300502-0608300003

RSWB

Removal Action

OSC REPORT

Closes PRSs 131-146, 209, 234, 249-254, 327-329, 425, 437-438, 440
Closes slab/soil for Buildings R, SW, 58, 62, 68, B&T Stacks, and B Building structure/slab/soil

July 2006

Final

Department of Energy
Miamisburg Closure Project

CH2MHILL

RSWB OSC Report Final
9:44 AM

300502-0608300003

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

CH2MHILL

SMO-472/06
August 3, 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 #36 Building Data Package; Section C.2.1.1 Facility Demolition; RSWB OSC Report, Final

Dear Mr. Pfister:

Attached is the following Final document for your records.

- RSWB 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
S. Brindle, CH2M Hill, w/o attachments
file, CH2M Hill, w/o attachments

Bldg 58 & Bldg+slabs of B, R, SW, 68, 62, B & T Stacks

PRSs 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143 (EG-1 tank), 144, 145, 146, 209, 234 (EG-6 tank), 249, 250, 251, 252, 253, 254, 327, 328, & 329.

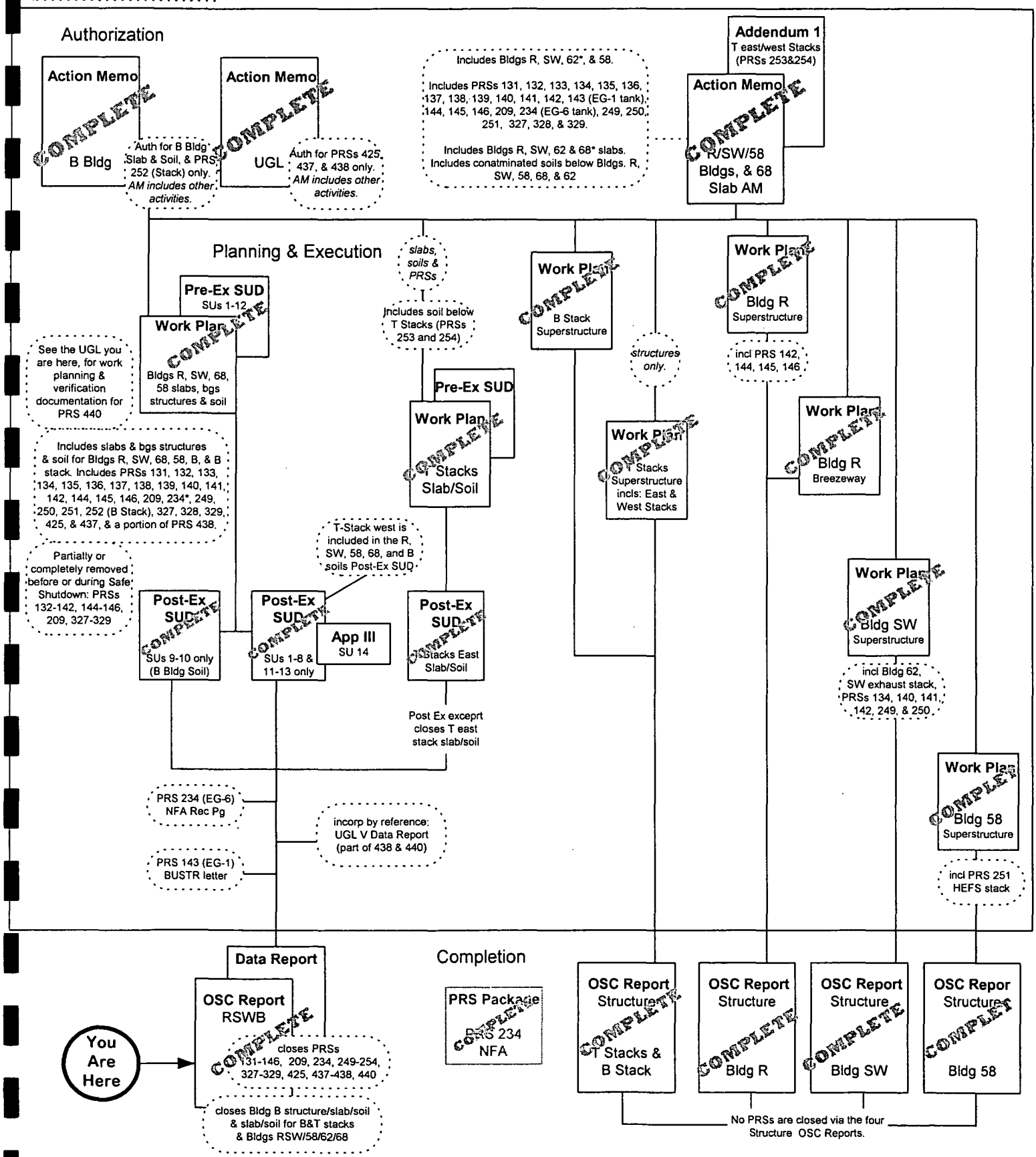
Includes work planning & verification of parts of PRS 425, 437, & 438

Bldg 68 was demolished via E Bldg Action Memo (final, April 2000).

Bldg 62 is considered part of Bldg SW.

PRS 234 (EG-6 tank) is listed in R/SW AM, but was previously NFA on 8/23/96; the remaining soil in the vicinity will be verified via the SUD.

Some PRSs are listed in multiple work plans because the work was performed in phases.



13july06 kma

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Attachment A	Data Report
Attachment B	General Media Information
Attachment C	Post-Ex SUD Excerpts
Attachment D	Backfill Packages
Attachment E	BUSTR Letter & PRS 234 Recommendation Page

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
MCL	maximum contaminant level
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
ROD	Record of Decision
SUD	Survey Unit Design
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
VSAP	Verification Sampling and Analysis Plan

RECOMMENDATION: RSWB

Closes PRSs 131-146, 209, 234, 249-254, 327-329, 425, 437-438, 440
Closes slab/soil for Buildings R, SW, 58, 62, 68, B&T Stacks, and B Building structure/slab/soil

The RSWB Removal Action (RA) was authorized via the R/SW/58 Buildings and 68 Slab Action Memo, (Action Memorandum EE/CA) and the B Building Action Memo, Final, March 2002. The RSWB RA was performed as a result of historical knowledge and processes, and radiological surveys which showed elevated levels of multiple isotopes. All below grade structures were removed prior to verification.

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 56,287 cubic yards of soil/debris below grade (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.

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). 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.

The CO for tritium in soil is 75,800 pCi/g. A conservative model was developed to account for the potential for tritium in soil to "leach" to groundwater. The resulting value of 75 pCi/g is comparable to a screening level that represents the activity of tritium in soil that, if transported via groundwater to the Buried Valley Aquifer (BVA), could result in a maximum contaminant level (MCL) exceedance. If the 95% UCL is greater than 75 pCi/g, further evaluation is needed.

Verification sampling documents that the soil and hard surfaces cleanup criteria were met. The 95% UCL for tritium is greater than 75 pCi/g. The Core Team agrees that tritium will be further evaluated during the seep monitoring that will be required in the Parcel 6, 7, & 8 Record of Decision (ROD).

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

Paul Lucas 7/19/06

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

Timothy J. Fischer 7/20/06

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

Kathy Lee Fox for Brian K. Nickel 7/19-06

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. This OSC Report closes the slab/soil for Buildings R, SW, 58, 62, 68, B&T Stacks, and B Building structure/slab/soil. Potential Release Sites (PRSs) closed via this OSC Report are identified in Table 1 below. These PRSs and building structure/slab/soils identified above are collectively referred to as "RSWB". The structures associated with the PRSs were removed. The previous recommendation page (No Further Assessment) for PRS 234 (see page E2/2) is included herein for completeness.

