0.16	PCI/G	U	T05
SU23-70-130	F6D060305	GAMMA	Cobalt 60	0.009	0.069	0.14	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Lead 210	2.8	1.4	2.8	PCI/G	U	T05, N02
SU23-70-130	F6D060305	GAMMA	Lead 212	0.9	0.15	0.16	PCI/G	=	
SU23-70-130	F6D060305	GAMMA	Potassium 40	20.3	2.9	0.9	PCI/G	=	
SU23-70-130	F6D060305	GAMMA	Protactinium 231	0.6	1.4	2.2	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Radium (226)	1.05	0.25	0.46	PCI/G	=	T15
SU23-70-130	F6D060305	GAMMA	Thorium 229	-0.43	0.59	0.97	PCI/G	UJ	T06, N02
SU23-70-130	F6D060305	GAMMA	Uranium 235	0.51	0.6	1.1	PCI/G	UJ	T06
SU23-70-130	F6D060305	GAMMA	Uranium 238	2.6	1.6	1.7	PCI/G	J	T04
SU23-70-131	F6D060305	EML A-01-R	Plutonium-238	3.08	0.5	0.07	PCI/G	=	
SU23-70-131	F6D060305	EML A-01-R	Plutonium-239/240	0.028	0.036	0.043	PCI/G	UJ	T06
SU23-70-131	F6D060305	EML A-01-R	Uranium 233/234	0.65	0.17	0.05	PCI/G	=	
SU23-70-131	F6D060305	EML A-01-R	Uranium 235/236	0.048	0.051	0.053	PCI/G	UJ	T06
SU23-70-131	F6D060305	EML A-01-R	Uranium 238	0.76	0.19	0.04	PCI/G	=	
SU23-70-131	F6D060305	GAMMA	Actinium 227	0.14	0.32	0.51	PCI/G	UJ	T06, N02
SU23-70-131	F6D060305	GAMMA	Actinium 228	1.15	0.4	0.23	PCI/G	=	
SU23-70-131	F6D060305	GAMMA	Americium 241	0.05	0.12	0.22	PCI/G	UJ	T06, N02
SU23-70-131	F6D060305	GAMMA	Bismuth 214	0.94	0.23	0.42	PCI/G	=	
SU23-70-131	F6D060305	GAMMA	Bismuth-207	-0.012	0.046	0.081	PCI/G	UJ	T06
SU23-70-131	F6D060305	GAMMA	Bismuth-210M	-0.092	0.064	0.097	PCI/G	UJ	T06
SU23-70-131	F6D060305	GAMMA	Cesium 137	0.066	0.069	0.14	PCI/G	UJ	T06

R and V Table

Sample Name	SDG	Method Name	Analyte Name	Result	Uncertainty	MDC	Units	Valid Qualifier	Reason Code
SU23-70-131	F6D060305	GAMMA	Cobalt 60	-0.0008	0.048	0.097	PCI/G	UJ	T06
SU23-70-131	F6D060305	GAMMA	Lead 210	2.3	2.4	2.1	PCI/G	J	T04
SU23-70-131	F6D060305	GAMMA	Lead 212	0.98	0.16	0.14	PCI/G	=	
SU23-70-131	F6D060305	GAMMA	Potassium 40	19.2	2.8	0.8	PCI/G	=	
SU23-70-131	F6D060305	GAMMA	Protactinium 231	-2.4	1.2	1.6	PCI/G	UJ	T06, N02
SU23-70-131	F6D060305	GAMMA	Radium (226)	0.94	0.23	0.42	PCI/G	=	T15
SU23-70-131	F6D060305	GAMMA	Thorium 229	-0.29	0.64	1.1	PCI/G	UJ	T06, N02
SU23-70-131	F6D060305	GAMMA	Uranium 235	0.13	0.69	1.1	PCI/G	UJ	T06
SU23-70-131	F6D060305	GAMMA	Uranium 238	0.9	1.1	2	PCI/G	UJ	T06
SU23-70-132	F6D060305	EML A-01-R	Plutonium-238	1.01	0.23	0.05	PCI/G	=	
SU23-70-132	F6D060305	EML A-01-R	Plutonium-239/240	0.01	0.027	0.026	PCI/G	UJ	T06
SU23-70-132	F6D060305	EML A-01-R	Uranium 233/234	0.77	0.2	0.07	PCI/G	=	
SU23-70-132	F6D060305	EML A-01-R	Uranium 235/236	0.048	0.055	0.065	PCI/G	UJ	T06
SU23-70-132	F6D060305	EML A-01-R	Uranium 238	0.73	0.19	0.05	PCI/G	=	
SU23-70-132	F6D060305	GAMMA	Actinium 227	0.66	0.28	0.48	PCI/G	=	
SU23-70-132	F6D060305	GAMMA	Actinium 228	0.35	0.25	0.26	PCI/G	J	T04
SU23-70-132	F6D060305	GAMMA	Americium 241	-0.104	0.09	0.15	PCI/G	UJ	T06, N02
SU23-70-132	F6D060305	GAMMA	Bismuth 214	0.65	0.17	0.12	PCI/G	=	
SU23-70-132	F6D060305	GAMMA	Bismuth-207	0.018	0.033	0.063	PCI/G	UJ	T06
SU23-70-132	F6D060305	GAMMA	Bismuth-210M	-0.034	0.049	0.082	PCI/G	UJ	T06
SU23-70-132	F6D060305	GAMMA	Cesium 137	0.022	0.044	0.084	PCI/G	UJ	T06
SU23-70-132	F6D060305	GAMMA	Cobalt 60	0.055	0.047	0.1	PCI/G	U	T05
SU23-70-132	F6D060305	GAMMA	Lead 210	0.2	1	1.8	PCI/G	UJ	T06, N02
SU23-70-132	F6D060305	GAMMA	Lead 212	0.458	0.081	0.093	PCI/G	=	
SU23-70-132	F6D060305	GAMMA	Potassium 40	12.3	1.9	0.7	PCI/G	=	
SU23-70-132	F6D060305	GAMMA	Protactinium 231	0.08	1	1.6	PCI/G	UJ	T06, N02
SU23-70-132	F6D060305	GAMMA	Radium (226)	0.65	0.17	0.12	PCI/G	=	T15
SU23-70-132	F6D060305	GAMMA	Thorium 229	-0.2	0.49	0.79	PCI/G	UJ	T06, N02
SU23-70-132	F6D060305	GAMMA	Uranium 235	-0.14	0.48	0.81	PCI/G	UJ	T06
SU23-70-132	F6D060305	GAMMA	Uranium 238	0.05	0.79	1.4	PCI/G	UJ	T06

definitions and acronyms provided in R&V Report

ATTACHMENT B

DATA REPORT

PRS 70 HARD SURFACES (SUs 1-11 & 20-22)

DATA REPORT

PRS 70 Hard Surfaces
(SUs 1-11 & 20-22)

May 2006

Rev. 0

Department of Energy

Miamisburg Closure Project

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Figure 1: Summary for Hard Surfaces Data

Tables

[none]

Appendices

Appendix A Figures
Appendix B Survey Excerpts

Acronyms

Ex	Excavation
pCi/g	picoCuries per gram
PRS	Potential Release Site
RA	removal action
SUD	Survey Unit Design
VSAP	Verification Sampling and Analysis Plan

1.0 PURPOSE

This Data Report provides documentation of sampling/screening activities conducted in accordance with the Standard VSAP, Soils Verification Sampling & Analysis Plan [VSAP], Final, August 2004 and the Post-Excavation (Ex) Survey Unit Design (SUD); required to close out the hard surfaces associated with the PRS 70 Removal Action (RA). The locations of the surveyed surfaces are shown on Figure 1.

The purposes of this Data Report are to document any variances to the VSAP/Post-Ex SUD and provide the following documentation to support Appendix II of the Potential Release Site 70 (PRS 70) Post-Ex SUD:

- survey results summary,
- onsite gamma spec results for crack evaluation in SUs 1-11, and
- RSDS (Radiological Survey Data Sheets) summary for direct/swipes collected at SUs20-22 and swipes collected at SUs 1-11.

2.0 DOCUMENT ORGANIZATION / SUMMARY

This Data Report is for hard surfaces associated with PRS 70. A separate Data Report will be prepared to document soil verification of the remaining SUs associated with PRS 70.

Unless otherwise specified as a variance, sampling and analyses were conducted in accordance with the VSAP and Post-Ex SUD. This Data Report is included in Appendix II to the PRS 70 Partial II (Hard Surfaces) Post-Ex SUD.

3.0 FIELD ACTIVITIES

Field activities occurred between September 2005 and March 2006. The purpose of the screening/sampling was to evaluate the hard surfaces at SUs 1-11 and 20-22 and identify areas requiring concrete removal. The investigation was conducted in accordance with the Core Team-approved Post-Ex Partial II SUD.

MO Crossing Area. Shonka scanning was performed over SUs 1-11 (shown on Figure 1) to obtain integrated measurements. Swipes were collected by RadCon over the same area. A summary of the Shonka and RSDS reports are identified on Figure 1 and excerpts are provided in Appendix B. Two of the Shonka elevated areas were investigated with a Ludlum 2360 and found to be below free release criteria. The remainder of the elevated areas were removed and are shown in black on Figure 1. The black areas were removed and subsequently identified as SU23. Sampling below the removed concrete at SU23 will be documented in the PRS 70 OSC/Data Report. Reports documenting the scanning/sampling at SUs 1-11 are summarized on Figure 1. All other measurements supported that additional concrete removal in this area was not required because they met free release criteria.

Weir Basin Area. Direct/swipe measurements were collected at SUs 20-22 (shown on Figure 1). All measurements supported that concrete removal in this area was not required because they met free release criteria. A summary of the RSDS reports are identified on Figure 1 and excerpts are provided in Appendix B.

Statistical analyses are not performed on scanning/screening data because all results meet surface release criteria.

4.0 DATA REVIEW / VALIDATION

All survey data were reviewed. Validation is not performed on the type of data provided in this Data Report.

APPENDIX A

FIGURES

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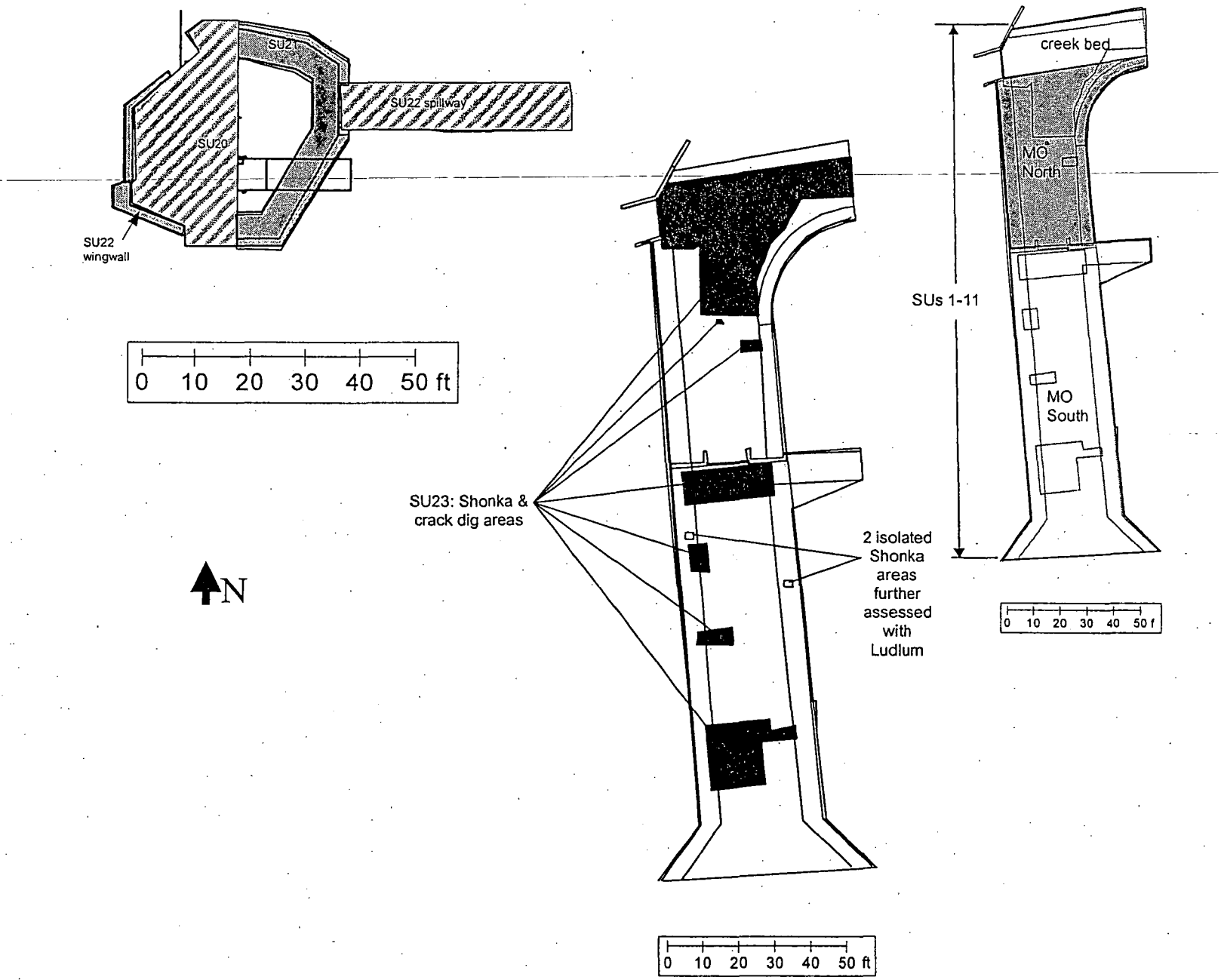
Figure 1: Summary for Hard Surfaces Data



Report	Type of Data	Area Covered
Shonka FAZ0113A	integrated measurements	creek bed wall
Shonka FAZ0103A	integrated measurements	creek bed floor
Shonka FAZ0213A	integrated measurements	MO crossing North walls
Shonka FAZ0203A	integrated measurements	MO crossing North floor
Shonka FAZ0303A	integrated measurements	MO crossing South floor
Shonka FAZ0313A	integrated measurements	MO crossing South walls
Shonka FAZ0303B	integrated measurements	MO crossing South floor
RSDS 05-GP9-0571	swipes	all MO crossing & creek bed
RSDS 05-ER-650	Ludlum reassessment of Shonka results	2 isolated wall locations
RSDS 05-ER-574	onsite gamma data for crack evaluation	MO crossing
RSDS 05-ER-628	directs	SU22 spillway walls & floor
RSDS 05-ER-694	swipes	SU22 spillway walls & floor
RSDS 06-ER-169	directs & swipes	SU20
RSDS 06-ER-0211	directs & swipes	SU 21 & SU22 wingwall

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APPENDIX B

SURVEY EXCERPTS

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Survey Results Summary

Survey Units 1-11

Class I Survey Units

Alpha static measurements: All Shonka measurements of these survey units were 100% static measurements rather than 100% scan due to the configuration. Areas above alarm setpoints* were identified. See discussion below.

Removable contamination measurements: All smears were below applicable guideline values.

Soil analysis results: Cracks and joints in the concrete were investigated and sediment samples collected. Areas above the CO for analytes were identified. See discussion below.

Treatment of elevated * measurements: The wall and floor of the concrete creek bed was almost completely removed without investigation. A section of the wall above the high water line did not alarm and remains. No further action was required.
Missouri Crossing North walls and floors had a large section of floor adjacent to the creek bed alarm. This section was removed without investigation. A small section of the northeast wall alarmed causing its removal. No further action was required.

Missouri Crossing South floor had sections alarm that were adjacent to the floor joints with soil results >CO. These areas of concrete were removed without investigation. No further action was required.

Missouri Crossing South walls had 2 isolated elevated readings. A Ludlum 2360 investigation (05-ER-650) was initiated. No elevated areas were detected during the scanning. The remaining lower wall alarm sections of concrete were removed without investigation. No further action was required.

Crack and floor joints sediment results were evaluated. Where sediment was available a sample was collected. The amount of material collected at each location was less than the required 500 g for onsite gamma spec. The reported results are estimates due to the available volume and as such some results did not meet the screening level MDA. But where the results were >CO for any COC was evaluated in the field. Most locations required removal of the concrete to sample the material below the concrete. These were grouped together with the sections removed due to Shonka alarms and will be verified as part of SU 23. Two locations were at the sluice gate. These were core drilled and exposed a rubber barrier between the joints that did not allow sediment to enter. All sediment was removed from this joint. No further action was required.

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* Instruments are set to alarm at 75% of the applicable guideline values for the most restrictive alpha emitter (Pu-238).

Conclusion: Locations of concrete that were removed are being verified as SU 23 in the PRS 70 Post-Ex Partial I Soils SUD. Survey units 1-11 meet the release criteria.

Survey Units 20-22

Class I Survey Units

Alpha scanning and static measurements: All measurements were performed using a Ludlum 2360. A metal plate within the weir basin had elevated** readings. See discussion below.

Removable contamination measurements: All smears were below applicable guideline values.

Soil analysis results: None required.

Treatment of elevated ** measurements: Metal plate was removed and disposed of as contaminated waste. It was covering a sampling pipe that was full of water with no visible sediment. No further action was required.

Conclusion: Survey units 20-22 meet the release criteria.

** Elevated is defined as > $DCGL_W$ without further investigation.

B9/75

~~II 28/64~~

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) PRS70 (Missouri Crossing)	SURVEY NO. 05-GP9-0571
PURPOSE: Survey of PRS70	RWP NO. N/A
	DATE: 090805
	TIME: 0830

MAP / DRAWING

See pg 3

COPY

LEGEND:

= mrem/hr (γ) whole body

#E = mrem/hr (β+η+γ) extremity on contact

K = factor of 1000

— · — · — · · = radiological boundary

- mrem/hr neutron

- swipe number

- air sample number

#/α or /β - direct contamination measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
	N/A	

[redacted]

HP# 4695	Date: 090805
HP#	Date:
d	
HP# 7348	Date: 9/12/05

ML-9620 (2-98)

B10/75

~~H29/44~~

Survey No. 05-ER-0571

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	See	Attached		PRS70-20
2				21
3				22
4				23
5				24
6				25
7				26
8				27
9				28
10				29
11				30
12				31
13				32
14				33
15				34
16				35
17				36
18				37
19				41
20				42
21				43
22				44
23				38
24				39
25				40
26				45
27				46
28				47
29				48
30				49
31				50
32				51
33				52
34				53
35				54

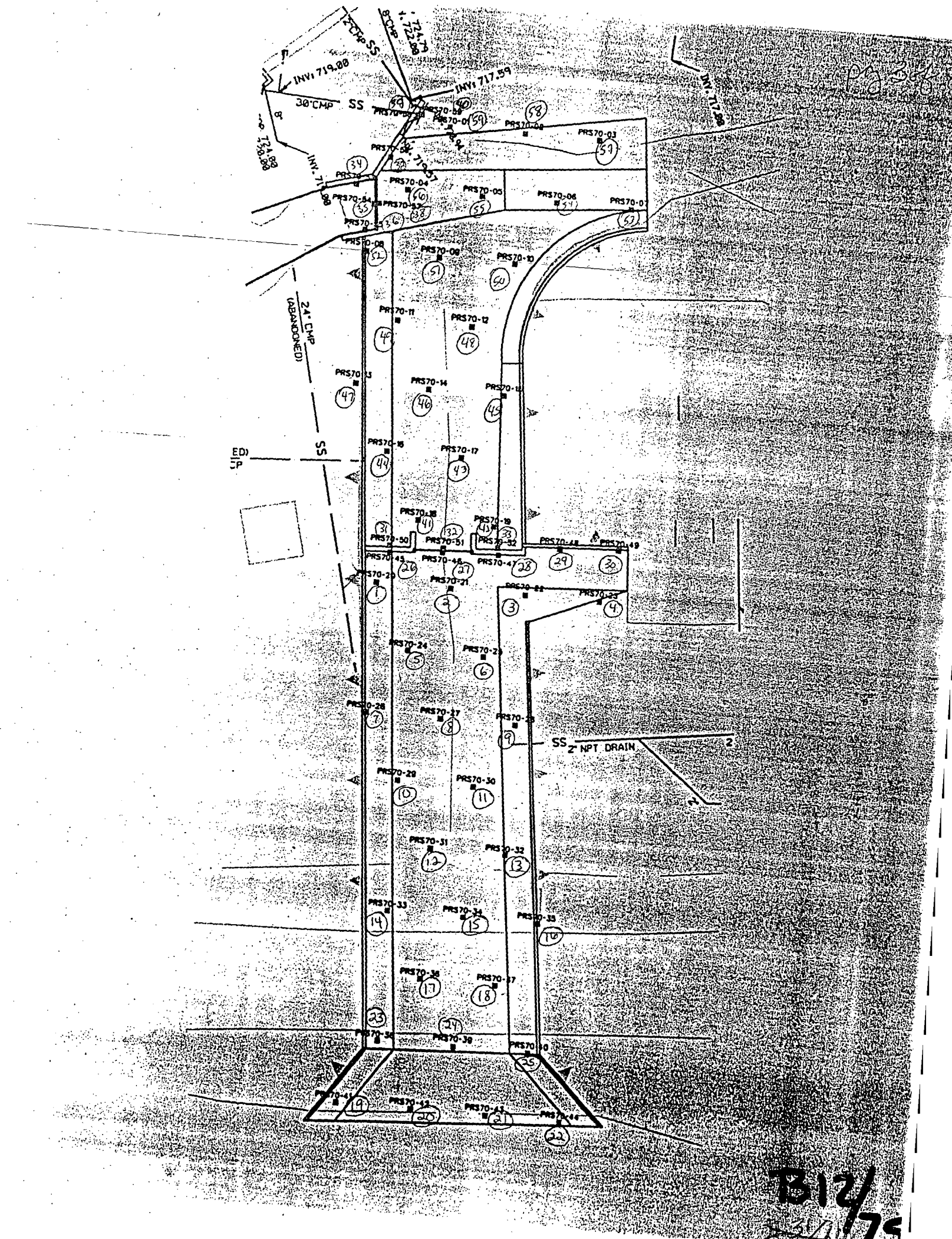
Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
36	See	Attached		PRS70-55
37				56
38				57
39				58
40				59
41				18
42				19
43				17
44				16
45				15
46				14
47				13
48				12
49				11
50				10
51				9
52				8
53				7
54				6
55				5
56				4
57				3
58				2
59				1
			NFE	

COMMENTS:	
N	
A	

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

B11/75
~~B30/64~~

ML-9620A (4-98)


INV: 719.00
30"CMP
SS
INV: 717.59
INV: 717.88
24" CMP (ABANDONED)
SS
2" NPT DRAIN
PRS70-01
PRS70-02
PRS70-03
PRS70-04
PRS70-05
PRS70-06
PRS70-07
PRS70-08
PRS70-09
PRS70-10
PRS70-11
PRS70-12
PRS70-14
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PRS70-37
PRS70-38
PRS70-39
PRS70-40
PRS70-41
PRS70-42
PRS70-43
PRS70-44
PRS70-45
PRS70-46
PRS70-47
PRS70-48
PRS70-49
PRS70-50
PRS70-51
PRS70-52

B12/75

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR013
Batch Ended: 9/8/05 11:12
Cal. Due Date: 11/17/05
Serial Number: 26966-3

Batch ID: 05-ER-0571 SMITH [59] GWD

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.22		0.99	2.27	
A2	2	0.00	2.00		0.00	1.18	
A3	3	0.00	2.27		0.00	1.27	
A4	4	0.00	2.12		0.32	1.71	
B1	5	0.00	1.88		0.00	1.20	
B2	6	0.00	1.85		0.00	1.14	
B3	7	0.00	2.20		0.31	1.88	
B4	8	1.28	2.75		0.00	1.21	
C1	9	0.00	2.07		1.49	2.13	
C2	10	0.00	1.92		0.47	1.59	
C3	11	0.00	2.07		0.27	1.72	
C4	12	0.00	1.95		0.00	1.12	
D1	13	0.00	2.06		0.29	1.77	
D2	14	0.00	2.15		0.00	1.19	
D3	15	1.72	2.10		0.02	1.75	
D4	16	0.00	2.06		1.37	2.03	
A1	17	6.07	3.79		0.46	2.27	
A2	18	0.00	2.02		0.42	1.65	
A3	19	0.00	2.27		0.00	1.27	
A4	20	1.71	2.13		1.37	2.10	
B1	21	0.00	1.88		0.00	1.21	
B2	22	0.00	1.87		0.00	1.59	
B3	23	1.92	2.27		4.06	2.97	
B4	24	0.00	1.99		0.37	1.70	
C1	25	0.00	2.07		1.49	2.13	
C2	26	0.00	1.91		0.00	1.12	
C3	27	0.00	2.07		0.27	1.72	

B 13/75
~~A32/69~~

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR013
Batch Ended: 9/8/05 11:12
Cal. Due Date: 11/17/05
Serial Number: 26966-3

Batch ID: 05-ER-0571 SMITH [59] GWD

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
C4	28	0.00	1.99		2.87	2.25	
D1	29	1.76	2.05		0.00	1.26	
D2	30	0.00	2.15		0.00	1.19	
D3	31	0.00	2.10		0.18	1.75	
D4	32	0.00	2.04		0.00	1.17	
A1	33	0.00	2.20		0.00	1.86	
A2	34	1.56	2.05		2.58	2.33	
A3	35	1.77	2.34		4.31	2.82	
A4	36	1.71	2.13		1.37	2.10	
B1	37	0.00	1.88		0.00	1.20	
B2	38	0.00	1.85		0.00	1.13	
B3	39	0.00	2.22		1.63	2.30	
B4	40	0.00	1.97		0.00	1.21	
C1	41	1.69	2.06		0.11	1.74	
C2	42	1.41	1.91		0.00	1.12	
C3	43	1.73	2.06		0.00	1.22	
C4	44	0.00	1.95		0.00	1.13	
D1	45	0.00	2.06		0.29	1.77	
D2	46	0.00	2.15		0.00	1.19	
D3	47	0.00	2.10		0.18	1.75	
D4	48	0.00	2.04		0.00	1.17	
A1	49	1.74	2.22		0.81	2.27	
A2	50	1.57	2.00		0.00	1.18	
A3	51	0.00	2.27		0.00	1.27	
A4	52	0.00	2.13		1.53	2.10	
B1	53	0.00	1.88		0.00	1.20	
B2	54	1.33	1.90		0.82	1.94	
B3	55	0.00	2.18		0.00	1.34	
B4	56	0.00	2.05		3.95	2.68	
C1	57	1.69	2.06		0.11	1.74	

CS091205

8/14/05
~~11/23/04~~

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR013
Batch Ended: 9/8/05 11:12
Cal. Due Date: 11/17/05
Serial Number: 26966-3

Batch ID: 05-ER-0571 SMITH [59] GWD

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
C2	58	0.00	1.91		0.00	1.12	
C3	59	0.00	2.06		0.00	1.22	

B 15/75
Test/Ch

091205
CS

C8091205

08 Sep 2005 11:09 ALPHA/BETA - 1.09 Page #1 7of8
Protocol #: 2 PW H3 #403728 User : 5801

Time: 2.00
Data Mode: DPM Nuclide: SMGLO2 Quench Set: SMGLO2
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	7.79
Region B:	2.0 -	18.6	0	0.0	7.64
Region C:	40.0 -	2000	0	0.0	11.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
05-ER-0571 SMITH [59] GWD
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: c:\data\prot1.dat
Count Data Filename: c:\data\SDATA2.DAT
Spectrum Data Drive & Path: c:\data

S#	TIME	CPMA	CPMB	LUM	FLAG	tSIE	DPM1	2Sigma	CPMC
-1	10.00	7.79	7.64	1	B	667.28		0.00	11.00
0	2.00	483.07	462.80	0		603.57	892.99	78.97	0.00
1	2.00	0.00	0.00	0		648.85	0.00	0.00	0.00
2	2.00	0.00	0.00	0		665.43	0.00	0.00	0.14
3	2.00	0.21	0.00	6		579.35	0.39	8.25	0.00
4	2.00	1.52	1.41	5		597.93	2.82	8.66	0.00
5	2.00	0.00	0.00	0		616.17	0.00	0.00	0.00
6	2.00	30.70	28.33	1		638.44	55.16	16.42	10.62
7	2.00	8.71	7.82	0		639.74	15.62	10.83	2.50
8	2.00	20.90	19.69	0		650.07	37.20	14.02	11.50
9	2.00	5.21	4.15	0		644.63	9.30	9.66	3.50
10	2.00	2.21	2.36	0		638.57	3.96	8.64	3.00
11	2.00	9.33	7.78	0		671.75	16.32	10.74	2.91
12	2.00	32.27	29.98	1		602.52	59.70	17.26	48.50
13	2.00	7.02	5.93	0		657.37	12.43	10.15	0.00
14	2.00	0.00	0.00	0		641.28	0.00	0.00	0.00
15	2.00	0.71	0.86	0		604.55	1.30	8.29	0.00
16	2.00	0.00	0.00	0		652.77	0.00	0.00	0.00
17	2.00	4.43	3.72	0		652.02	7.88	9.34	0.00
18	2.00	18.21	17.34	0		594.38	33.91	13.98	19.00
19	2.00	19.71	18.82	0		641.36	35.32	13.83	9.00
20	2.00	0.00	0.00	0		585.95	0.00	0.00	0.00
21	2.00	0.00	0.00	0		589.32	0.00	0.00	1.50
22	2.00	0.00	0.00	0		648.92	0.00	0.00	0.00
23	2.00	0.21	0.00	0		672.28	0.36	7.65	0.00
24	2.00	0.21	0.01	0		646.24	0.37	7.81	0.00
25	2.00	0.00	0.00	0		662.24	0.00	0.00	0.00
26	2.00	0.00	0.00	0		646.68	0.00	0.00	0.00
27	2.00	0.00	0.00	0		538.04	0.00	0.00	0.00
28	2.00	0.00	0.00	0		654.07	0.00	0.00	0.00
29	2.00	0.71	0.61	0		589.59	1.32	8.39	1.50
30	2.00	0.00	0.00	0		612.63	0.00	0.00	0.00
31	2.00	0.00	0.00	0		658.76	0.00	0.00	0.00
32	2.00	0.00	0.00	0		605.09	0.00	0.00	0.00
33	2.00	0.00	0.00	0		661.73	0.00	0.00	0.50
34	2.00	0.00	0.00	0		597.68	0.00	0.00	0.00