Table 1: PRSs Closed via this OSC Report

PRS	Description
131	SW Building Soils
132	Area 15 Entombed SW Cave (Room SW-1A)
133	SW Building Room 1B
134	Building SW Drum Storage (Staging) Area
135	Room SW-8, Beta Wastewater Tank (Tank 20)
136	Room SW-125, Beta Wastewater Tank 21
137	Room SW-143, Beta Wastewater Tank 22
138	Room SW 137 Alpha Wastewater Sump (Tank 23)
139	Room SW-10, Beta Wastewater Sump (Tank 226)
140	Beta Waste Solidification Facility, SW
141	Tritium Effluent Recovery System (ERS)
142	SW/R Building Solid Radioactive Waste Compactor
143	R/SW/T Building Stack Diesel Fuel Storage Tank 117 [assoc. with EG-1]
144	R Building Sanitary Waste Collection Tank
145	Room R-128 Alpha Wastewater Tank
146	R Building Rooms 121, 144, 146, & 148 Entombed Drains
209	Building 62 Stack Deluge Tank
234	Building 58 Diesel Fuel Storage Tank 222 [assoc. with EG-6]
249	SW Building NCPDF Stack
250	SW Building SW1C Stack
251	SW Building HEFS Stack
252	B Building Stack
253	T Building West Stack
254	T Building East Stack
327	R-111 Calorimetry Bath (Tank 255)
328	R-111 Calorimetry Bath (Tank 256)
329	Building 62 Hot Waste Sump (Tank 258)
425	Main Hill Underground Rad Waste Lines
437	Main Hill Underground Rad Waste Lines
438	Main Hill Underground Rad Waste Lines
440	Main Hill Underground Rad Waste Lines

Removal Action. The RSWB Removal Action (RA) was authorized via the R/SW/58 Buildings and 68 Slab Action Memo, (Action Memorandum EE/CA) and the B Building Action Memo, Final, March 2002. The level of soil radiological contamination present warranted a RA under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act). All below grade structures were removed prior to verification.

The location of the RSWB Area is shown on Figure 1 of Appendix A (page A7/39).

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 from the SUDs are included in Appendix C of Attachment A to this On-Scene Coordinator (OSC) Report.

T East Stack (PRS 254) did not require verification based on data provided in the Post-Ex SUD excerpt (page C71/82). Prior to demolition of T East Stack, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that all debris met the surface release criteria. In-process demolition surveys and, later RASS soil samples for T East Stack revealed no contamination exceeding cleanup objectives (page C79/82). No soil remediation was indicated or performed around the T East Stack. Therefore, no COCs have been identified for T East Stack and verification sampling was not required.

PRS 143 is the underground storage tank (UST) associated with Emergency Generator 1 (EG-1). The UST was closed per BUSTR guidance. The State Fire Marshal approval letter of the UST removal is provided on page E1/2. PRS 234 (UST associated with EG-6) was previously binned by the Core Team as requiring No Further Assessment (see page E2/2).

Since the Department of Energy (DOE) is the sole responsible party for verification of RSWB, 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 2 lists the parties responding to the removal actions, and their responsibilities.

Table 2: 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 3 and 4.

Table 3: Materials and Disposition

Type of Material	Quantity (cy)	Disposal Method	Disposal Location
Contaminated soil/debris below grade	56,287	Rail transport	Envirocare of Utah

Table 4: Removal Cost

Cost Category	Cost
Planning/Fieldwork/ Restoration/grading/seeding	$3,165,776
Subcontractors (Verification Sampling, Analyses, & Data Validation)	
Closure Documentation	
Transportation/Disposal of Contaminated Soil	$6,473,051
RSWB (below grade) Estimated Total Project Cost	$9,638,827

Cost Category	Cost
Bldgs. R, SW, B, 58, 62, 68, & T Stacks Estimated Demo Project Cost	$12,307,456

Cleanup Objective. Contaminants of Concern (COCs), COs, and hot spot (HS) criteria for RSWB are identified in Table 5. COCs associated with individual areas are identified on page C33/82.

Table 5: Soil Cleanup Objectives (pCi/g)

Analyte	Cleanup Objective	Hot Spot
Actinium-227+D	4.6	13.61
Americium-241	63	189
Beryllium (mg/kg)	22,500	67,500
Bismuth-207	1.2	3.6
Bismuth-210m	8.3	24.9
Cobalt-60	0.7	2.1
Cesium-137+D	3.8	10.62
Lead-210+D	7.4	19.8
Protactinium-231+D	4.0	11.81
Plutonium-238	55	165
Plutonium-239/240	62	181
Radium-226+D	2.9	4.7
Thorium-228+D	2.6	4.8
Thorium-229	18.9	56.7
Thorium-230+D	2.8	4.6
Thorium-232+D	2.1	3.5
Tritium	75,800	227,000
Uranium-233/234	4.82	14.5
Uranium-235+D	3.2	44.8
Uranium-238+D	2.2	4.2
Strontium-90	94.72	282.72

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

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

Pu-238	average < 100 & maximum < 300

Verification sampling results totaled over 19,000 and confirmed all results are below Hot Spot criteria. Two verification results for Th-230 of 2.87 and 3.88 pCi/g exceeded the CO of 2.8 pCi/g. One verification result for U-238 of 2.5 pCi/g exceeded the CO of 2.2 pCi/g. Four verification results for U-233/234 of 6.7, 6.7, 8.3, and 12.6 pCi/g exceeded

the CO of 4.82 pCi/g. Nineteen verification results for Pu-238 ranging from 57.2-162 pCi/g exceeded the CO of 55 pCi/g.

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. Thirty-two verification results (bolded on Table 1, page A12/39) for Bi-214 ranging from 1.18-1.97 pCi/g exceeded the RBGV of 1.17 pCi/g. The Bi-214m is probably in equilibrium with U-238, but is unproven because the detection limits for the U-238 were not sensitive enough. Bi-214 is a daughter product of U-238 and the CO for U-238 accounts for daughter product activity; therefore, these results are not considered significant and are not evaluated further.

While U-238 was not a COC for all areas sampled, results were requested and reported from the offsite gamma spec analyses. Although a U-238 duplicate result (RSW-761D) was 2.4 pCi/g, no action was taken because field duplicate results are not used in the statistical analyses and because of the range of uncertainty for this sample.

All other results are below COs.

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.

Bi-214 is a daughter product in the U-238 decay chain. Since all U-238 results meet the cleanup criteria, the Bi-214 CO exceedances are not considered significant because the CO for the parent nuclides account for daughter product activity. Therefore, no further action will be taken based on the parent nuclide results.

The CO for tritium in soil is 75,800 pCi/g and there are no results above CO. A conservative model was developed to account for the potential for tritium in soil to "leach" to groundwater. The resulting value of 75 pCi/g is comparable to a screening level that represents the activity of tritium in soil that, if transported via groundwater to the Buried Valley Aquifer (BVA), could result in a maximum contaminant level (MCL) exceedance. If the 95% UCL is greater than 75 pCi/g, further evaluation is needed. The Core Team agreed to evaluate tritium verification data as one statistical unit. The 95% UCL for tritium (see page A15/39) is greater than 75 pCi/g. The Core Team agreed that additional removal was not practical due to encountering hard surfaces and tritium will

be further evaluated during the seep monitoring that will be required in the Parcel 6, 7, & 8 Record of Decision (ROD).

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

Hot Spot Criteria. The Hot Spot criteria for the COCs are presented in Table 5 above. There were no sample results that exceeded the hot spot criteria for any analyte.

1.4 Chronological Narrative of the Removal Action

Table 6 presents a chronological narrative of events surrounding the RA.

Table 6: Chronology of RA

Timeframe	Activity
June 2003	R/SW/58 Buildings and 68 Slab Action Memo finalized
March 2002	B Building AM finalized
November 2004 - March 2006	Work Plans approved
February 2006	R Building OSC Report finalized
February 2006	SW Building OSC Report finalized
February 2006	Building 58 Structure OSC Report finalized
December 2004 – June 2006	RA fieldwork and excavation
December 2005 - May 2006	Verification sampling & analysis
July 2006	OSC Report prepared

2.0 EFFECTIVENESS OF THE REMOVAL ACTIONS

The RSWB removal action is complete, and the objectives of the Action Memoranda have been met. The limits of verification are identified on Figure 2 (see page A8/39). Results of verification sampling and analysis are provided in Attachment A.

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 Memoranda.

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.
- SK Construction (Middletown, OH) – provided backfilling 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

DATA REPORT

RSWB (SUs 1-14)

July 2006

Rev. 0

Department of Energy
Miamisburg Closure Project

CH2MHILL

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Figure 2: PRSs, SUs and Bldgs.