B16/75
II-35/64 BW

05-ER-0571

C8 09120.S

08 Sep 2005 13:01 ALPHA/BETA - 1.09 Page #2 8 of 8

Protocol #: 2 PW H3 #403728 User : 5801

S#	TIME	CPMA	CPMB	LUM FLAG	tSIE	DPM1	2Sigma	CPMC
35	2.00	0.00	0.00	8	447.34	0.00	0.00	1.00
36	2.00	0.71	0.00	6	566.63	1.34	8.55	0.00
37	2.00	0.00	0.00	0	641.13	0.00	0.00	2.00
38	2.00	0.21	0.05	0	624.57	0.37	7.94	0.00
39	2.00	3.21	3.04	0	539.06	6.26	9.80	2.50
40	2.00	0.00	0.00	0	510.44	0.00	0.00	1.50
41	2.00	0.00	0.00	7	540.93	0.00	0.00	0.00
42	2.00	0.71	0.86	0	609.64	1.30	8.25	0.00
43	2.00	0.00	0.00	0	638.27	0.00	0.00	0.00
44	2.00	0.09	0.24	0	661.03	0.15	7.67	0.00
45	2.00	0.00	0.00	0	626.44	0.00	0.00	2.00
46	2.00	0.00	0.00	0	658.06	0.00	0.00	1.00
47	2.00	0.00	0.00	0	640.58	0.00	0.00	0.00
48	2.00	0.00	0.00	0	664.72	0.00	0.00	0.00
49	2.00	0.00	0.00	0	646.61	0.00	0.00	0.00
50	2.00	0.77	0.93	0	642.45	1.38	8.06	0.00
51	2.00	0.00	0.00	0	648.94	0.00	0.00	1.00
52	2.00	0.00	0.00	0	628.35	0.00	0.00	0.00
53	2.00	1.71	1.86	0	655.48	3.02	8.34	0.00
54	2.00	0.00	0.00	0	649.06	0.00	0.00	0.00
55	2.00	1.21	0.36	0	625.85	2.19	8.34	5.08
56	2.00	0.00	0.00	0	621.02	0.00	0.00	0.00
57	2.00	0.00	0.00	0	587.00	0.00	0.00	0.00
58	2.00	2.21	2.36	0	615.92	4.04	8.80	0.50
59	2.00	0.00	0.00	0	593.42	0.00	0.00	0.00

B17/75

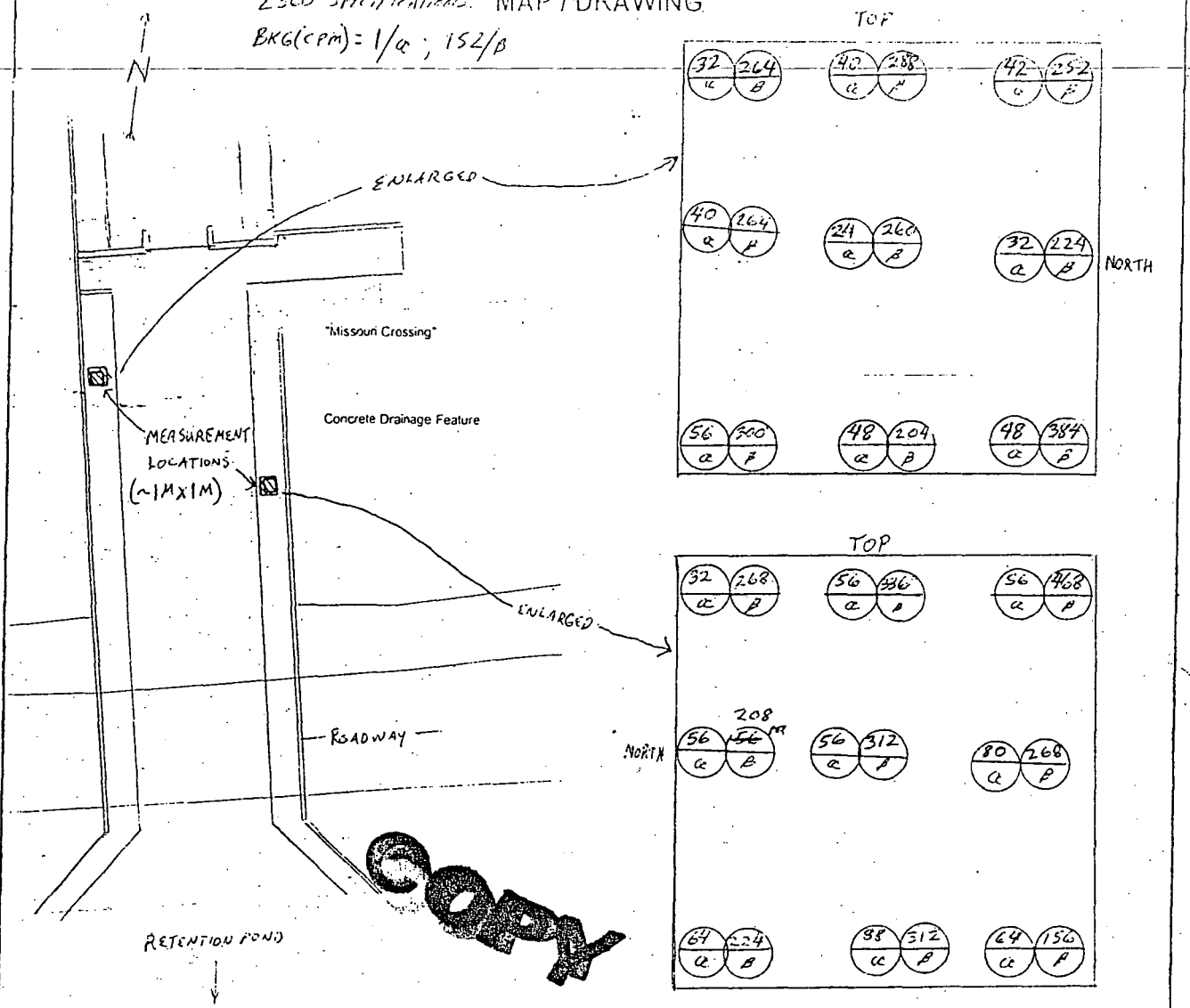
~~II 36/64~~

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG. / ROOM / AREA) PRS 70 CONCRETE DRAINAGE CANAL	SURVEY NO. 05 ER 650
PURPOSE: DIRECT CONTAMINATION MEASUREMENTS ON CONCRETE (SLOPED WALLS)	RWP NO. N/A
	DATE: 10 17 05
	TIME: 1300

2360 SPECIFICATIONS: BKG(cpm) = 1/α ; 152/β

MAP / DRAWING



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LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
△# = mrem/hr neutron
□# = air sample number
(#) = swipe number
(#/α) or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5692/5719	01 05 06

Completed	[redacted]	HP# 4992	Date: 10 18 05
Completed			
Counted b		HP#	Date:
Counted b			
Reviewed/		HP# 7249	Date: 10/20/05
Reviewed/			

ML-9620 (2-98) Computer Generated

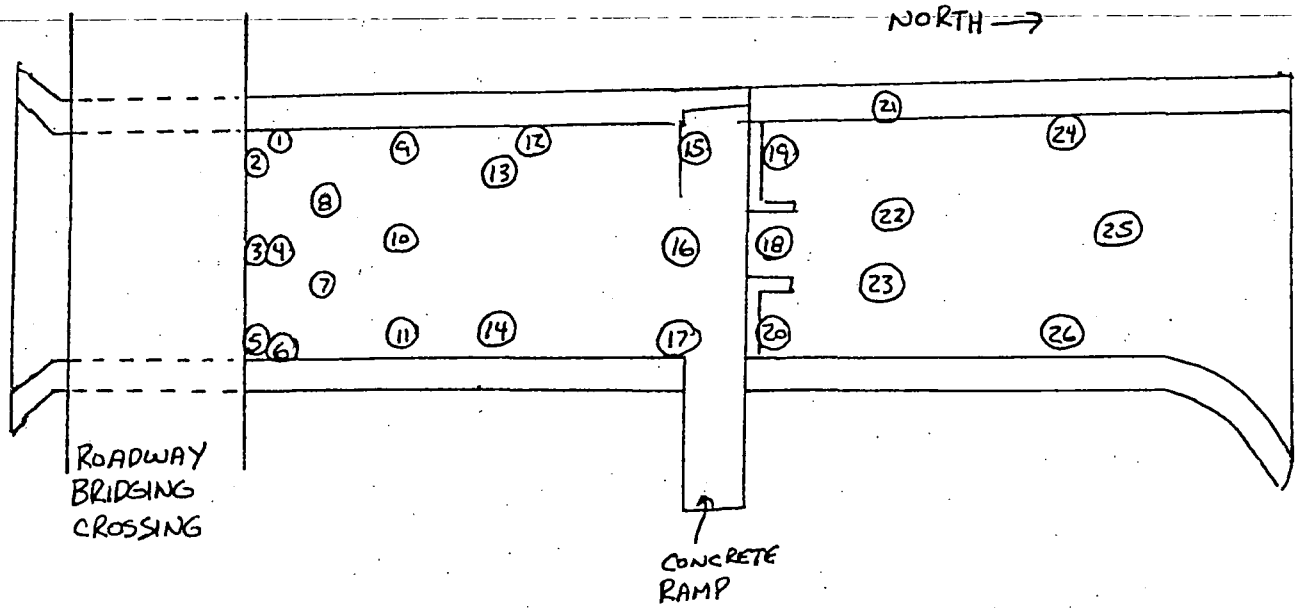
B 18/75

~~I~~ 37/64

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG. / ROOM / AREA) PRS-70 (Missouri Crossing)	SURVEY NO. OSER 574
PURPOSE: SAMPLE SOIL FROM CRACKS IN CONCRETE	RWP NO. NA
	DATE: 9-13-05
	TIME: 1320

MAP / DRAWING



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Pages 1-27

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary

△# = mrem/hr neutron

□# = air sample number

(#) = swipe number SAMPLE LOCATION

(#/α) = or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
N		
		A

[redacted]	HP# 7760	Date: 9-22-05
	HP#	Date:
	HP# 348	Date 9/26/05

ML-9620 (2-98) Computer Generated

B19/75 ~~#38/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07539
File ID: 1SC02515.s0
Priority: Yes

Description\Location
05ER574-1
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.16
Cs-137		0.12	0.11
Pb-210		2.39	1.39
Ra-226		2.32	1.61
Ac-227 (D)		3.65	0.57
Th-230	*	0	14.25
Th-232 (D)		0.99	0.4
Pu-238	*	6.87	28.78
Am-241	*	0.06	0.15

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.05 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B 20/75 ~~II 39/64~~

Pg 8 of 27

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07545
File ID: 1SC02521.s0
Priority: Yes

Description\Location
05ER574-7
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.45
Cs-137	*	0.07	0.31
Pb-210	*	1.84	2.74
Ra-226	*	2.27	4.28
Ac-227 (D)	*	0.39	1.44
Th-230	*	0	24.91
Th-232 (D)	*	0.72	0.95
Pu-238	*	47.5	62.98
Am-241	*	0	0.31

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.10 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B21/75 ~~II 40/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07546
File ID: 1SC02522.s0
Priority: Yes

Description\Location
05ER574-8
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.25
Cs-137	*	0	0.19
Pb-210		1.73	1.44
Ra-226	*	2.14	2.24
Ac-227 (D)	*	0.53	0.7
Th-230	*	0	15.19
Th-232 (D)	*	0	0.9
Pu-238	*	9.41	36.51
Am-241	*	0.07	0.15

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.06 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

• Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B22/75 II 41/64

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07548
File ID: 1SC02524.s0
Priority: Yes

Description\Location
05ER574-10
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.36
Cs-137	*	0	0.22
Pb-210		2.68	1.75
Ra-226	*	2.34	2.66
Ac-227 (D)	*	0.79	0.94
Th-230	*	0	18.23
Th-232 (D)	*	0.42	0.74
Pu-238	*	18.26	47.75
Am-241	*	0.08	0.2

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.07 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B23/75 II 42/64

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07549
File ID: 1SC02525.s0
Priority: Yes

Description\Location
05ER574-11
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.44
Cs-137	*	0.05	0.27
Pb-210	*	1.38	2.56
Ra-226	*	2.26	4.09
Ac-227 (D)	*	0.57	1.23
Th-230	*	0	24.05
Th-232 (D)	*	0	1.25
Pu-238	*	51.12	66.39
Am-241		0.43	0.26

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.10 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

• Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B24/75 II 43/64

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07550
File ID: 1SC02526.s0
Priority: Yes

Description\Location
05ER574-12
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.23
Cs-137		0.16	0.11
Pb-210		2.89	1.41
Ra-226	*	1.46	1.99
Ac-227 (D)		4.41	0.55
Th-230	*	0	15.57
Th-232 (D)		0.71	0.44
Pu-238	*	26.92	34.58
Am-241		0.2	0.14

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.06 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B 25/75 II 44/64

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07555
File ID: 1SC02531.s0
Priority: Yes

Description\Location
05ER574-18
Long Count

Collector: 7760
Date Received: 9/15/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.46
Cs-137	*	0.11	0.25
Pb-210		4.59	2.15
Ra-226	*	3.36	3.81
Ac-227 (D)	*	0.17	1.27
Th-230	*	2.11	23.15
Th-232 (D)	*	0	1.12
Pu-238	*	17.94	66.9
Am-241	*	0.2	0.23

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.10 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B26/75 ~~#45/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07586
File ID: 1SC02534.s0
Priority: Yes

Description\Location
05ER574-20
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.04	0.14
Cs-137	*	0	0.19
Pb-210		2.69	1.08
Ra-226		2.02	1.77
Ac-227 (D)	*	0.45	0.58
Th-230	*	0.23	11.1
Th-232 (D)		0.64	0.46
Pu-238	*	19.13	29.16
Am-241		0.13	0.12

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.05 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

• Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B27/75 ~~II46/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07587
File ID: 1SC02535.s0
Priority: Yes

Description\Location
05ER574-21
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.03	0.11
Cs-137	*	0.04	0.12
Pb-210		2.04	1.11
Ra-226		1.96	1.32
Ac-227 (D)	*	0.3	0.5
Th-230	*	4.19	9.47
Th-232 (D)		0.85	0.43
Pu-238	*	3.41	27.83
Am-241		0.24	0.12

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.04 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B28/75 ~~B47/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07588
File ID: 1SC02536.s0
Priority: Yes

Description\Location
05ER574-22
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.13	0.21
Cs-137	*	0.09	0.16
Pb-210		1.78	1.76
Ra-226		2.81	2.58
Ac-227 (D)	*	0	1.09
Th-230	*	0	19.2
Th-232 (D)	*	0.25	0.79
Pu-238		43.13	39.92
Am-241	*	0.04	0.19

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.07 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/21/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B29/75 ~~T-18/44~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07589
File ID: 1SC02537.s0
Priority: Yes

Description\Location
05ER574-23
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.09	0.2
Cs-137	*	0.04	0.22
Pb-210	*	1.78	1.79
Ra-226	*	1.78	2.43
Ac-227 (D)	*	0.6	0.74
Th-230	*	2.63	15.59
Th-232 (D)	*	0.33	0.73
Pu-238	*	21.02	43.14
Am-241		0.21	0.17

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.07 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

• Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/22/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B30/75 ~~I-49/-64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07590
File ID: 1SC02538.s0
Priority: Yes

Description\Location
05ER574-24
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.76
Cs-137	*	0.36	0.49
Pb-210	*	1.23	4.87
Ra-226	*	4.46	7.45
Ac-227 (D)	*	0	3.1
Th-230	*	1.79	43.22
Th-232 (D)	*	0.29	1.88
Pu-238	*	112.2	136.3
Am-241	*	0.15	0.51

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.20 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/22/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B31/75 ~~II-50/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07591
File ID: 1SC02539.s0
Priority: Yes

Description\Location
05ER574-25
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.08	0.18
Cs-137	*	0.13	0.17
Pb-210	*	1.53	1.78
Ra-226	*	1.17	2.28
Ac-227 (D)		0.96	0.95
Th-230	*	6.78	14.94
Th-232 (D)	*	0.34	0.67
Pu-238	*	21.66	40.74
Am-241	*	0.08	0.19

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.06 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/22/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B32/75 ~~II-51/64~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07592
File ID: 1SC02540.s0
Priority: Yes

Description\Location
05ER574-26
Long Count

Collector: 7760
Date Received: 9/19/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.16	0.23
Cs-137	*	0.11	0.2
Pb-210		2.54	1.92
Ra-226	*	2.41	2.74
Ac-227 (D)	*	0	1.06
Th-230	*	2.64	17.78
Th-232 (D)	*	0.58	0.76
Pu-238	*	4.47	51.71
Am-241	*	0.09	0.19

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.08 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions.
Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments: Reported activities are only estimates due to sample variety.