Figure 3: RSWB Sample Locations

Figure 4: Tritium Posting Plot

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Table 1: Verification Results

Table 2: SUs and COCs

Table 3: SU5 Bias Metals results

Table 4: Tritium 95 % UCL Calculations

Appendices

Appendix A Figures

Appendix B Tables

Appendix C Data Review & Validation

Acronyms

BUSTR	Bureau of Underground Storage Tank Regulations
COC	contaminant of concern
EG	emergency generator
Ex	Excavation
mg/kg	milligram per kilogram
pCi/g	picoCuries per gram
PRS	Potential Release Site
QC	quality control
RA	removal action
RASS	Remedial Action Survey Support
R&V	review and validation
SU	Survey Unit
SUD	Survey Unit Design
UCL	upper confidence limit
VSAP	Verification Sampling and Analysis Plan

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 Designs (SUDs); required to close out Survey Units 1 through 14 (SUs 1-14) of the RSWB removal action (RA). The RSWB area is shown on Figure 1. The locations of SUs 1-14 (and associated Potential Release Sites [PRSs] and buildings) are shown on Figure 2.

The purposes of this Data Report are to:

- document any variances to the VSAP/Post-Ex SUDs,
- 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

Unless otherwise specified as a variance, sampling and analyses were conducted in accordance with the VSAP and Post-Ex SUDs. Applicable excerpts of the Post-Ex SUDs are presented in Attachment C to the RSWB On-Scene Coordinator (OSC) Report.

3.0 FIELD ACTIVITIES

Verification sampling activities occurred between December 2005 and May 2006. The investigation was conducted in accordance with the VSAP.

Soil verification results are presented in Table 1 and results above cleanup objective (CO) are bolded. A breakdown of Contaminants of Concern (COCs) by SU is shown on Table 2. Verification and Remedial Action Support Survey (RASS) sample locations, hard surface locations, CO exceedances, and results of walkover surveys are identified on Figure 3.

Per the Post-Ex SUD, one bias location in SU5 (RSW-778) was analyzed for total metals with results reported in Table 3. This location was subsequently excavated to a hard surface but the results document that metals were not present above COs.

Statistical analyses (except for tritium) are presented in the Backfill Packages (presented in Attachment D to the RSWB OSC Report) to document that the results above cleanup objective and below hot spot criteria were acceptable. A posting plot for tritium is provided as Figure 4 and the associated 95% upper confidence limit (UCL) calculation is shown on Table 4. Results of sampling at hard surface locations are presented in Attachment D.

Removal of the emergency generator underground storage tank (EG-1 UST) was based on Bureau of Underground Storage Tank Regulations (BUSTR) guidance. The State Fire Marshal approval letter requiring no further action is included in Attachment E to the RSWB OSC Report.

4.0 DATA REVIEW / VALIDATION

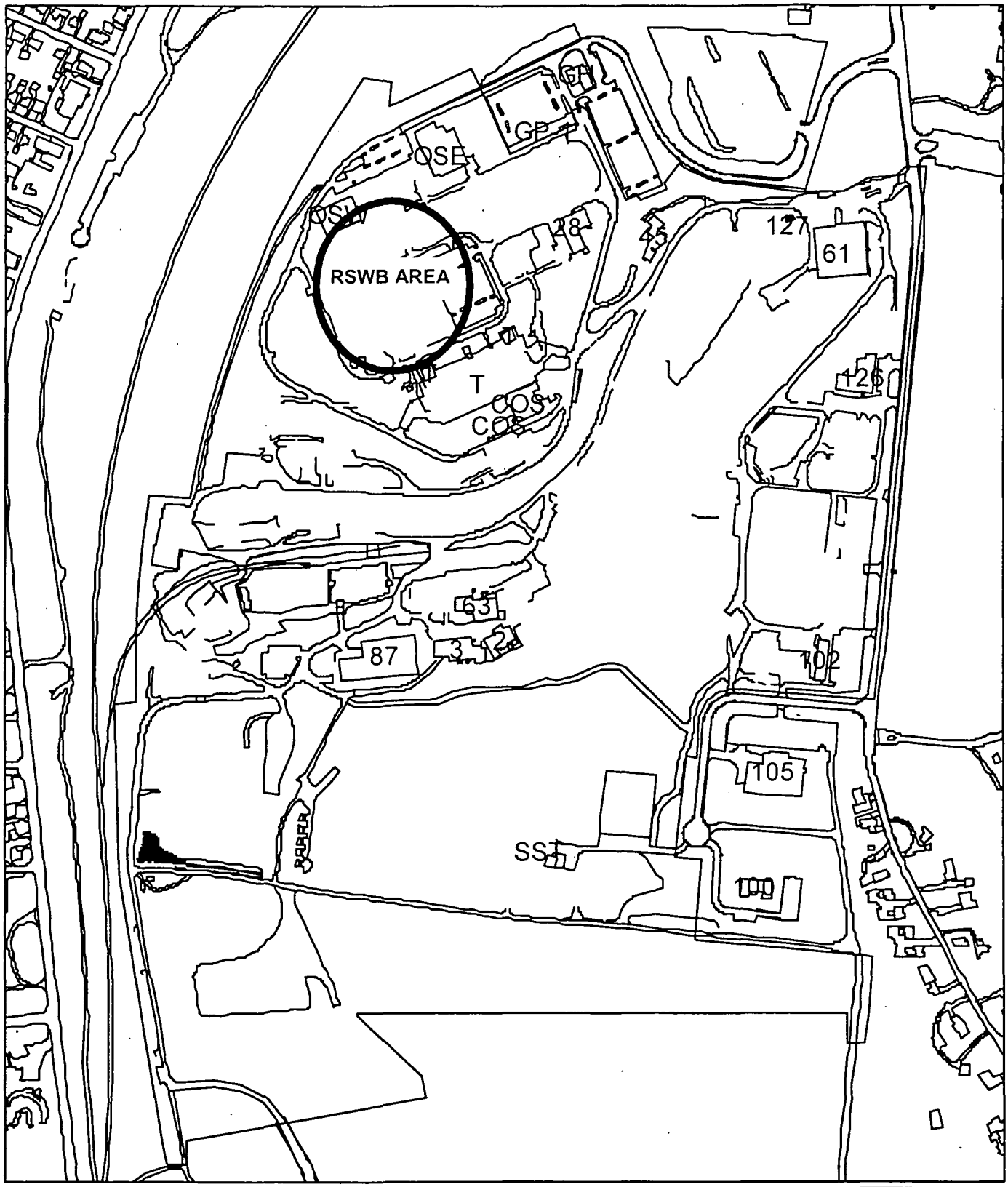
All data were reviewed and 10% of offsite data were validated.

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 C. Review and validation supports that the data are usable.

APPENDIX A

FIGURES



Scale in feet

0 200400 600 8001000

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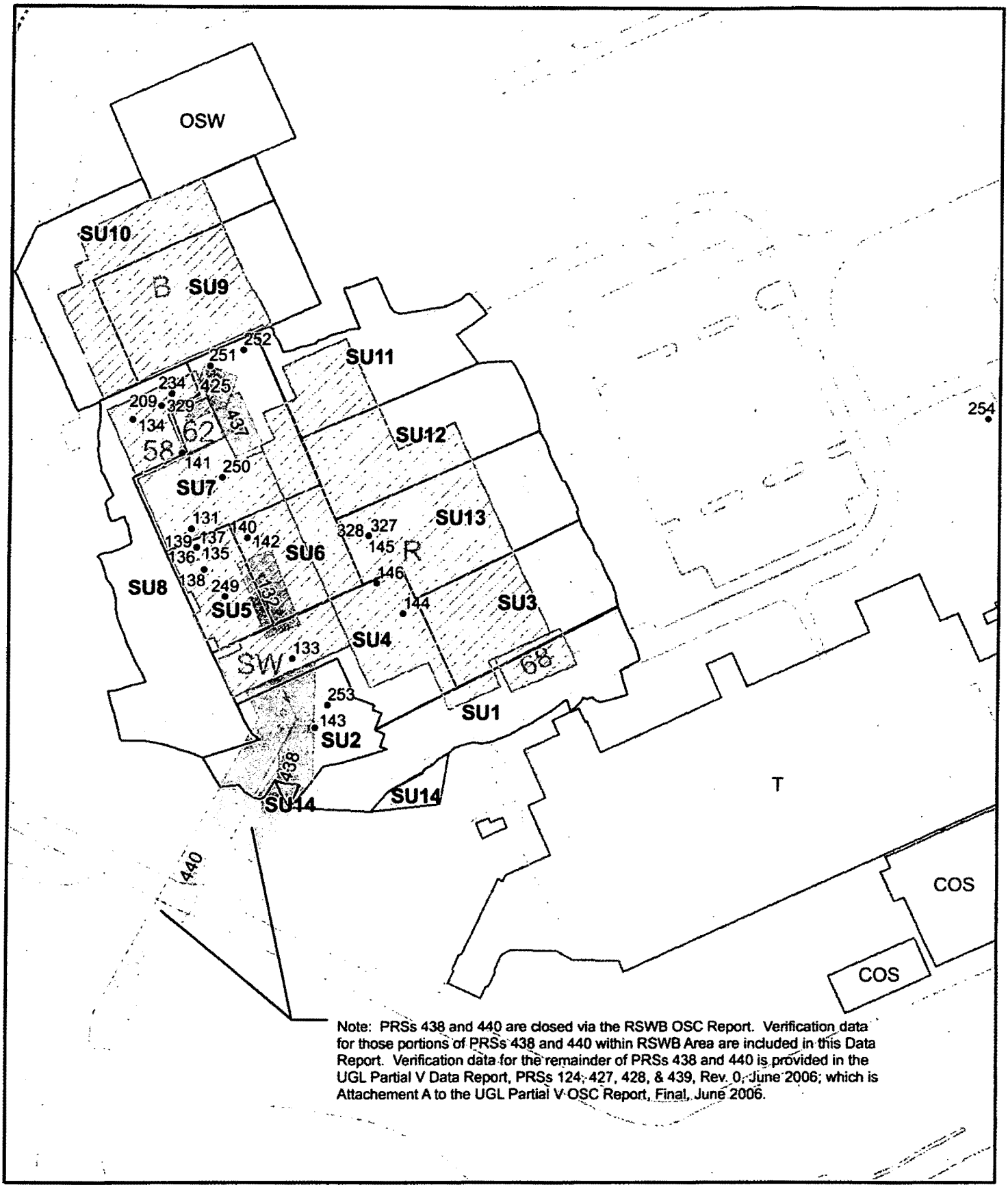
Figure 1:
Location of RSWB Area

A7/39



Site Boundary
Paved Drives & Parking
Building
Historic Building
Limits of RSWB Verification
PRS Area
PRS Point

50 0 50 100 150
Feet

MOUND
Environmental Restoration Geographic Information System

Figure 2
PRSs, SUs and Bldgs

A8/39

DATE: 06/27/06 | BY: SSP | APPROVED:
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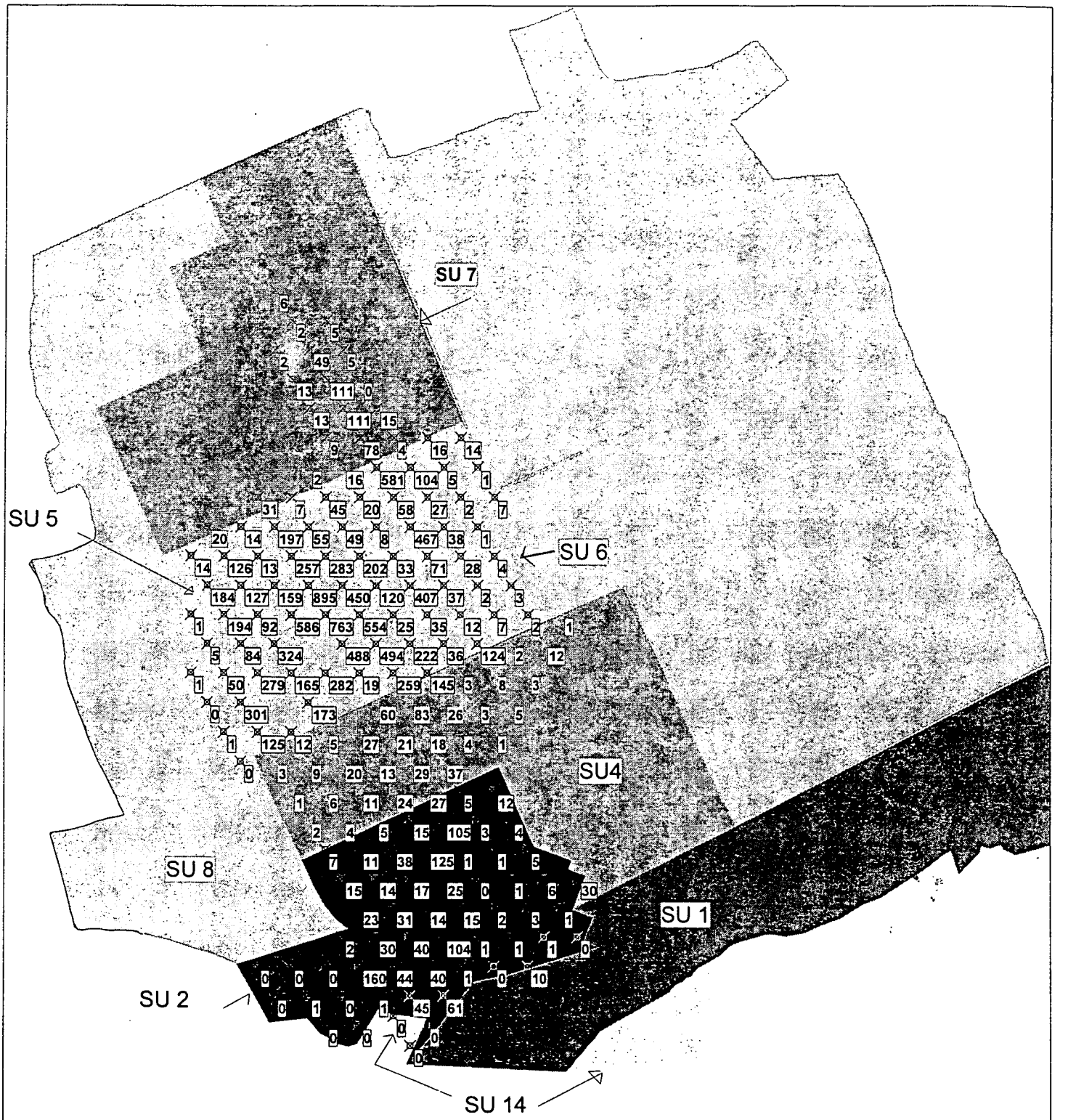

Tritium Posting Plot

Tritium results rounded to the nearest whole number (pCi/g) for legiblity

Figure 4: Tritium Posting Plot

(detailed results in Table 1)