Date: 9/22/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

B33/75 ~~II 52/69~~

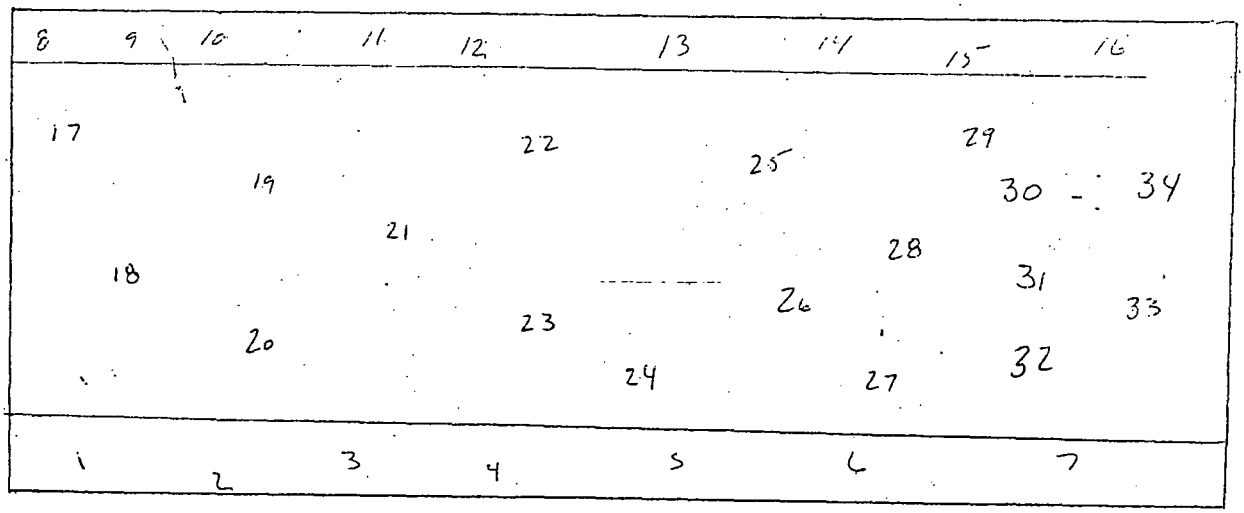
5432

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG/AREA/ROOM) PRS 70 - OUTFALL Spill Way	SURVEY NO. 05-ER-628
PURPOSE: Characterization of outfall spill way West of Missouri crossing + settling ponds	RWP NO. N/A
	DATE: 10-6-05
	TIME: 0800 hrs

See page 3 for map of area

MAP/DRAWING North ↑



100% Direct survey of outfall spill way
All accessible surfaces scanned with 2360 - Location numbers are stationary. One minute counts taken where secondary responces were noted during scan.
All other areas were <100 α / <5000 β with no secondary responces.

COPY

LEGEND: # = mrem/hr (γ) whole body
E = mrem/hr (β+η+γ) extremity on contact
△# = mrem/hr neutron
[#] = air sample number
(#) = swipe number
(#/α) or /β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5710/5787	2-10-06
	N/A	

[redacted]

HP#	Date:
5520	10-10-05
HP#	Date:
HP# 7348	Date: 10/11/05

[redacted]

ML-9620 (2-98)

334/75

RADIOLOGICAL SURVEY DATA SHEET
MAP/DRAWING Continuation Page

Survey No.
DS-ER-628

5710/5787
N.C. 2-10-00

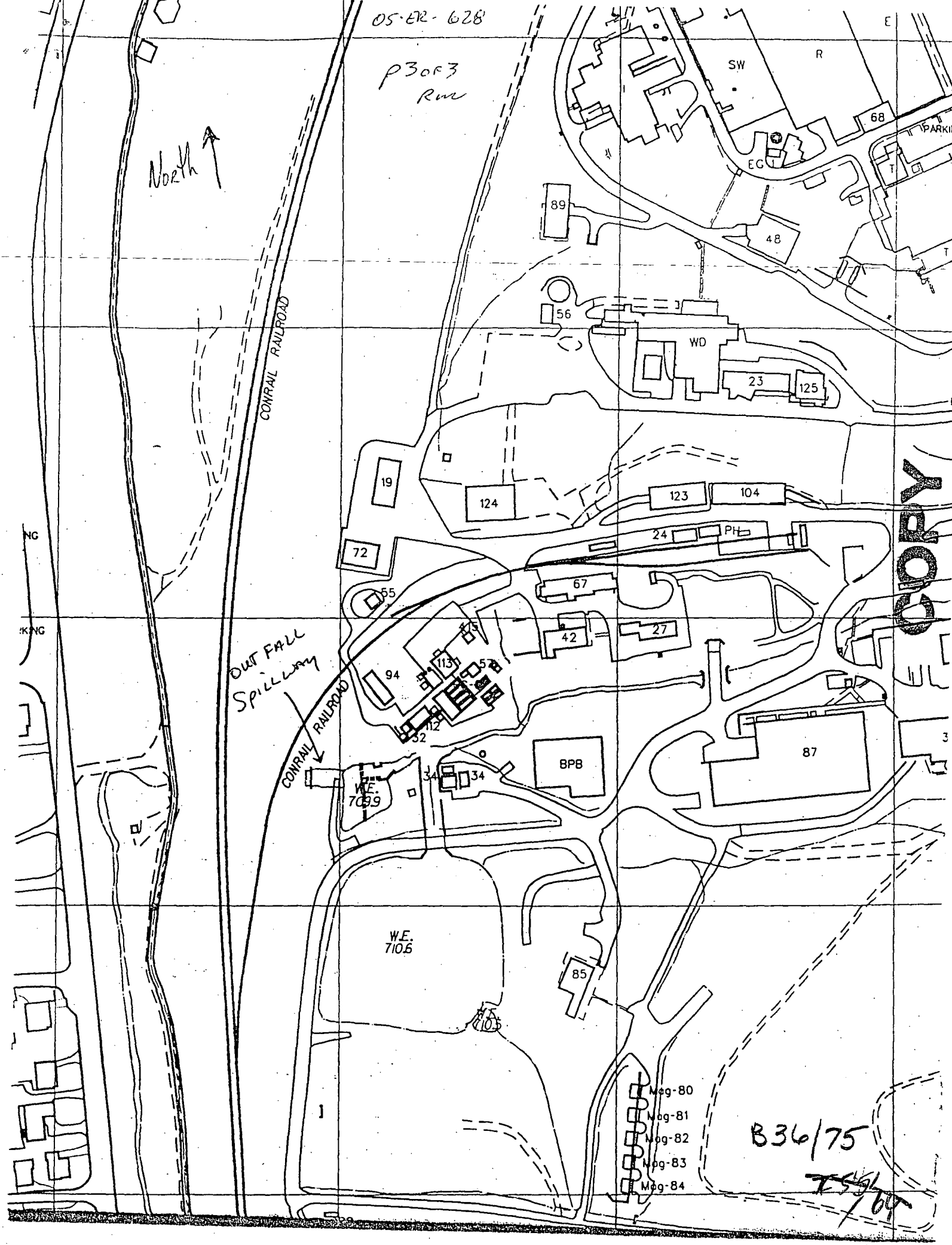
MAP/DRAWING
Stationary Integrated Measurement Data
Background - 1.0 cpm α 122 cpm β-
Correction Factor - 8 α 4 β-
Count Time - 1 min.

Location	Gross Counts		Gross cpm		Net cpm		Result dpm/100 cm²	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1	10	190	10	190	9	68	72	272
2	4	203	4	203	3	81	24	324
3	6	161	6	161	5	39	40	156
4	8	187	8	187	7	65	56	260
5	5	184	5	184	4	62	32	248
6	7	155	7	155	6	33	48	132
7	11	131	11	131	10	9	80	36
8	6	194	6	194	5	72	40	288
9	8	199	8	199	7	77	56	308
10	12	207	12	207	11	85	88	340
11	9	221	9	221	8	99	64	396
12	10	141	10	141	9	19	72	76
13	4	186	4	186	3	64	24	256
14	3	191	3	191	2	69	16	276
15	2	177	2	177	1	55	8	220
16	11	133	11	133	10	11	80	44
17	13	191	13	191	12	69	96	276
18	10	165	10	165	9	43	72	172
19	3	157	3	157	2	35	16	140 ~~5~~
20	9	141	9	141	8	19	64	76
21	12	189	12	189	11	67	88	268
22	7	162	7	162	6	40	48	160
23	11	174	11	174	10	52	80	208
24	5	188	5	188	4	66	32	264
25	6	211	6	211	5	89	40	352
26	9	147	9	147	8	25	64	100
27	5	221	5	221	4	99	32	396
28	9	153	9	153	8	31	64	124
29	8	169	8	169	7	47	56	188
30	4	190	4	190	3	68	24	272
31	8	198	8	198	7	76	56	304
32	3	203	3	203	2	81	16	324
33	12	130	12	130	11	8	88	32
34	8	181	8	181	7	59	56	236
				N/R				

B35/75 ~~#54/69~~

05-ER-628

P3 of 3
Rm



RADIOLOGICAL SURVEY DATA SHEET

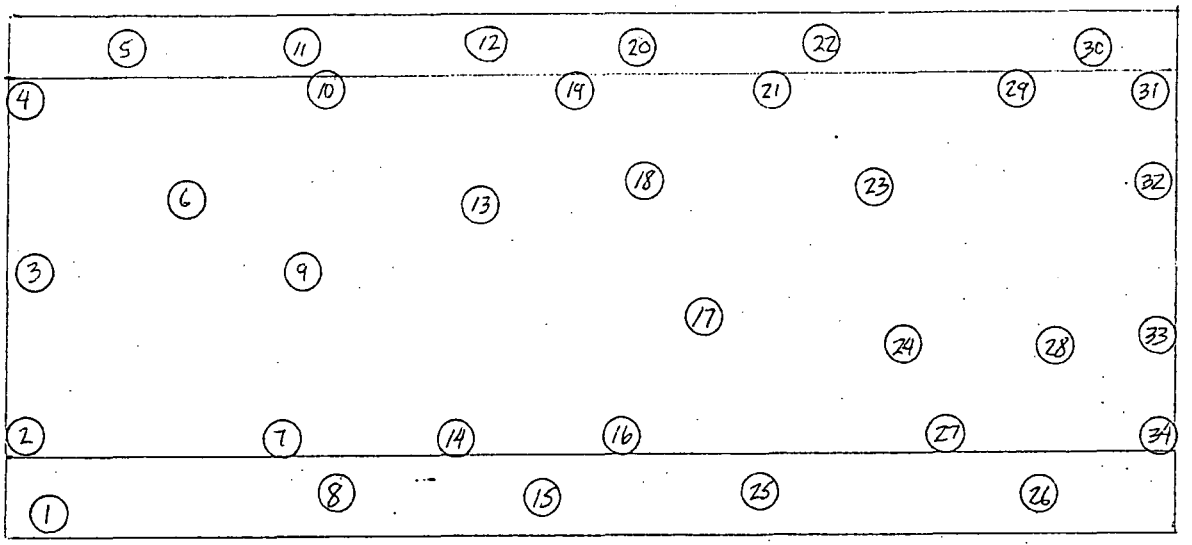
LOCATION: (BLDG./AREA/ROOM) PRS 70 - OUTFALL SPILLWAY	SURVEY NO. 05 ER 694
PURPOSE: CHARACTERIZATION OF OUTFALL SPILLWAY WEST OF MISSOURI CROSSING + SETTLING PONDS	RWP NO. N/A
	DATE: 11 03 05
	TIME: 1000

MAP/DRAWING

SV 22 S

FOR DIRECT SURVEY RESULTS, SEE RSDS 05 ER 628

N



SETTLING PONDS →

SEE pg. 2 FOR SWIPE RESULTS.

COPY

LEGEND: # = mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact

△# = mrem/hr neutron

[#] = air sample number

(#) = swipe number

(#/α) or/β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
3030	5822	07 19 06

[redacted]

HP # 4992	DATE: 05 11 03 ~~05~~
HP # 4992	DATE: 11 03 05
HP # 7348	DATE: 11/7/05

[redacted]

ML-9620 (2-98)

837/75 ~~756~~/64

Survey No. 05 ER ~~628~~ 694 10505

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	comments	
1	< DL	0	SEE MAP - PG 1	
2	< DL	0		
3	< DL	0		
4	< DL	4		
5	< DL	0		
6	< DL	4		
7	< DL	0		
8	< DL	0		
9	< DL	0		
10	< DL	0		
11	< DL	0		
12	< DL	0		
13	< DL	0		
14	< DL	0		
15	< DL	0		
16	< DL	0		
17	< DL	0		
18	< DL	0		
19	< DL	0		
20	< DL	0		
21	< DL	4		
22	< DL	0		
23	< DL	0		
24	< DL	0		
25	< DL	0		
26	< DL	0		
27	< DL	0		
28	< DL	4		
29	< DL	0		
30	< DL	0		
31	< DL	0		
32	< DL	4		
33	< DL	0		
34	< DL	0		
35		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	comments	
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				

COPY

COMMENTS:		BKG	Ct	DL	MDA
3030# 5822	alpha -	0.0	0.5	0.0	15.3
	beta -	27.0	0.5	39.8	95.4

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-9620 (4-98)

B38/75 ~~I67/64~~

V20

RADIOLOGICAL SURVEY DATA SHEET

LOCATION (BLDG AREA): PRS-70 WIEK BASIN	OU: OU-ER-169
PURPOSE: Release of Area	N/A
	021506
	1400

2360 BK00 DL

ID 5708/5731
α 3cpm 2.2cpm
β⁻ 229cpm 20 cpm

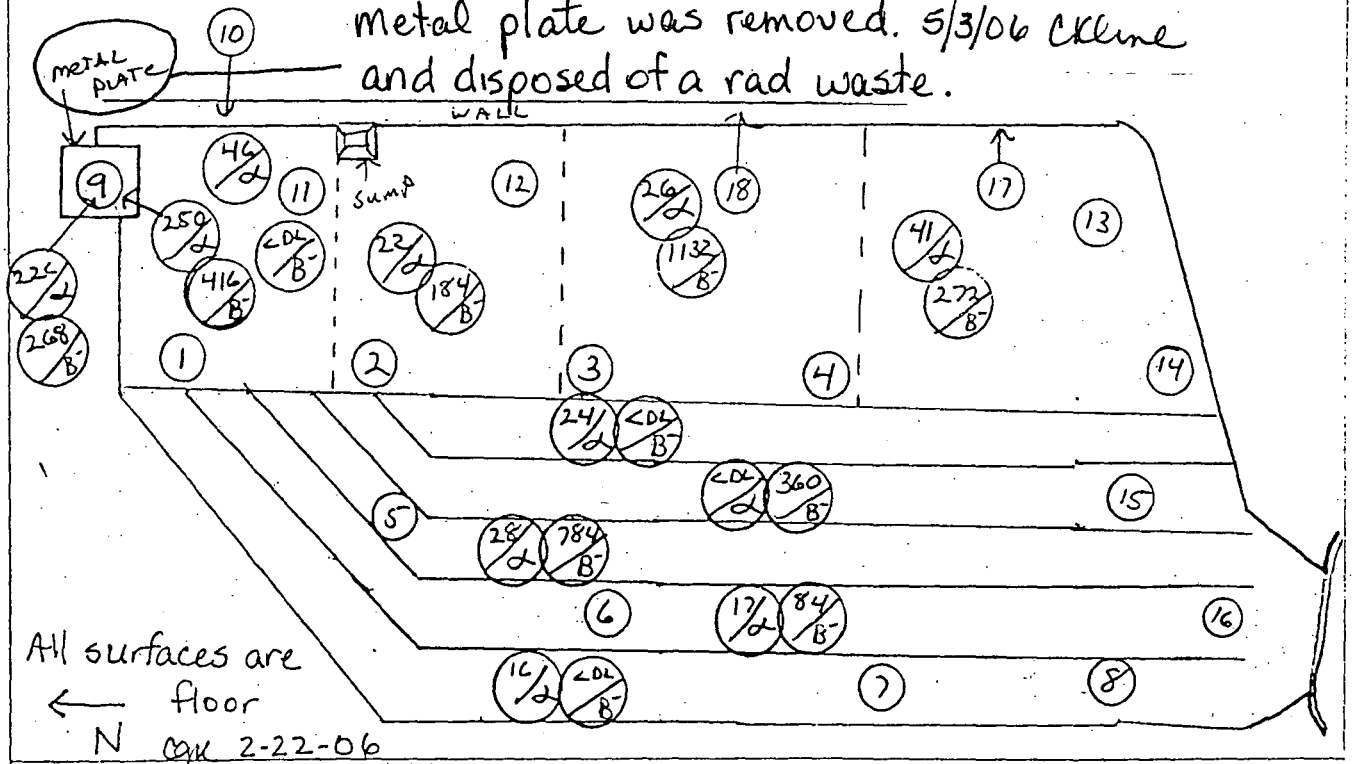
ID 5780/5781
α 1.8cpm 1.8cpm
β⁻ 216cpm 20cpm

ID 5734/5807
α 2.4cpm 2.2cpm
β⁻ 204cpm 20cpm

MAP / DRAWING

SEVERAL INTEGRATED COUNTS WERE CONDUCTED DURING THE SURVEY. THE HIGHEST READING ARE DOCUMENTED FOR EACH SURVEY GRID.

Metal plate was removed. 5/3/06 CKline and disposed of a rad waste.



CJK 2-22-06

LEGEND.
= mrem/hr (γ) whole body
#E = mrem/hr (β+γ) extremity in contact
K = factor of 1000
— · — · — · = radiological boundary
= mrem/hr neutron
= swipe number
= swipe number
α/β - direct contamination measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Date
2360	5708/5731	083106
2360	5780/5781	062306
2360	5734/5807	121206
3030	5899	030906
3030	5900	022806

[redacted] 7561 2-22-06

[redacted] 7561 2-16-06

[redacted] 2/22

[redacted]

539/75

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	29	5	N/A	See map
2	0	0		
3	96	0		
4	0	0		
5	5	0		
6	0	0		
7	38	0		
8	26	0		
9	131	0		
10	30	0		
11	0	0		
12	23	0		
13	29	0		
14	17	0		
15	109	0		
16	0	2		
17	2	0		
18	17	2		

N/A

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

N/A

COPY

COMMENTS: N/A

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of re are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A

ML-9620A (4-98)

B 40/75 II 59/69

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) PRS 70	SURVEY NO. 06 . ER 0211
PURPOSE: CHARACTERIZATION OF SU 20 - SU 22 (WEIR BASIN)	RWP NO. N/A
	DATE: 03 07 06
	TIME: 1100

MAP/DRAWING

SEE PAGE 3

COPY

LEGEND: # = mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact

△# = mrem/hr neutron

[#] = air sample number

(#) = swipe number

(#/α) or/β = direct cont. measurement in dpm/100cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5752/5732	012507
3030	5899	030906
~~3030~~	~~5900~~	~~030407~~

[redacted]

HP # 7068 4992	DATE: 03 07 06
HP # 7068 4992	DATE: 03 07 06
HP # 6175	DATE: 3-13-06

ML-9620 (2-98)

Survey No. 06 ER 0211

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination			
Swipes (dpm/100cm²)			
Sample #	β/γ	Alpha	Comments
1	< DL	2	SE FACE OF WALL
2	< DL	2	SE FACE OF WALL
3	< DL	0	NE FACE OF WALL
4	< DL	0	NE FACE OF WALL
5	< DL	0	SE Lip And Edge
6	< DL	2	NE Lip And Edge
7	< DL	0	North Lip + Edge
8	< DL	0	South Lip + Edge
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			

Removable Contamination			
Swipes (dpm/100cm²)			
Sample #	β/γ	Alpha	Comments
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			

COMMENTS:	3030 # 5899	alpha Bkg 0.6	Ct 1.0	DL 3.7	MDA 14.7
		Beta Bkg 36.0	Ct 1.0	DL 36.9	MDA 82.3

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-9620 (4-98)

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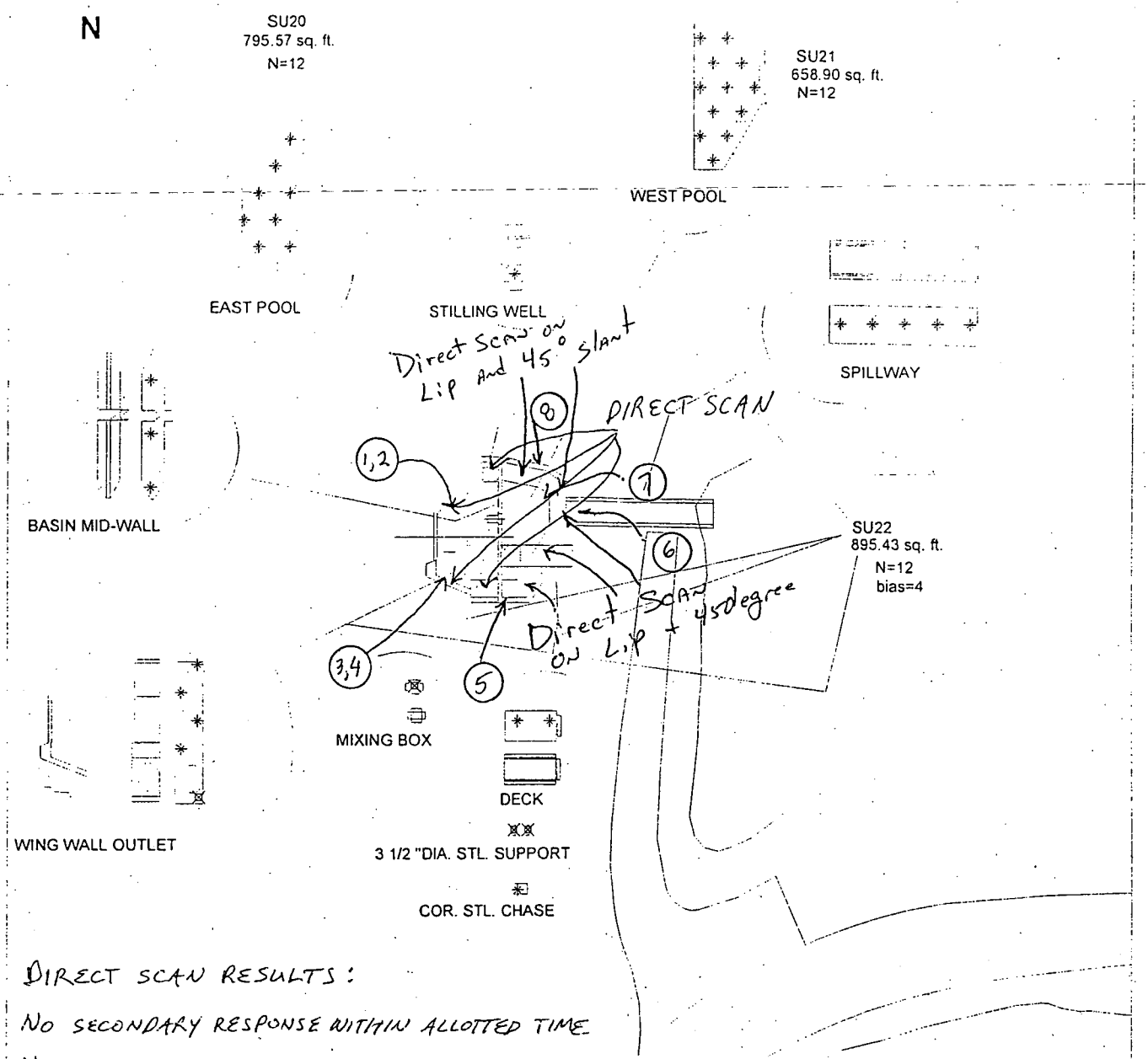
PRS 70

SU20 - SU22 (Weir Basin)



DIRECT SCAN RESULTS:

NO SECONDARY RESPONSE WITHIN ALLOTTED TIME

NO INTEGRATED COUNT

2360 BACKGROUND (CPM): 4/α ; 227/β

COPY

0 10 20 30 40 ft

B43/75 ~~II 02/04~~

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07341
File ID: 2SC02760.s0
Priority: Yes

Description\Location
PRS 70-SW Prior to removal.
Long Count

Collector: 4488
Date Received: 8/30/05
Date Collected: 8/29/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.01	0.06
Cs-137	*	0.02	0.04
Pb-210		1.14	0.6
Ra-226		0.97	0.7
Ac-227 (D)		0.7	0.27
Th-230	*	2.97	6.88
Th-232 (D)		0.34	0.18
Pu-238	*	8.05	13.88
Am-241		0.09	0.07

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.02 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments:

Date: 8/30/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07340
File ID: 2SC02759.s0
Priority: Yes

Description\Location
PRS 70-N Prior to removal.
Long Count

Collector: 4488
Date Received: 8/30/05
Date Collected: 8/29/05

Radionuclide		Activity (pCi/g)	MDA
Co-60		0.01	0.01
Cs-137	*	0	0.03
Pb-210	*	0.28	0.5
Ra-226		0.71	0.56
Ac-227 (D)	*	0	0.19
Th-230	*	0	4.79
Th-232 (D)	*	0.21	0.14
Pu-238	*	0	11.54
Am-241	*	0	0.05

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.02 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments:

Date: 8/30/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

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SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07890
File ID: 1SC02715.s0
Priority: Yes

Description\Location
PRS 70-1012-8 Creek @ N. Return Pond
Long Count dried/reran

During removal. [illegible]

Collector: 4992
Date Received: 10/13/05
Date Collected: 10/12/05

Radionuclide		Activity (pCi/g)	MDA
Co-60		0.08	0.06
Cs-137		0.09	0.08
Pb-210		3.28	1.12
Ra-226		1.9	1.15
Ac-227 (D)	*	0.76	1.06
Th-230	*	0	11.6
Th-232 (D)		0.62	0.22
Pu-238	*	23.47	24.86
Am-241		0.13	0.13

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.04 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments:

Date: 10/21/05 Counted By: 5801 Analyzed By: 5801 Initials [redacted]

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07342
File ID: 2SC02761.s0
Priority: Yes

Description\Location
PRS 70-SE
Long Count

Prior to removal. [illegible]

Collector: 4488
Date Received: 8/30/05
Date Collected: 8/29/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.06
Cs-137	*	0.01	0.03
Pb-210	*	0.53	0.54
Ra-226		0.72	0.65
Ac-227 (D)		0.48	0.22
Th-230	*	0	6.12
Th-232 (D)	*	0.12	0.17
Pu-238	*	0	13.23
Am-241	*	0	0.06

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.02 nCi/g

Instrument type: High Purity Germanium

Σ_{DOT} 2nCi/g limit, total activity.

(D) Denotes identification by daughter emissions. Sample is Assumed to be in secular equilibrium.

* Indicates activity < MDA. MDA used in limits calculation

Comments:

Date: 8/30/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

8 of 75

[illegible]

Applicable Excerpts from PRS 70 Partial II for Hard Surface Post-Ex SUD

SU1-11 and SU20-22

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Survey Unit Design (SUD)

FINAL

Project: **PRS 70 Partial II for Hard Surfaces (SU1-11 and SU20-22)**

Review & Approval

Project Engineer: Mark Spivey

Reviewer: James Fontaine

Reviewer: _____

Document	Title
Fact Sheet	PRSs 67, 68, 69, & 70: Site Stormwater Drainage System; March 2004
RP	Site Stormwater Drainage System Removal Plan, Final, August 2004
WP	PRS 69 and 70 Sediment Removal, Cleaning, and Sampling, Draft, March 2005, ER/ST-04-017
VSAP	Standard Verification Sampling & Analysis Plan, Final, August 2004

☐ Pre-Excavation or ☒ Post-Excavation SUD (SU 1-11& 20-22 Only)

Summary of Changes (for Post-Ex SUDs ONLY) (See following pages for details)
1. Did the COC(s) change? **Yes, COCs Removed (Original Erroneous Inclusion)**
2. Did the grid size or N change? **Yes: Shonka**
3. Did the classification change? **No**
4. Were bias/judgmental samples collected? **Yes, Assess Cracks**
5. Other significant change? **Yes, Sections of SU1-11 concrete removed and made part of SU23, Inaccessible Areas, Etc.**

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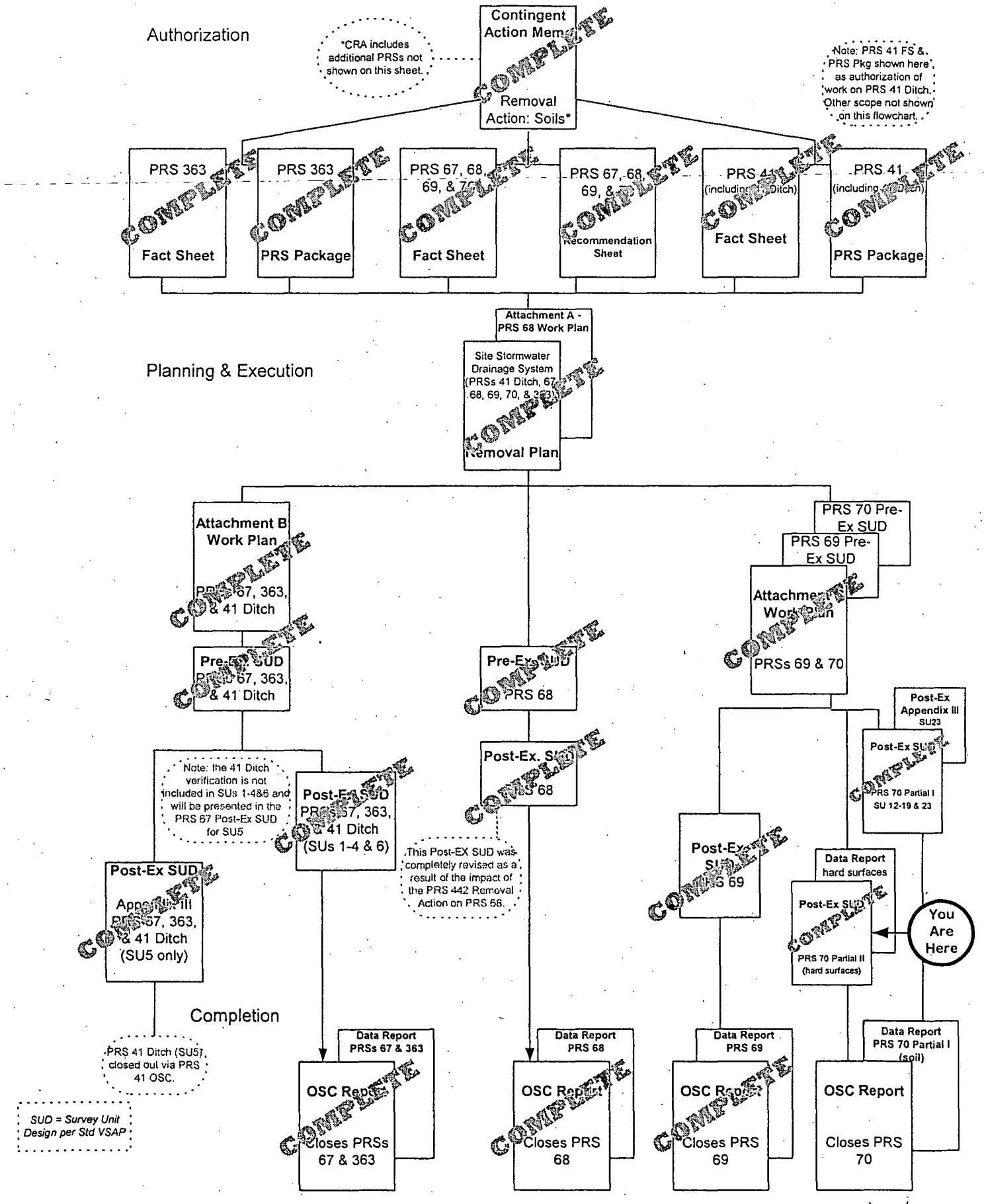
PRSs 67, 68, 69, 70, 363, & 41 Ditch