0 10 20 30 40 50 ft

A10/39

APPENDIX B

TABLES

CD for Table 1

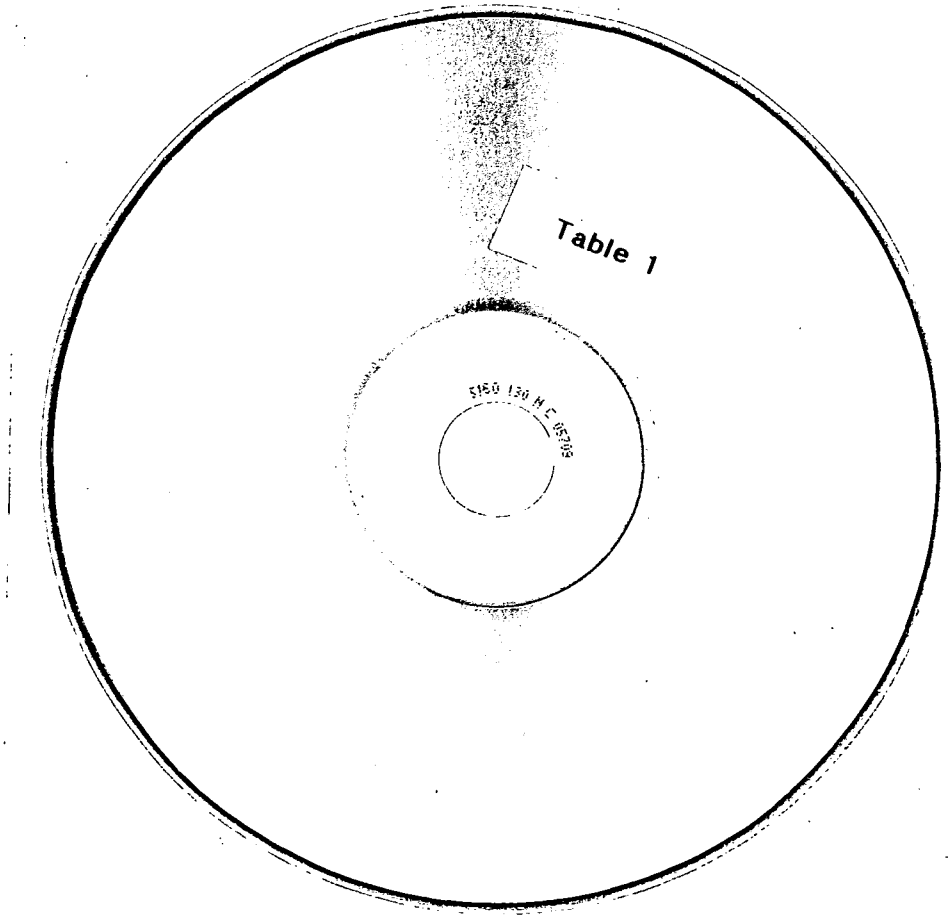

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Table 2: SUs and COCs

SU	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ac-227	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Am-241	X	X	X	X	X	X	X	X			X	X	X	X
Bi-207	X	X	X	X	X	X	X	X			X	X	X	X
Bi-210m	X	X	X	X	X	X	X	X			X	X	X	X
Co-60	X	X	X	X	X	X	X	X			X	X	X	X
Cs-137	X	X	X	X	X	X	X	X			X	X	X	X
Pa-231	X	X	X	X	X	X	X	X			X	X	X	X
Pb-210	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pu-238	X	X	X	X	X	X	X	X			X	X	X	X
Pu-239/240	X	X	X	X	X	X	X	X			X	X	X	X
Ra-226	X	X	X	X	X	X	X	X			X	X	X	X
Th-228	X	X	X	X	X	X	X	X			X	X	X	X
Th-230	X	X	X	X	X	X	X	X			X	X	X	X
Th-232	X	X	X	X	X	X	X	X			X	X	X	X
Tritium		X			X	X								
Th-229					X									
U-233/234					X									
U-235					X									
U-238					X									
Sr-90						X								
Beryllium									X	X				

Table 3: SU5 Bias Metals Results (mg/kg)

Location	Date	Analyte	CO	HI	Result	DL	Lab Qual
RSW-778A	6/14/06	Mercury		63.9	0.036	0.036	U
RSW-778A	6/14/06	Aluminum		213000.0	7110	217	NE
RSW-778A	6/14/06	Antimony		85.2	1.1	1.1	UN
RSW-778A	6/14/06	Arsenic	28.50	63.9	2	1.1	
RSW-778A	6/14/06	Barium		14900.0	11.9	5.4	
RSW-778A	6/14/06	Beryllium	22500.00	421.0	0.41	0.54	B
RSW-778A	6/14/06	Cadmium	30000.00	213.0	0.54	0.54	UN
RSW-778A	6/14/06	Calcium	(note 1)		217000	1360	NE
RSW-778A	6/14/06	Chromium		319000.0	7.4	1.1	
RSW-778A	6/14/06	Cobalt		12800.0	5	5.4	B
RSW-778A	6/14/06	Copper		8520.0	7	2.7	
RSW-778A	6/14/06	Iron	(note 1)		16900	109	NE
RSW-778A	6/14/06	Lead	(note 2)		5.8	1.1	
RSW-778A	6/14/06	Magnesium	(note 1)		16000	109	NE
RSW-778A	6/14/06	Manganese		22800.0	423	1.1	NE
RSW-778A	6/14/06	Nickel	112000.00	4260.0	10.7	4.4	
RSW-778A	6/14/06	Potassium	(note 1)		1590	5430	BN
RSW-778A	6/14/06	Selenium		1060.0	1.6	1.6	U
RSW-778A	6/14/06	Silver		1060.0	1.1	1.1	UN
RSW-778A	6/14/06	Sodium	(note 1)		181	109	
RSW-778A	6/14/06	Thallium		17.0	2.2	2.2	U
RSW-778A	6/14/06	Vanadium		1490.0	7.5	5.4	
RSW-778A	6/14/06	Zinc		63900.0	26.7	5.4	N

E: estimated due to interference
N: spiked sample recovery outside of control limits
U: not detected
B: less than contract required reporting limit but equal to or greater than instrument detection limit
DL: detection limit
CO: cleanup objective
HI: hazard Index (HI=1) values
note 1: essential human nutients
note 2: result is below the residential setting value of 400 mg/kg

note: this sample location was subsequently excavated to a hard surface.

Data File | Variable: 0.32

Raw Statistics	
Number of Valid Samples	196
Number of Unique Samples	181
Minimum	0.005
Maximum	895
Mean	72.38597
Median	14.65
Standard Deviation	138.7716
Variance	19257.56
Coefficient of Variation	1.917107
Skewness	3.156705

Gamma Statistics	
k hat	0.37467
k star (bias corrected)	0.372336
Theta hat	193.1995
Theta star	194.4102
nu hat	146.8705
nu star	145.9558
Approx.Chi Square Value (.05)	119.0295
Adjusted Level of Significance	0.048776
Adjusted Chi Square Value	118.8509

Log-transformed Statistics	
Minimum of log data	-5.29832
Maximum of log data	6.796824
Mean of log data	2.507025
Standard Deviation of log data	2.290939
Variance of log data	5.248403

RECOMMENDATION
Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.30098
Lilliefors 5% Critical Value	0.063286
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	88.76801

Gamma Distribution Test	
A-D Test Statistic	2.744231
A-D 5% Critical Value	0.85108
K-S Test Statistic	0.101848
K-S 5% Critical Value	0.069562
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	88.76076
Adjusted Gamma UCL	88.89418

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.067738
Lilliefors 5% Critical Value	0.063286
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	299.8658
95% Chebyshev (MVUE) UCL	365.9627
97.5% Chebyshev (MVUE) UCL	454.4418
99% Chebyshev (MVUE) UCL	628.2418

95% Non-parametric UCLs	
CLT UCL	88.69018
Adj-CLT UCL (Adjusted for skewness)	91.07832
Mod-t UCL (Adjusted for skewness)	89.14051
Jackknife UCL	88.76801
Standard Bootstrap UCL	88.80583
Bootstrap-t UCL	91.12431
Hall's Bootstrap UCL	91.23599
Percentile Bootstrap UCL	89.69765
BCA Bootstrap UCL	92.18546
95% Chebyshev (Mean, Sd) UCL	115.5925
97.5% Chebyshev (Mean, Sd) UCL	134.288
99% Chebyshev (Mean, Sd) UCL	171.0117

95% UCL < CO of 75,800 pCi/g >>> PASS
95% UCL > screening level of 75 pCi/g >>> FAIL

Table 4: Tritium 95% UCL Calculation

APPENDIX C

DATA REVIEW & VALIDATION

Review & Validation (R&V) Report

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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 R/SW/58/68/B soil verification samples. The work was generally performed in compliance with the Statement of Work (SOW) issued April 27, 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**
E07	Serial dilution criteria were not met.
F01	Sample data were qualified as a result of the method blank.
F07	Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL (contract required detection limit)
G02	Surrogate/radiological chemical recovery was below the lower control limit.
H02	MS/MSD (matrix spike/matrix spike duplicate) recovery was below the lower control limit.
H04	MS/MSD pairs exceed the RPD (relative percent difference) limit.
J01	Duplicate RPD/radiological duplicate error ratio (DER) was outside the control limit.
N02	MDLs (method detection limits) reported by the laboratory exceeded corresponding CRQLs.
T04	Professional judgment was used to qualify the data.
T05	Analytical result is less than the associated MDA(minimum detectable activity), but greater than the counting uncertainty.
T06	Analytical result is less than both the associated counting uncertainty and MDA.
T07	Negative analytical result where the absolute value exceeds 2X the associated MDA.
T15	Activity may be biased low due to lack of ingrowth.

This sampling effort is discussed in nine sections: field quality assurance (QA) frequency, gamma spectroscopy, isotopic plutonium, isotopic thorium, isotopic uranium, tritium, strontium-90, gross beta, and total metals. The data validation of each of these is discussed in the following subsections. The validated results immediately follow this R&V (Review and Validation) Report.

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. Thirty-nine (39) field duplicates were collected for eight hundred forty-six (846) regular field samples for a frequency of 4.6%. This approximately 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 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 three pairs, one analyte was compared; for twenty-nine pairs, twenty-one analytes were compared; for two pairs, twenty-two analytes were compared; for two pairs, twenty-three analytes were compared; and for three pairs, twenty-four analytes were compared, making a total of seven hundred seventy-four (774) comparisons. Sixty-four comparisons (8.3%) 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 (MS) and matrix spike duplicates (MSD) are prepared to verify that the sample matrix is not interfering with the accurate and precise determination of target parameters in non-radiological fractions. For each Total Metals batch, an MS and MSD were analyzed. When an MS or MSD percent recovery exceeded the control limits, affected sample results were qualified as estimated J/UJ, H02. Seven (7) Total Metals results were qualified as estimated, J/UJ, H02. When the MS/MSD relative percent difference exceeded the control limits, the affected sample results were qualified as estimated, J, H04. Two Total Metals (2) results were qualified J, H04.

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 eight hundred forty-six (846) 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. No gamma spec sample data were affected by blank contamination.

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 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. The laboratory analyzed one duplicate pair for each analytical run. One hundred twenty (120) results (0.9% of gamma spec results) were qualified as estimated, J/UJ, J01, due to laboratory duplicate exceedances.

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. Four thousand two hundred two (31.0%) 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 and 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 samples have 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 MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Four hundred forty-one (441) records (3.3% of the gamma spec records) had results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Nine hundred thirty-four (934)

records (6.9% 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 MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Eight thousand one hundred eighteen (8118) records (60.0% of the gamma spec records) had results qualified as non-detect, estimated (UJ) with a reason code T06.

Sample results with negative analytical results where the absolute value of the result is greater than twice the MDA were qualified as rejected (R) with a reason code T07. Two (2) records (<0.1% of the gamma spec records) had results qualified as rejected (R) with a reason code T07.

2.3 Isotopic Thorium

The field team submitted eight hundred forty-eight (848) samples for isotopic thorium 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. Seven samples had yields for thorium analysis that exceeded control limits. These seven samples (0.8% of the samples) had the Thorium-228, Thorium-230 and Thorium-232 results qualified as estimated, J/UJ, G02, due to tracer yields exceeding the control limits.

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 SDG had one laboratory blank per analytical run.

Thorium-230 was detected in eight blanks with activity concentrations ranging from 0.027 pCi/g to 0.037 pCi/g. This may indicate that contamination could have been introduced during the laboratory preparation. Those samples where the normalized absolute difference (NAD) between the blank and the sample result is greater than 2.58 are qualified as estimated (J) with a reason code F01. Forty-one samples (4.8% of the samples) had Thorium-230 results qualified as estimated (J) with a reason code F01.

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. Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the MDA. If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. One hundred twenty-three samples (14.5%) had the Thorium-228 results qualified J01 because the associated laboratory duplicate had an RPD greater than 35%. One hundred thirty-one samples (15.5%) had the Thorium-230 results qualified J01 because the associated laboratory duplicate had an RPD greater than 35%. One hundred forty samples (16.5%) had the Thorium-232 results qualified J01 because the associated laboratory duplicate had an RPD greater than 35%.

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 were within control limits and no qualifications to the data were required.

2.3.5 Radionuclide Quantitation

Project Quantitation Limits (PQLs) establish the MDAs required to properly quantify non-detected analytes. One (0.1%) Thorium-228 result was non-detect, but the MDA did not meet the PQL of 0.1 (pCi/g). One (0.1%) Thorium-232 result was 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 were qualified with the reason code N02.

2.3.6 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Thirty-eight samples (4.5% of the samples) had Thorium-228 results qualified as estimated (J) with a reason code T04. Fifteen samples (1.8% of the samples) had Thorium-230 results qualified as estimated (J) with a reason code T04. Thirty-two samples (3.8% of the samples) had a Thorium-232 result qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Two samples (0.2% of the samples) had Thorium-228 results qualified non-detect (U) with a reason code T05. None of the samples had Thorium-230 results qualified non-detect (U) with a reason code T05. One sample (0.1% of the samples) had Thorium-232 results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. One of the samples (0.1% of the samples) had Thorium-228 results qualified as non-detect, estimated (UJ) with a reason code T06. None of the samples had Thorium-230 results qualified as non-detect, estimated (UJ) with a reason code T06. Two samples (0.2% of the samples) had Thorium-232 results qualified as non-detect, estimated (UJ) with a reason code T06.

2.4 Isotopic Plutonium

The field team submitted eight hundred forty-four (844) samples for isotopic plutonium 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 plutonium analysis were within control limits. No qualifications to the usability of the data were 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 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.

2.4.3 Laboratory Duplicates

Laboratory duplicates are used to assess the sample analysis precision. The laboratory duplicate samples were evaluated by calculating the relative percent differences (RPDs). Relative percent differences are considered non-calculable for duplicate pairs where one or both results were not detected or less than 2x the 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. The laboratory analyzed one duplicate pair for each analytical run. One hundred forty-three (143) Plutonium-238 records were qualified as estimated, J/UJ, J01 due to the laboratory duplicate. Eighty-eight (88) Plutonium-239/240 records were qualified as estimated, J/UJ, J01 due to the laboratory duplicate.

2.4.4 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were within control limits and no qualifications to the data were required.

2.4.5 Radionuclide Quantitation

Project Quantitation Limits (PQLs) establish the MDAs required to properly quantify non-detected analytes. Four (0.5%) Plutonium-238 results were non-detect, and the MDA did not meet the PQL of 0.1 (pCi/g). Nine (1.1%) Plutonium-239/240 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.

2.4.6 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Ninety-four samples (11.1% of the samples) had Plutonium-238 results qualified as estimated (J) with a reason code T04. One hundred ninety-seven of the samples (23.3% 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 MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Nine of the samples (1.1% of the samples) had Plutonium-238 results qualified non-detect (U) with a reason code T05. Forty-three samples (5.1% 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 MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Eighty-nine of the samples (10.6% of the samples) had Plutonium-238 results qualified as non-detect, estimated (UJ) with a reason code T06. Four hundred seventy-one samples (55.8% of the samples) had Plutonium-239/240 results qualified as non-detect, estimated (UJ) with a reason code T06.

2.5 Isotopic Uranium

The field team submitted fifty-eight (58) samples for isotopic uranium analysis. The associated quality control result assessments are discussed in the following subsections.

2.5.1 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 were required based on the yield recoveries.

2.5.2 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. One laboratory blank had Uranium-233/234 detected at a level that affected one sample. One Uranium-233/234 result was qualified as estimated, J, F01 due to blank contamination.

2.5.3 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 MDA. If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. All RPDs were within control limits. The sample data did not require qualification for sample analytical precision.

2.5.4 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were within control limits and no qualifications to the data were required.

2.5.5 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. One sample (1.7% of the samples) had Uranium-233/234 results qualified as estimated (J) with a reason code T04. None of the samples had Uranium-238 results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. None of the samples had Uranium-233/234 or Uranium-238 results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. None of the samples had Uranium-233/234 or Uranium-238 results qualified as non-detect, estimated (UJ) with a reason code T06.

2.6 Tritium

The field team submitted two hundred seventeen (217) samples for Tritium analysis. The associated quality control result assessments are discussed in the following subsections.

2.6.1 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 the Tritium analysis were within control limits. No qualifications to the usability of the data were required based on the yield recoveries.