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SUD Worksheet

Acronyms

AM	Action Memorandum
CO	Cleanup Objective
COC	Contaminant of Concern
Chem	Chemical
dev	deviation
Iso	Isotopic
EPA	Environmental Protection Agency
FSS	Final Status Survey
HS	Hot Spot
MARSSIM	Multi – Agency Radiation Survey and Site Investigation Manual
MD	Mound Document
MDC	Minimum Detectable Concentration
MEIMS	Mound Environmental Information Management System
NA or N/A	Non-applicable
NC	No Change
pCi/g	pico -Curie(s) per gram
PRS	Potential Release Site
Pu	Plutonium
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action/Removal Action
RadCon	Radiological Control
RASS	Remedial Action Support Survey
RP	Removal Plan
SPF	Survey Plan Form
RSDS	Radiological Survey Data Sheet
(s) or s	effective standard deviation (MARSSIM)
Std	standard
SU	Survey Unit
SUD	Survey Unit Design
TBD	To Be Determined
Th	Thorium
U	Uranium
VSAP	Verification Sampling and Analysis Plan
VSP	Visual Sample Plan
WP	Work Package/Work Plan

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SUD Worksheet

Item 1	Summary of historic **information** relevant to SU: PRS 70 is part of the site's storm water runoff system that supports the reduction of suspended solids in runoff. PRS 70 is located at the southwest end of the drainage ditch (PRS 67). It consists of concrete drainage features (the "Missouri Crossing") which directs the flow of storm water (between PRS 69 and the impoundment), an open impoundment with earthen sides and bottom used to control the flow of water and settle sediment, and a concrete channel and weir basin that moderates the flow so that the discharge volume can be measured. The open impoundment is partitioned into three basins by concrete dividers. The Removal Action (RA) associated with this SUD addresses identified contamination areas with Contaminants of Concern (COCs) above the cleanup objective (CO) which was detected in the impoundment sediment.
Item 2	Summary of historic data relevant to SU — See Appendix D

Item 3a

COC	BASIS	(pCi/g) CO	HS	MAX	Offsite Analysis & Compendium Method: Gamma (A-015)	Iso Pu (A-012)	Iso Th (A-012)	Iso U (A-012)
Pu-238	Public Fact Sheet for PRSs 67, 68, 69, & 70: Site Stormwater Drainage System	55	165.13	749		X		
Th-228	PRS 68 Post-Ex SUD (RSDS 04-ER-0532 page 11 of 13), up-gradient	2.6	4.8	4.42			X	
Th-232	PRS 68 Post-Ex SUD (RSDS 04-ER-0532 page 11 of 13), up-gradient	2.1	3.5	3.26			X	

Analyses are to be performed per Mound Methods Compendium and COs (for surface samples/analysis i.e., bedrock, asphalt, concrete) as applicable. Compendium Method A-012 is Isotopic Uranium, Isotopic Plutonium, and Isotopic Thorium by Alpha Spectrometry and Compendium Method A-015 is Gamma Spectrometry. Surface samples/analysis are to be in accordance with MD-80036 OP 30005, 30007, and 30040. Hard surfaces will be swiped and gross alpha and beta measurements will be performed and compared to the most restrictive COC in Mound 2000 Work Plan Appendix A Table 1 (NUREG 1.86 Regulatory Guide). If the location fails to meet the most restrictive criteria then it will be sent to alpha spec for determination of the COC so the applicable, instead of the most restrictive, criteria can be applied.

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Item 3a Cont	**Changes if any, from Pre-Ex SUD:** Clarification: Per the Fact Sheet cited above; Pu-238 is the only COC in PRS 70. Th-228 and Th-232 are being removed as COCs because they were erroneously included in the Pre-Ex SUD from PRS 68 data. SU1-11 and 20-22 all consist of concrete surfaces. The surfaces in SU1-11 were assessed using a Shonka Surface Contamination Monitor (SCM) (Appendix II and Item 10 change box for details).
Item 3b	Chem. basis for std dev, AM COCs/New COCs N/A

Item 4

Classify Areas <u>& provide justification</u>

The areas identified within this SUD are to be considered Class 1 due to a potential for radioactive contamination (based on site operating history) or know contamination (based on previous radiological surveys).

Note: Given the geometry of the SUs it is not physically possible to achieve 100% scan coverage (due to intersecting angle of floor to wall, etc.); therefore a best effort will be given.

Class	Scan Coverage guidelines
1	100%
2	10-90%
3	Judgmental

Changes if any, from Pre-Ex SUD: None.

Item 5	Subdivide areas into SUs 22 Class 1 SUs	See Appendix C The SUs determination is based upon size and geometry. Hard Surface (concrete) SUs are limited to an area of 100 m^2 (1076.4 ft^2) Open impoundment and creek inlet (non-hard surface) are SU19 with a combined area of approximately 903.76 m^2 (9,728 ft^2).

Item 5 Cont

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Changes if any, from Pre-Ex SUD: 23 Class I SUs. Soil SUs contained in PRS 70 Post-Ex SUD Partial for Soils.

Item 6a	Calculations / Rad	See Appendix A & B
	a. Calculate the (s) for each COC listed above	Hard Surface (All except SU19): s=17%
	b. Number of Samples (N)	Soil: s=0.36
		Hard Surface: N=10 + 20% or nominally 12 per SU
		SU1 through SU11: **135 Samples** selected by VSP
		SU12 through SU18: **82 Samples** selected by VSP
		SU20 through SU22: **36 Samples** selected by VSP
		Soil: SU19 - MARSSIM Spread N=11, Area Factor N=333, due to Pu-238 being the primary driver the default **15 foot triangular grid shall apply** and therefore the number of samples is dependent upon the random starting point and area. The number of samples selected by VSP based upon a 15-foot triangular grid is 54 (VSP calculated N=54 based upon area).
Item 6a Cont		*Note: Due to limited data in PRS 70, Data from PRS 67 was used to simulate as left conditions for the calculations*

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Item 6a Cont

Changes if any, from Pre-Ex SUD: Hard surfaces that comprised SUs 12-18 have been removed and disposed of as waste. Therefore, they will be considered closed.

Hard surface assessments for SU 1-11 were performed with the Shonka SCM (see Appendix II and Item 10 change box for details). A summary of the Shonka SCM Results is contained in the Data Report. Several sections were identified as being contaminated above the Pu-238 free release level. The Shonka is prone to false positives and the Shonka alarms when 75% of the cleanup value is reached. The Ludlum 2360 provides closer inspection of the 1-meter square area surrounding the alarm area with a smaller probe than the Shonka. Scans and integrated counts are recorded on RSDS sheets provided in Appendix B of the Data Report. Two sections on the North walls were investigated with a Ludlum 2360 (see RSDS 05-ER-650 in Data Report) and found to be below free release criteria. The other sections of concrete were removed and disposed of as contaminated waste. The subsurface cracks and surface soils were sampled and analyzed. In the instances that it exceeded cleanup objectives, the soil was removed along with enough concrete to allow access to subsurface. The soil results, which did not result in removal, are contained in Data Report. The areas that resulted in a removal were taken out of SU 1-11 and were combined into a new SU23, which is addressed in the PRS 70 Partial I Post-Ex SUD for Soils. SU20-22 were assessed using a Ludlum 2360 (see RSDS 05-ER-0628, 05-ER-0694, 06-ER-0169, and 06-ER-0211 in Data Report).

An accessibility safety issue exists for the hard surface associated with a portion of SU1 (west side of sluice gate and adjacent concrete). These surfaces were evaluated by Safety and not surveyed. Refer to E-Mail correspondence and photo contained in Appendix Sediment within the sluice gate was sampled prior to removal, during removal, and verified following removal. All results are below COs. Soil analysis reports for samples collected before and during removal are included in Appendix II. Verification results are presented in Appendix A to the PRS 70 OSC Report. Results of sediment adjacent to the sluice gate surface is an indicator of the radiological condition of the surface itself.

SU20 and SU21 were inappropriately labeled as East Pool and West Pool, respectively. SU20 is the West Pool and SU21 is the East Pool.

An area within the Weir Basin (a portion of SU21, the East Pool) was unable to be surveyed due to the inability of keeping the area dry (water infiltration). See Appendix II map for area delineation.

The Deck, Steel Supports, mid section of the Wing Wall Outlet, and Mixing Box (all part of SU22) were not assessed.

- The Deck and Steel Supports locations were above any achievable high water level and therefore not subjected to the COC source term.
- The Mixing Box was full of water, contained no sediment and was unable to be kept dry for assessment. The area surrounding the mixing box was surveyed and no elevated activity was detected. This box was used to sample accumulated water for release and all results were below release limits.
- The mid section of the Wing Wall Outlet was assessed and released with PRS 416 (the Twin 60s).

SU22 bias samples were removed from consideration due to adequate coverage in the RSDS survey locations.

Area of the remaining hard surfaces of the Missouri Crossing (SU 1 through SU 11) is 5,834 sq. ft.

The area of the hard surfaces of SUs 20-22 is 2,359 sq. ft.

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Item 6b	Calculations/ Chem., Std dev, Number of Samples	NA
	Changes if any, from Pre-Ex SUD: None	
Item 7	Grid spacing	Hard Surface: See Appendix A and VSP outputs in Appendix C Soil Area (SU19) 15-foot triangular grid (MARSSIM spreadsheet in Appendix B) per SVSAP Section 3.7. SU19 proposed sampling layout in Appendix C.
Item 7 Cont	**Changes if any, from Pre-Ex SUD:** See Appendix II Survey Plan Form. Hard surfaces layout is revised to include the following: SU 1-11: See Data Report RSDSs for 59 swipe locations. Shonka data was 100% stationary counts. 26 bias sediment locations at cracks and joints in the concrete. Locations >CO had the sediment and additional concrete removed (if required) and is verified with new SU 23 in Partial I Soils Post-Ex SUD. SU 20-21: See Data Report RSDSs for 36 swipe locations, 100% scan of accessible areas with the Ludlum 2360 and 36 integrated counts. SU 22: See Data Report RSDSs for 34 swipe locations and 100% scan of accessible areas with the Ludlum 2360 and highest recorded integrated counts.	

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Item 8	QA/QC	For Soil Samples: 1/20 via field duplicate in accordance with Mound Methods Compendium. Q-002 Chain-of-Custody Procedures Q-003 Documentation Requirements Q-004 Laboratory Data Reduction Q-006 Validation of Laboratory Data Packages Q-007 Data Assessment Q-008 Data Integrity Verification Q-010 Electronic Data Deliverable Format Specifications – MEIMS Std. ... S-001 General Instructions for Field Personnel S-002 Soil Sampling With a Spade and Scoop S-028 Sample Control and Documentation S-029 Guide to Handling, Packaging, and Shipping of Samples and Method Q-002 For Hard Surfaces: QA/QC aspects are covered between the SUD, the RSDS information/ requirements, and following MD-80036 (Operations 10001, 10002, and 30030) and MD-80043 (Operation 400).
	Changes if any, from Pre-Ex SUD: None	
Item 9	Bias/ Judgment samples	SU12 has 5 bias locations based upon professional judgment to have adequate coverage SU22 has 4 bias locations based upon professional judgment to have adequate coverage
	Changes if any, from Pre-Ex SUD: Hard surfaces that comprised SUs 12-18 have been removed and disposed of as waste. Therefore, they will be considered closed. The four (4) bias locations in SU22 were omitted. See Change Section to Item 6a.	

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Item 10	Not otherwise covered.../ comments	The sediment basins will be dewatered and potentially contaminated sediments removed. The remaining hard surfaces will be cleaned (pressure washed) and allowed to dry such that the verification surveys can be performed. Because the concrete structures will be left in place, the primary concern is surface contamination on the structures; therefore, a large portion of the FSS will be associated with RSDSs. Cracks in the concrete shall be marked and assessed by the RCTs, RCT POC, and project engineer. The crack shall be evaluated for contamination and if it indicates that it has provided for contamination migration, then chipping away concrete for further assessment shall be performed. If the crack is of sufficient width and depth to provide a pathway for contaminated silt through the entire depth of the concrete, a soil sample from the subsurface materials shall be taken. In-process sampling events (Characterization and RASS samples of sediment) will be conducted during the entire PRS remediation. Those samples will undergo gamma spectrometry analysis to guide actions. Surveys of the surface following cleaning will be used to determine when FSS (verification) sampling can be conducted. Site policy requires performance of onsite soil screening (NaI or germanium) on soil verification samples slated for offsite analysis and evaluation of the results prior to shipment. This analysis will generally be performed on a split of the verification sample containerized in an EPA dish (approximately 500 mL) but may be performed on the actual verification sample as long as containerization requirements are maintained for the offsite lab. Count time of the analysis will be sufficient to meet the cleanup objectives (COs) of the contaminants of concern (COCs) requiring verification. On site gamma spec typically provides results for: Co-60, Cs-137, Pb-210, Ra-226, Ac-227 (D), Th-230, Th-232 (D), Pu-238, and Am-241. In addition, any isotopes identified to be greater than their MDA (e.g., U-238, Bi-210m, etc.) will be reported on the analytical results sheet. Any exceedances of the CO associated with any isotope will constitute disposal as contaminated waste and evaluation for inclusion as a COC. If there is an insufficient volume of material to fill an EPA dish within a 1m x 1m square centered on the proposed sample location, due to bedrock or obstruction (such as a structure, foundation, concrete, pavement/asphalt (pond lining), large rock formations, utility bank, etc. which is not to be removed), then sediment/soil analysis will not be performed. In lieu of a sediment/soil analysis result, RadCon will survey the surface per COs and provide documentation thereof in an RSDS. The RSDS(s) will be included as documentation. Any final sample location that does not meet the surface release criteria will be submitted to the Core Team for concurrence or determination of further action.
Item 10 Cont		

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Since Building methodology for Final Status Survey on hard surfaces (such as concrete and asphalt) was unable to be duplicated in the outside environment (due to problems encountered during RASS sampling, Reference PRS 68 Post-Ex SUD), the use of the L-2350 instrument and the 43-37 floor probe in an outdoor environment was reevaluated. The information contained in the Survey Planning Form (SPF), from the Building methodology approach, is covered between the SUD, the RSDSs, and following MD-80036 (Operations 10001, 10002, and 30030) and MD-80043 (Operation 400).