2.6.2 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. All laboratory blanks were non-detect for Tritium. No blank contamination of the samples was detected.

2.6.3 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 MDA. If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. Sixty-four samples (29.5% of the samples) were qualified as estimated, J/UJ, with a reason code J01 due to the laboratory duplicate relative percent difference exceeding the control limit.

2.6.4 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were required.

2.6.5 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. Five samples (2.3% of the samples) had their Tritium results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. Five samples (2.3% of the samples) had their Tritium results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Twelve samples (5.5% of the samples) had their Tritium results qualified as non-detect, estimated (UJ) with a reason code T06.

2.7 Gross Beta

The field team submitted forty-nine (49) samples for Gross Beta analysis. The associated quality control result assessments are discussed in the following subsections.

2.7.1 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 Gross Beta were within control limits. No qualifications to the usability of the data were required based on the yield recoveries.

2.7.2 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. All laboratory blanks were non-detect for Gross Beta. No blank contamination of the samples was detected.

2.7.3 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 MDA. If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. None of the samples required qualification due to the laboratory duplicate.

2.7.4 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were within control limits and no qualifications to the data were required.

2.7.5 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. None of the samples had their Gross Beta results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. None of the samples had their Gross Beta results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. None of the samples had their Gross Beta results qualified as non-detect, estimated (UJ) with a reason code T06.

2.8 Strontium-90

The field team submitted three (3) samples for Strontium-90 analysis. The associated quality control result assessments are discussed in the following subsections.

2.8.1 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 Strontium-90 were within control limits. No qualifications to the usability of the data were required based on the yield recoveries.

2.8.2 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. All laboratory blanks were non-detect for Strontium-90. No blank contamination of the samples was detected.

2.8.3 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 MDA. If one result was greater than 2x the MDA and the other result was detected at less than 2x the MDA, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. None of the samples required qualification due to the laboratory duplicate.

2.8.4 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were required.

2.8.5 Overall Assessment of Data

Sample results that were quantified greater than the MDA with an uncertainty 50% to 100% of the sample result were qualified as estimated (J) with a reason code T04. None of the samples had their Strontium-90 results qualified as estimated (J) with a reason code T04.

Sample results that were quantified less than the MDA, but greater than the uncertainty were qualified non-detect (U) with a reason code T05. None of the samples had their Strontium-90 results qualified non-detect (U) with a reason code T05.

Sample results with analytical results less than both the MDA and uncertainty were qualified as non-detect, estimated (UJ) with a reason code T06. Three samples (100% of the samples) had their tritium results qualified as non-detect, estimated (UJ) with a reason code T06.

2.9 Total Metals

The field team submitted two (2) samples for Total Metals analysis. The associated quality control result assessments are discussed in the following subsections.

2.9.1 Holding Times

Holding times are established to ensure that target parameters do not deteriorate prior to analysis. All samples were analyzed within holding times. No qualification of the data was necessary.

2.9.2 Initial Calibration

The laboratory analyzes an initial calibration verification sample to confirm the accuracy of the calibration line or curve against which sample concentrations are determined. The percent recovery (%R) of the initial calibration verification sample should be between 90% and 110% for each analyte. The RPD was within control limits for all initial calibration verification samples. No qualification of the data was required.

2.9.3 Continuing Calibration

A continuing calibration verification is performed every 10 samples that are analyzed to ensure that the initial calibration curve is still valid for the determination of sample concentration. The percent recovery (%R) is calculated to check the accuracy of the calibration curve used and should be between 90% and 110% to be considered in control. The %R was within control for these analyses. No qualification of the data was required.

2.9.4 Laboratory Blanks

Laboratory blanks are used to verify that laboratory handling and procedures are not cross-contaminating samples with target analytes. Each SDG had one method blank and at least one continuing calibration blank per analytical run.

Arsenic and Beryllium were detected in the method blank at concentrations of 4.3 and 3.3 μg/L, respectively. Selenium and Thallium were detected in the method blank at concentrations of 4.1 and 5.6 μg/L, respectively. This may indicate that contamination could have been introduced during the laboratory preparation. An action level is calculated for each batch by multiplying the detected contamination by five and converting to soil units. Those samples where the sample result is less than the associated action level are qualified as non-detect (U) with a reason code F01. One sample (50.0% of the samples) had the Arsenic, Beryllium, Selenium and Thallium results qualified as non-detect (U) with a reason code F01.

Arsenic and Beryllium were detected in the continuing calibration blank at concentrations of 10.1 and 8.9 μg/L, respectively. This may indicate that contamination could have been introduced during the laboratory analysis. An action level is calculated for each batch by multiplying the detected contamination by five and converting to soil units. Those samples where the sample result is less than the associated action level are qualified as non-detect (U) with a reason code F07. One sample (50.0% of the samples) had the Arsenic and Beryllium results qualified as non-detect (U) with a reason code F07.

2.9.5 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 MDL. If one result was greater than 2x the MDL and the other result was detected at less than 2x the MDL, the RPD was calculated. The laboratory analyzed one duplicate pair for each analytical run. All laboratory duplicates had RPDs within control limits.

2.9.6 Laboratory Control Spike

Laboratory control spikes (LCSs) 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 were within control limits and no qualifications to the data were required.

2.9.7 Serial Dilution

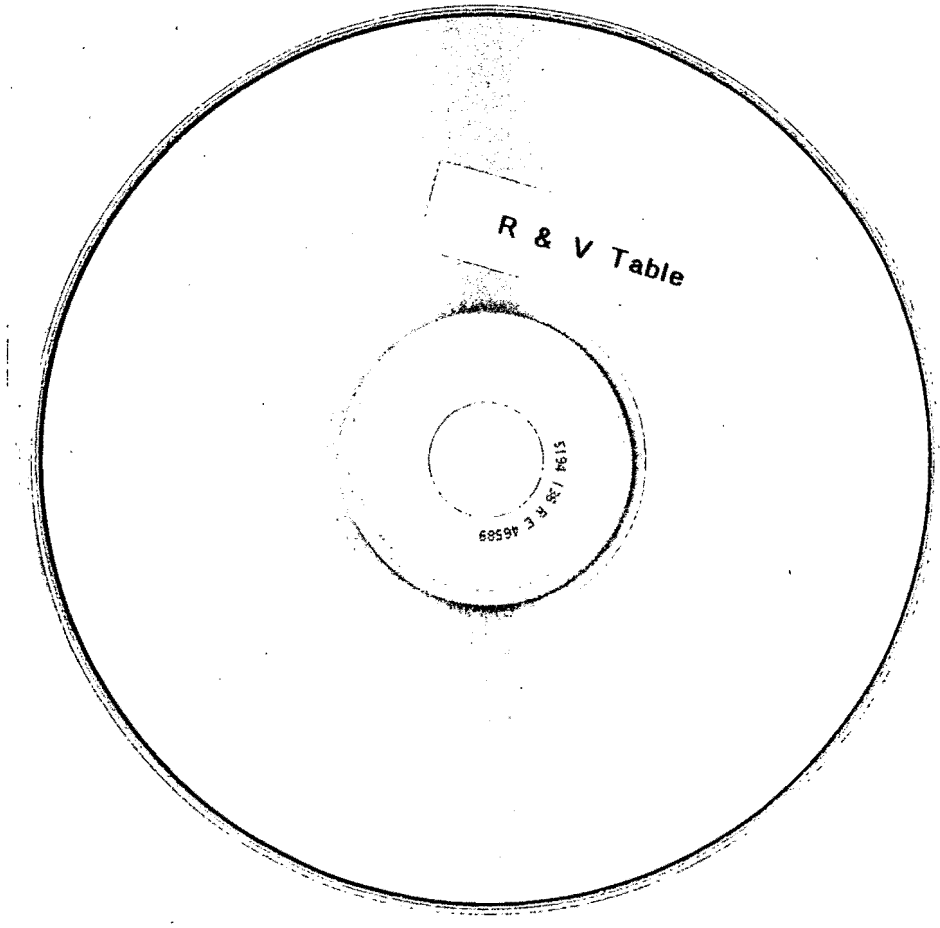
Serial dilutions are analyzed to verify the sample matrix does not contribute variability to the quantitation of total metals samples. A serial dilution is prepared by diluting a field sample by a factor of five and comparing the expected value to the analyzed value. A percent recovery within control limits demonstrates that the sample matrix does not interfere with the quantitation. Both samples had serial dilutions with percent recoveries that exceeded the control limits. Both samples had all results qualified as estimated, J/UJ, with a reason code E07.