The plan is to place all facets of the Storm Drainage System back into service upon completion of verification sampling. Most of the plant remediation projects, which supply storm water to this system, will be nearing completion and present a low possibility for recontamination. Those areas, which are not complete, will require monitoring of potential contamination sources and the appropriate storm water pollution prevention plans must be put in place to guard against recontamination.

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Changes if any, from Pre-Ex SUD: Sediment from the basins was removed along with any hard surfaces (SUs 12-18). As a result, SUs 12-18 are removed from further consideration and are considered closed.

Cracks in SU1 – 11 concrete were assessed by the RCT, RCT POC, and the project engineer. The evaluation of the cracks resulted in some sections of concrete being removed and the addition of SU 23.

Mound Removal Actions have regulator approved work plans, each of which has a section that addresses runon/runoff controls. In addition, the site Storm Water Pollution Prevention Plan applies to the entire site and is monitored by the Environmental Compliance and Analytical Services group. As a result of the removal of contamination and the implementation of runon/runoff protection, spread of contamination is prevented. Restoration of the Missouri Crossing will consist of the addition of any necessary backfill and re-establishing sections of concrete that were removed, south of the main drainage creek, to promote proper drainage and to ensure the stability and function of remaining structures. Re-seeding of the near horizontal surfaces, to enhance erosion control, is intended to be performed when weather conditions exist to promote germination.

The Shonka SCM (see Appendix II for details) was used to survey hard surfaces. For alpha scans and static measurements, areas above alarm set points* were identified. Ludlum 2360 investigated identified areas of Shonka alarms or the area was remediated. All smears for removable contamination measurements were below free release levels. The exposure rate measurement was less than 20 uR/hr..

* Instruments were set to alarm at 75% of the Mound 2000 free release values for the most restrictive alpha emitter (Pu-238).

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SURVEY PLAN FORM			
SP NUMBER		DATE OF REQUEST	
TYPE OF SP	☒ FSS ☐ CHARACTERIZATION ☐ REFERENCE ☐ OTHER:		
AREA/LOCATION	PRS 70 a.k.a. Missouri Crossing		
PURPOSE	The purpose of this SPF is to perform a final status survey in Class 1 areas with remaining concrete to support decisions on final disposition and free release of the structures.		
SU # 1 - 11	100% scan; 12 swipes/SU; soil samples	SU # 19	Soil (covered in Soils Post-Ex SUD)
SU # 12- 14	Structures Removed	SU # 20 - 22	100% scan; 12 swipes/SU
SU # 15 -18	Structures Removed	SU # 23	Soil (covered in Soils Post-Ex SUD)

SURVEY TYPE					
REMOVABLE SURFACE SWIPES	☐ BETA ☐ GAMMA ☒ ALPHA	SWIPE	100 cm2 swipe	COLLECTION AND ANALYSIS	Refer to MD-80036, Op. 10002 Radiological Surveys.
		FREQ.	Per Pre-Ex SUD sample plan		
INTEGRATED COUNT	☐ BETA ☐ GAMMA ☒ ALPHA	INST. TYPE	Shonka PSPC	COUNT TIME & DETECTOR DISTANCE FROM SURFACE	Refer to SHONKA Surface Contamination Monitor (SCM) operating procedures.
		PROBE TYPE	2 ft, 4ft, or 6 ft		
SURFACE SCAN	☐ BETA ☐ GAMMA ☒ ALPHA	INST. TYPE	L-2360	SCAN RATE & DETECTOR DISTANCE FROM SURFACE	Refer to MD-80036, Op 30030, Operation of Ludlum 2360 Scaler/ratemeter with Ludlum 43-89 alpha/beta scintillator.
		PROBE TYPE	43-89 hand probe		
INTEGRATED COUNT	☐ BETA ☐ GAMMA ☒ ALPHA	INST. TYPE	L-2360	COUNT TIME & DETECTOR DISTANCE FROM SURFACE	Refer to MD-80036, Op 30030, Operation of Ludlum 2360 Scaler/ratemeter with Ludlum 43-89 alpha/beta scintillator.
		PROBE TYPE	43-89 hand probe		
FIDLER SCAN	☐ BETA ☒ GAMMA ☐ ALPHA	INST. TYPE	Bicron Analyst	COUNT TIME & DETECTOR DISTANCE FROM SURFACE	Refer to MD-80036, Op 30005, Performance testing and operation of the Bicron Analyst with the FIDLER detector
		PROBE TYPE	FIDLER		
SOIL SAMPLE	☐ BETA ☐ GAMMA ☒ ALPHA	SOIL SAMPLE	Collect sample in an EPA dish	COLLECTION AND ANALYSIS	Refer to MD-80036, Op 10001, Sample preparation for Radiological Analysis. Request onsite long count gamma spec.
		FREQ.	RASS: Minimum 1 judgmental sample per exposed area under removed concrete in MO Crossing. RASS: Minimum 30 judgmental samples in SU 19.		

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Loose Surface Contamination:

Obtain a smear of 100cm^2 at each pre-designated systematic verification location.

Count each smear for alpha.

Record location and attach results on the RSDS in accordance with Mound Rad Con procedures.

Scanning using SHONKA:

Position Sensitive Proportional Counter (PSPC) with 2',4' and 6' probes

Perform a static measurements over 100% of the accessible concrete surfaces within SU 1-11.

Record the locations and document the results of the areas surveyed.

Mark areas of elevated readings for removal or to be confirmed by scanning using Ludlum 2360.

Scanning using Ludlum 2360 with 43-89 probe:

Perform a scan survey on the concrete surfaces in 20-22 AND

Perform a confirmatory scan survey on the concrete surfaces that were identified while scanning with the SHONKA counter showing elevated readings and is to remain in place AND

Perform a scan survey on the concrete surface adjacent to any areas where concrete was removed and soil was exposed

Scan in accordance with instrument procedures at a rate of ½ inch per sec at a distance of not more than ¼ " from the surface.

Integrated Measurement using Ludlum 2360 with 43-89 probe:

Perform an integrated measurement at every location where an indication of elevated activity is observed by scanning. Refer to MD-80036, Op. 30030 for count time.

Record the locations and document the results of the area scanned and any integrated measurements taken on the RSDS.

Document the net activity (dpm/100 cm2) for each location (no "<" or ">" values).

Scanning soil surfaces using Bicron Analyst with FIDLER probe:

Perform FIDLER walkover survey of the soil surfaces exposed by excavation or concrete removal.

If there is any indication of soil contamination, continue excavating until there is no detectable activity readings on the instrument. If readings are uncertain, collect a soil sample at that location for indication of further action. If there are no indications of activity, document survey completion and collect RASS soil samples as directed above.

Record the locations and document the results of the area walked over and any readings on the RSDS.

Collect RASS soil samples:

Collect a minimum of 30 soil samples within SU 19. Locations and additional samples selected by RCT judgment and FIDLER indications. Analyze by onsite long count gamma spec. If any locations are >CO continue excavating and resample.

Collect a minimum of 1 soil sample per area of removed concrete within SU 1-11 (MO Crossing). Locations and additional samples are selected by RCT judgment and FIDLER indications.

Record the locations and document the analysis results on the RSDS.

Verification soil samples to be collected following the post-ex SUD.

Quality Control:

Check Configuration Index (CI) for latest revision of procedures.

Daily source checks will be performed at the beginning and end of each day in accordance with Mound Rad Con procedures.

Follow Rad Con procedures for Chain of Custody requirements.

Record all locations and results on the RSDS in accordance with Mound Rad Con procedures.

GENERAL COMMENTS	Verification soil samples by systematic 15' triangular grid as presented in the post-ex SUD. All surveys shall be performed and documented in accordance with Mound Radiological Control procedures. Ensure surfaces are clean, dry and free of loose debris, dirt, and obstructions prior to performing surveys. Rad Con shall document all discrepancies from the above sampling and surveying instructions on the RSDS.

APPROVAL SIGNATURES

Project Engineer	Mark [illegible]	**DATE**	5/4/06
Radiological Eng.	Connie Kline	**DATE**	5/4/06
Manager	[illegible]	**DATE**	5/4/06

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SP CLOSE-OUT SIGNATURES			
Project Engineer		DATE	
Radiological Eng.		DATE	
Manager		DATE	

COMMENTS

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From: Sheila Willis
To: Fontaine, James
Date: 1/31/06 12:36PM
Subject: SLUICE GATE RAD SURVEY

I have evaluated the hazards associated with performing radiological surveys on the concrete structure west of the sluice gate. A fall hazard exists for any one who performs the radiological surveys. OSHA regulation 29 CFR 1926.501 requires fall protection for employees when exposed to a 6' or greater fall hazard. There is no 5000 lb. anchorage point for workers to be tied-off from, therefore, making it impossible to provide fall protection for employees.

The weir is a shallow concrete structure. Radiological surveys can be completed by workers with no restrictions for entry/egress.

If you have any questions, please contact me at 673-7935.

Thanks,
Sheila

CC: Kline, Constance

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Shonka Research Associates, Inc.
June, 2005

Technical White Paper

On The

Detection Sensitivity of the SRA Surface Contamination Monitor (SCM) for Alpha and Beta Radiation

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Detection Sensitivity of the SRA Surface Contamination Monitor (SCM) for Alpha and Beta Radiation

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1. Executive Summary

The Shonka Research Associates (SRA) Surface Contamination Monitor (SCM) is a computer-based scanning gas flow proportional counter alpha and beta instrument with multiple types of associated detectors. One of the detector types is a Position Sensitive Proportional Counter (PSPC) that detects residual surface activity by allowing an event to be detected at any distance along the length of the detector (available in 2-foot, 4-foot, 6-foot, and custom lengths). This white paper will discuss the methods used by SRA in the determination of detection sensitivities for the SCM with a PSPC.

It is required by technical survey protocols that the instrument detection sensitivity be less than the established End Point Criteria (EPC). However, *for beta radiation*, it is commonly recommended for final status surveys that the detection sensitivity be around 50 percent of the EPC with a 95 percent confidence level. *For alpha radiation* this is more difficult to state due to the Poisson-based statistical nature of the backgrounds (that is, the backgrounds are very low, 0 to 1 counts in the observation period).

Since the SCM measures both hot spot (100 cm^2 activity) and square meter average activity simultaneously, both criteria must be considered. However, since the hot spot EPC is a more difficult detection problem than the square meter average activity, the hot spot EPC will be evaluated in this paper.

This paper discusses the differences in traditional and scanning methods and delineates a systematic method for the calculation of a scanning Minimum Detectable Concentration (MDC_{scan}) for the SCM for both alpha and beta radiation. Note that the MDC_{scan} can be equivalent to or better than the MDC_{static} for 100% coverage of a survey area.

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2. Survey Methodology

Radiological surveys for measurement of residual surface activity are performed using the patented SRA SCM. Detailed information describing the SCM and associated methods can be found in NUREG/CR-6450 (The development of the SCM was partially funded by the U.S. Nuclear Regulatory Commission through the Small Business Innovative Research program and a NUREG was generated to document the results of the research and development). The SCM uses a Position Sensitive Proportional Counter (PSPC) that is capable of determining where the pulse is sensed along the length of the detector anode wire. The information is binned in 5-cm increments along the axis of the detector. The effect is that long detectors (1-meter or more in length) act like a series of seamless 5-cm wide proportional counters. These "virtual" proportional counters are similar in efficiency to other proportional counters; that is, approximately 20 percent efficient (varies based on emission type and energy), with the associated background of a 5-cm wide detector. This feature results in improved sensitivity due to lower background and location-specific identification as to the site of the radioactivity. When performing surface contamination surveys, data are collected for each 5-cm of linear detector travel as determined by a precision wheel encoder. The survey data is then recorded for each 5-cm x 5-cm (25-cm^2) area over the entire surface. Each 25-cm^2 area is then combined contiguously as one-quarter of four separate 25-cm^2 areas. This process goes through multiple iterations to determine the highest possible four 25-cm^2 areas. This technique ensures that the highest 100-cm^2 area (hot spot) is identified; therefore the SCM does not have what is called grid registration error (GRE). With the more traditional systems of multiple, non-overlapping detectors, these GREs can create measurement errors when the system is not directly over the source of interest. The SCM can be used for almost any surface type; however, typically it is used to monitor large flat surfaces, such as floors, walls and paved areas.

The system records hundreds of measurements for every square meter it traverses. This characteristic allows for a uniquely comprehensive statistical analysis of the data, including an in depth understanding of the distribution(s) of the data. Normally, the amount of data would present a major challenge to a system that relied on manual data processing, but the Survey Information Management System (SIMS) provides a direct link between the system that obtains the data and the system that records and processes the data, so handling errors are eliminated.

The rolling or dynamic SCM PSPC detector is capable of surveying to within 10 cm of obstructions (e.g., walls or curbs). The SCM is also available with a static (also called "corner") detector to survey the areas adjacent to obstructions as necessary to meet survey plan objectives. This static detector is also a PSPC; however, it takes a static count of the area under the detector for a specified time interval. The counting time is established to achieve the desired minimum detectable concentration (MDC). Static detector data is merged with SCM rolling mode data to comprise the complete survey.

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Detection Sensitivity of the SRA Surface Contamination Monitor (SCM) for Alpha and Beta Radiation

The enormous amount of survey data generated by the SCM, both in the rolling mode and static mode, is analyzed using SIMS during **Post-Processing** (PP), which provides a powerful interface for studying and reporting survey information. Although primarily designed to handle the large quantity of data produced by the SCM—SIMS can manage any survey data—including non-radiological measurements. The data from various areas use special "stitching" software to re-assemble the strips of data from the various detectors used. The survey report that SIMS provides includes multiple documents as several representations of the data collected: 1) A normal probability plot of the data with 95% confidence level defined, 2) A 2-D color plot of the data with superimposed grids (1 m^2), 3) a table showing data for the minimum, maximum and average radioactivity level as well as the standard deviation for each 1 m^2 grid, and 4) a 2-D color plot of release limits which show areas with data higher than the defined criteria.

For some situations "recount" detectors are used. "Recount" detectors are additional detectors placed alongside the first detector to get a "recount" of the area of interest. The recount detectors are used in some instances (especially for TRU surveys) and therefore residence time is not always tied directly to cart speed. For instance, for a 100 cm^2 source, with a cart speed of 1 cm/sec gives a residence time of 10 seconds, but with a recount detector that residence time doubles to 20 seconds.

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3. *A Priori* Minimum Detectable Concentrations

There are many different derived equations to calculate MDC values. For this discussion the Multi-Agency Radiation Survey and Site Investigation Manual (MARISSM) will be used. The commonly used equation that most people recognize is for ***static*** measurements and is presented here:

Equation 1 – Static MDC

$$MDC_{static} = \frac{3 + 3.29\sqrt{r_b t_g\left(1 + \frac{t_g}{t_b}\right)}}{(efficiency) * (t_g)}$$

Where:

r_b is the background count rate in counts per minute,
t_g is the sample gross count time,
t_b is the background count time,
And **efficiency** is the overall efficiency.

However, when doing ***scanning*** MDC calculations the following equation should be used:

Equation 2 – Scanning MDC

$$MDC_{scan} = \frac{1.38\sqrt{bkg}}{\sqrt{\varepsilon_s}\,(efficiency)(t_r)}$$

Where:

1.38 is the detection probability ratio (.95/.60) (see NUREG-1507),
bkg = background counts during the residence time t_r,
ε_s = surveyor efficiency (for a human this will be less than one; however, since the SCM always captures the data we can make this variable 1),
efficiency = overall efficiency for the nuclide of interest. This is the product of the 2π instrument efficiency and the source efficiency factor (see ISO-7503, 0.25 was used here) (for the SCM, approximately 20% for beta radiation like uranium, and approximately 11% for alpha radiation like TRU),
And t_r = residence time that the scanning instrument spends over the pixel of interest.

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An example of the scanning MDC calculation for **beta** radiation might be like:
(Based on a scan speed of 5 cm/sec where the residence time is 2 seconds)

Equation 3 – Beta Example

$$MDC_{scan} = \frac{1.38\sqrt{20}}{\sqrt{1.0}(0.2)(0.033)} = 953 \text{ beta dpm per } 100 \text{ cm}^2$$

Where:

1.38 is the detection probability ratio (.95/.60) (see NUREG-1507),
20 = background counts at 600 cpm in a counting interval (residence time) of 2 sec,
0.2 = total efficiency for the PSPC for Cs-137,
1.0 = surveyor efficiency (not applicable for a computer-driven data acquisition system),
And 0.033 = time interval in minutes corresponding to 2 seconds, which is the acquisition time for a 100 cm^2 area for the SCM at a scan speed of 5 cm per second.

And an example of the scanning MDC calculation for **alpha** radiation might be like:
(Based on a scan speed of 1 cm/sec with a recount detector where the residence time is 20 seconds)

Equation 4 – Alpha Example

$$MDC_{scan} = \frac{1.38\sqrt{1}}{\sqrt{1.0}(0.12)(0.33)} = 35 \text{ alpha dpm per } 100 \text{ cm}^2$$

Where:

1.38 is the detection probability ratio (.95/.60) (see NUREG-1507),
1 = background counts in a counting interval (residence time) of 20 sec,
0.12 = total efficiency for the PSPC for TRU,
1.0 = surveyor efficiency (this is usually 0.5, but for a computer-driven data acquisition system it is 1.0),
And 0.33 = time interval in minutes corresponding to 20 seconds, which is the acquisition time for a 100 cm^2 area for the SCM at a scan speed of 1 cm per second.

Note that the detection capability of the SCM is determined more appropriately using the actual survey data and determining an *a posteriori* MDC.

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4. *A Posteriori* Minimum Detectable Concentrations

During the post-processing (PP) phase, SRA in its Final Survey Reports generates *a posteriori* MDCs based on the actual backgrounds and the residence times as seen in the data as taken by the survey crew. Unlike a human, who cannot record or even keep a consistent scan speed, the SCM can; therefore, the *a posteriori* MDCs are usually lower than the calculated *a priori* MDC values.

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5. Other Considerations

The current applicable regulatory limits for transuranic contamination are 100 dpm per 100 cm^2 (when averaged over a 1 m^2 area), or 300 dpm per 100 cm^2 maximum in a 100 cm^2 area.

The current applicable regulatory limits for beta emitters such as uranium are 5,000 dpm/100 cm^2 (averaged over 1 m^2), or 15,000 dpm/100 cm^2 maximum.

The methods employed using the SCM/SIMS are well suited to evaluating survey data against these criteria. The recording of hundreds of measurements within a one square meter area allows for thorough analysis of the data in comparison with data obtained when measuring clean (background) surfaces. The SCM may be operated on the alpha plus beta plateau, and the SCM will respond to both alpha and beta particles. Surface material background is expected to exhibit typical Poisson statistics, although the actual material background will be established from field measurements and printed in the SRA survey report.

The sensitivity of the SCM can be determined by comparing the impact of a radioactive source on the background count rate measured by the SCM in the field for a given survey speed and detector efficiency. As an example, SCM surveys for beta-emitting nuclides are expected to be conducted at a survey speed of approximately 5 cm per second. The survey speed will directly impact system sensitivity; slower speeds will result in greater sensitivity due to longer residence time of the radioactivity under the detector and a larger number of counts being detected. Figure 1 shows the SRA data collected for scan speed versus the beta MDC.

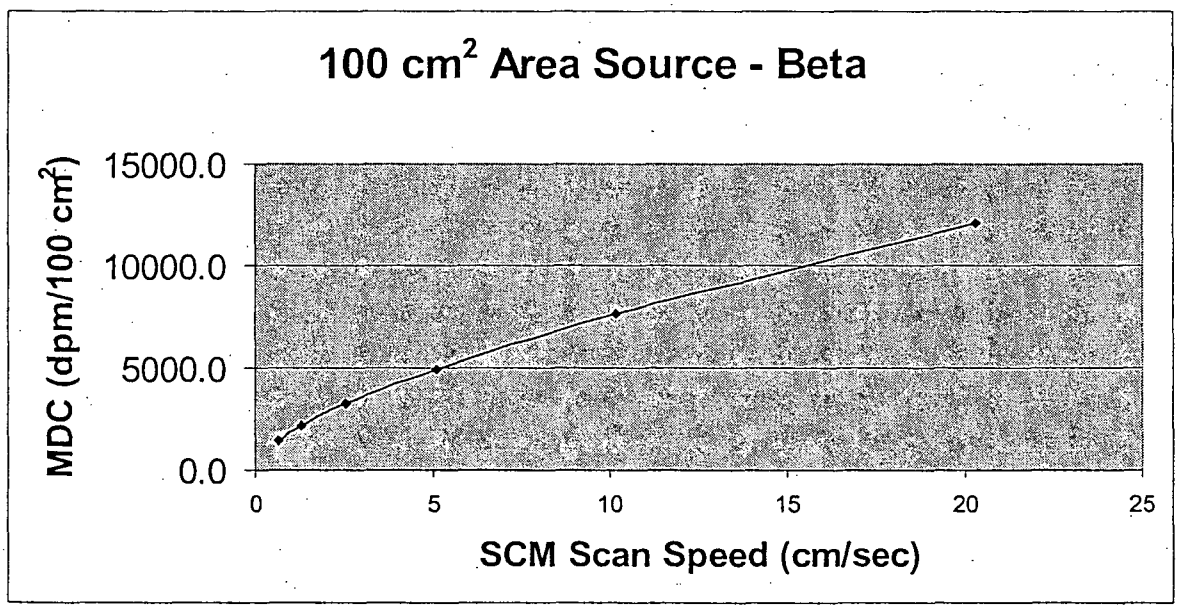

Figure 1 - Scan Speed vs. Beta MDC

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Detection Sensitivity of the SRA Surface Contamination Monitor (SCM) for Alpha and Beta Radiation

Historical data has shown that the SCM proportional counters have an efficiency for low-enrichment uranium of approximately 20 percent in the rolling mode. This efficiency is based on a 10-cm x 10-cm (100 cm^2) source. It should be noted that this source geometry will result in a conservative efficiency determination. Small areas of contamination (e.g. discrete particles) have greater residence time and will therefore be more easily detected. Sources of contamination distributed over areas greater than 100 cm^2 will not experience the edge effect (recognized by any detector when the source is the same or larger than the detector) and will therefore be more easily detected. Thus, 20 percent efficiency represents a conservative value relative to the actual geometries of the contamination that will be experienced in the field. The detector width for the trapezoidal detector used in the rolling mode is approximately 12 cm. However, since the leading and trailing edge (approximately 1 cm on each edge) of the active region of the detector have a slightly decreased response for beta, only 10 cm of the detector width is considered for the sensitivity evaluation. At this speed, the system is actively recording data over any point on the surface for 1 second.

Although the argument is valid for any detector operating with the parameters specified above, the distinct advantage of the SCM performing field surveys is that the large area probe used in a scan and record mode will ensure that the entire source is recorded. With other instruments that do not continuously record measurements, a scanning survey or fixed point measurement will result in a probability of detection that is much less than one for the SCM.

To supplement surveys performed with the SCM in the rolling mode, static ("corner") detectors are used to measure radioactivity in areas not easily accessible with the cart. The static detector is a PSPC that functions identically to the rolling mode detectors. However, the count cycle is triggered by a timer rather than a traveling wheel encoder. Efficiencies for the static mode application are higher than for the rolling mode since the detector is placed directly on the surface rather than being held a set distance above the surface. The timer is set to achieve count times that are approximately the same as the time that a surface would be exposed to a rolling detector during a specific survey.

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6. References

NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions", 1998.

NUREG/CR-6450, "Characterization of Contamination Through the use of Position Sensitive Detectors and Digital Image Processing.", September 1996

ISO-7503-1, "Evaluation of surface contamination - Part 1: Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters", 1988.

MARISSM Manual (NUREG-1575, EPA-402-R-97-016, DOE/EH-0624), "The Multi-Agency Radiation Survey and Site Investigation Manual", 2000.

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ATTACHMENT C

GENERAL MEDIA INFORMATION

[there was no general media information released to the public]

ATTACHMENT D

PUBLIC FACT SHEET

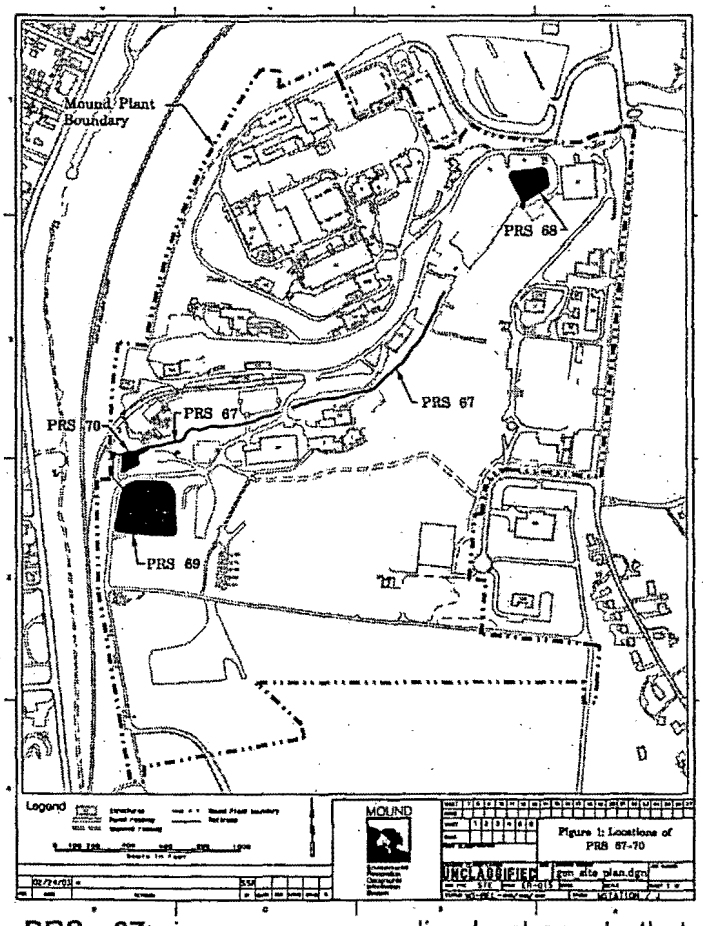
PUBLIC FACT SHEET

PRSs 67, 68, 69, & 70: Site Stormwater Drainage System

This Fact Sheet satisfies the Public Notification requirement set forth in the Contingent Action Memorandum[1].

Background. Potential Release Sites (PRSs) 67 through 70 are the primary components of the site stormwater drainage system as identified in the following table:

PRS	Description
67	Plant Drainage Ditch
68	Asphalt Lined Pond - North
69	Plant Overflow Pond - South
70	Retention Basins and Weir Basin



PRS 67 is an open, unlined channel that constitutes the primary plant drainage ditch (see Figure 1).

PRS 68 is the asphalt lined pond in the northeast corner of the site. The pond was constructed in the 1970s to receive stormwater runoff from the east central portion of the site to support reduction in suspended solids in runoff.

PRS 69 is the overflow pond and outfall pipe located at the south end of the drainage ditch. It is used to retain storm water flows, settle sediment, and support compliance with the National Pollutant Discharge Elimination System (NPDES) discharge standards for suspended solids. The pond is fed by two inlets, one being the PRS 67 drainage ditch and the other being a drainage structure (PRS 418) which was binned No Further Assessment. This PRS addresses only the stormwater sediment within the pond.

PRS 70 is also located at the south end of the drainage ditch (PRS 67) and consists of an open impoundment with earthen sides used to control the flow of water and settle sediment. The bottom is partitioned into three basins by concrete dividers. PRS 70 discharges into the weir basin. This PRS also includes the weir basin that moderates the flow so that the discharge volume can be measured.

Characterization. Several investigations have been conducted at or near the subject PRSs. Water and sediment samples have been collected and analyzed. All contaminants detected in the composited water samples were at concentrations less than applicable guideline values. The sediment sample results indicated exceedances to cleanup objectives (risk criteria), maximum results of which are presented in pCi/g in the table below.

Analyte	PRS	Maximum Result	Cleanup Objective
Plutonium-238	67	535	55
	68	257	55
	69	34	55
	70	749	55
Thorium-228	67	1.23	2.6
	68	9.44	2.6
	69	1.4	2.6
	70	1.27	2.6
Thorium-232	67	1.09	2.1
	68	0.44	2.1
	69	2.70	2.1
	70	1.57	2.1

1: Action Memorandum/Engineering Evaluation/Cost Analysis, Contingent Removal Action for Contaminated Soil, June 2002, Final
2: Standard Work Package for Contingent Removal Actions, November 2001, Final
3: Storm Water Pollution Prevention Plan

The maximum sample result of the only chemical found above cleanup objective is benzo(a)pyrene (8.0 mg/kg vs. 4.1 mg/kg CO). Benzo(a)pyrene is present in urban environments as a result of incomplete combustion in motor vehicles and is a component of asphalt based products. Five sample results were above the cleanup objectives; four were located within the asphalt-lined pond (PRS 68) and one at the discharge pipe from the asphalt-lined pond.

The Core Team originally recommended Further Assessment for these PRSs. Subsequently, the Department of Energy determined that a **Removal Action** (RA) per the Contingent Action Memo[1] is appropriate based on results above COs. RA COCs are Pu-238, Th-232, and isolated instances of benzo(a)pyrene.

The **Work Plan** for Contingent Removal Actions[2], supplemented by the Unique Work Package, includes procedures, instructions, and applicable permits and notifications required to safely conduct the work. Erosion and runon/runoff controls will be managed per the SWP3[3].

The RA will consist of excavation of contaminated soil and sediment in areas indicated by sample results above the cleanup objectives and shipping this soil to an approved disposal facility. Post-excavation sampling will be performed within the excavations per a Core Team-approved **Verification Sampling & Analysis Plan (VSAP)**.

Schedule. This Fact Sheet will be in public review for 30 days, ending April 29, 2004. The RA is planned to begin in late summer 2004. As currently planned, removal activities for PRSs 67-70 will not begin until all upgradient contamination has been remediated. However if the removal of upgradient contamination is not completed by the time removal activities begin in PRSs 67-70, additional precautions such as supplemental sediment and silt controls will be put in place on all upgradient projects at the project perimeters to ensure that upgradient contamination does not re-comtaminate these PRSs. Subsequent confirmatory sampling at the appropriate outfalls into the drainage system will occur to ensure cross contamination did not take place. These precautions will be further specified within the Core Team approved Removal Work Plan and Verification Sampling Plan. A summary of the RA & the verification data will be included in the On-Scene Coordinator (OSC) Report. The OSC Report will be placed in the public reading room after the conclusion of the verification sampling and approval by the Core Team.

Expected excavation of approximately 3220 yd^3 (2460 m^3) with possible maximum excavation of 8730 yd^3 (6675 m^3) and verification are expected to cost less than $500,000.

Additional information can be found in the public reading room, or by contacting Danny Punch at 847-8350 extension 301.

1: Action Memorandum/Engineering Evaluation/Cost Analysis, Contingent Removal Action for Contaminated Soil, June 2002, Final
2: Standard Work Package for Contingent Removal Actions, November 2001, Final
3: Storm Water Pollution Prevention Plan

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