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.

CD for R & V Table



A39/39

ATTACHMENT B

GENERAL MEDIA INFORMATION

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

ATTACHMENT C

POST-EX SUD EXCERPTS

- RSWB SUs 1-8 & 11-14
- RSWB SUs 9 & 10
- T East and T West Stack Soil

Survey Unit Design (SUD) FINAL

Project: **R, SW, 58, 68, and B Soils**

Review & Approval

Project Engineer: Bob Ransbottom _____ for

Reviewer: Jim Fontaine Connie Kline for J. Fontaine

Reviewer: _____

document	Title
AM	R, SW, 58, and 68 Slab Removal Action
AM	B Building Removal Action
WP	Demolition of Building B/R/SW/68/58 Slabs/Below Grade Structures
VSAP	Standard Verification Sampling & Analysis Plan, Final, August 2004

Pre-Excavation or X **Post-Excavation?** **Survey Units 1-8 and 11-14 only**

Summary of Changes (for Post-Excavation SUDs ONLY) (see following pages for details)	YES	NO	Comment
1. Did the COC(s) change?	X		Revised COCs; see Item 3a
2. Did the grid size or N change?	X		SUs sizes & numbers changed, so N changed
3. Did the classification change?		X	
4. Were bias/judgmental samples collected?	X		1 Total Metals
5. Other significant change?	X		Expanded SUs

c/82

SUD Worksheet

Item 1	Summary of historic **information** relevant to SU: The Removal Action associated with this SUD addressed identified contamination areas with contaminants of concern (COCs) **above the cleanup objective (CO)**. R and SW were used for various radiological processes through the years. The R, SW, 58, and 68 slab Action Memorandum COCs include Actinium-227, Americium-241, Bismuth-207, Cesium-137, Lead-210, Proactinium-231, Plutonium-238, Plutonium-239/240, Radium-226, Strontium-90, Thorium-228, Thorium-230, Thorium-232, Tritium, Uranium-233, Uranium-234, and Uranium-238. Isotopes associated with polonium processing also include Bi-210m and Co-60. Th-229 was associated with U-233 processing. Curium-244 has been found during recent R Building drain sampling. B Building was used for Actinium and Polonium radioisotopic research on animals. The B Building Action Memorandum COCs include Actinium-227, Lead-210, Tritium, and Beryllium. The tritium is due to B Building's proximity to R/SW and the Beryllium is due to processes in the building. Isotopes associated with polonium processing also include Bi-207, Bi-210m and Co-60. In addition, a solvent shed was associated with B Building, so organic COCs include Trichloroethene, 1,2 trans-Dichloroethene, and 1,2 cis-Dichloroethene.
	Changes if any, from Pre-ex SUD Metals were included in the Pre-Ex SUD due to a suspected drain line break under SW 137, which could have been a source of some metals such as mercury, chromium, lead, etc. With this information in mind, a bias sample will be taken under the former location of room 137 where there was a suspected drain line break. The sample will undergo analysis for the following metals: Mercury, Cadmium, Chromium, Lead, Silver, Copper and Zinc.
Item 2	Summary of historic **data** relevant to SU: See Appendix A

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)	Tritium (A-014)	Strontium-90 (A-016)	Metals & Mercury (A-031)	VOCs (A-001)	Explosives (A-010)

Analyses of COCs in surface soil are to be performed per Mound Methods Compendium as applicable. Compendium Method A-012 is Isotopic Uranium, Isotopic Plutonium, and Isotopic Thorium by Alpha Spectrometry. Cm-244 analysis is performed using the method found in Appendix G. Compendium Method A-015 is Gamma Spectrometry. A-014 is analysis by liquid scintillation for Tritium and A-016 is analysis for Strontium-90. Note that alpha spec data will supercede gamma spec data for isotopes where the former is more sensitive (e.g., Th-230, Pu-238). Analysis for Volatile Organic Compounds (VOCs) is by Operation A-002, for Explosives is A-001, for TPH is A-023, and for metals is A-031. (See Appendix D for the Target Analyte Lists for A-001, A-010, A-023, and A-031).
Surface samples/analysis are to be in accordance with MD-80036 OP 30005, 30007, 30040 for the FIDLER and 90022 for the AXISS. (Note: FIDLER G5 and Axiss instruments are both to be used for walkover surveys. See table in Appendix F for reference.)

C2/82

Changes if any, from Pre-ex SUD:

See Table 1 in Attachment III for changes to the COC list. Changes are associated with the change described in Item 5 change section.

Item 3b

Chem basis for std dev, AM COCs/New COCs NA, See Item 2

Changes, if any, from Pre-Ex SUD:

No changes

Item 4

Classify Areas & provide justification

The 181,447 sq. ft area covered in this SUD includes the footprints of R, SW, B, and 68 Buildings, as well as part of the Hot Waste Drain system and the loadout areas and roadways around the buildings. The H Building area is excluded since it was previously verified to be clean and is not being used as a loadout or storage area for the R/SW/B demolition. All of the above buildings housed various processes that were radiological or chemical in nature. As a result, all SUs are Class 1 due to the known presence of radiological contamination in the buildings above the areas, known contamination in pipe lines below the buildings, and possible cross-contamination from the demolition and load-out of debris.

Selection	Class	Scan Coverage guidelines
SU s 1 -12	1	100%
N/A	2	
N/A	3	

Changes if any, from Pre-ex SUD:

This Post-Ex SUD only applies to Survey Units 1-8 and 11-14. Post-Ex SUD for SU 9 & 10 was previously approved.

C3/82

Item 5	Subdivide areas into SUs See Appendix A for Data See Appendix B for SUs	The area is divided into 12 Survey Units (SUs). The SUs were first situated according to the processes that occurred in each area, but were limited in size to less than the 17,500 sq. ft. threshold. SU 1 is 12,347 sq. ft. and is located to the west and south of SW Building and includes the roadway as well as PRS 143, R/SW/T Bldg. Stack Diesel Fuel Storage Tank (EG-1) and PRS 253 T West Stack. A portion of the SW underground exhaust duct to T West stack lies in the SU. The EG-1 diesel tank was removed under the BUSTR program. Resulting soil sample analysis results will be presented along with the data report for this SUD. The T West stack foundation will be removed under a separate work plan and SUD. SU 2 is 14,978 sq. ft. and covers the western portion of R Building and the eastern portion of SW Building and includes SW-8, SW-13, and R-108 as well as PRSs 133, 135, 139, 142, 144, 327, and 328. SU 2 also includes a portion of the PRS 131 red and yellow drain system. The PRS 437 Hot Waste line runs through this SU but is broken out under SU 12. SU 3 is 13,807 sq. ft., covers the western portion of SW and includes the PRS 132 Old and New Cave areas , the SW-20 complex, as well as PRSs 136, 137, 138, 249, and 250. A portion of the SW underground exhaust duct to T West stack lies in the SU. As with SU 2, a portion of the PRS 437 Hot Waste line runs through this SU, but is excluded. SU 4 is 18,103 sq. ft., covers the middle portion of R Building and includes the majority of the PRS 131 red and yellow drain system as well as PRSs 145 and 146. This area slightly exceeds the 17,500 sq. ft. threshold, but it is totally surrounded by other SUs and includes a clearly definable potion of R Building. SU 5 is 16,784 sq. ft. and includes the northeast portion of R Building and the associated loadout area. SU 6 is 17,247 sq. ft. and includes the southeast portion of R Building and the associated loadout area as well as the Building 68 pad. SU 7 is 15,289 sq. ft., covers the southern portion of R Building and includes the R Building underground exhaust duct to T West stack. SU 8 is 11,316 sq. ft. and covers the area under and adjacent to Building 58. It includes Rooms SW-149/149A as well as PRSs 134, 140, 141, 209, 234, 251, and 329. As with SUs 2 and 3, a portion of the PRS 437 Hot Waste line and the PRS 425 portion of the Hot Waste line run through this SU, but are excluded. SU 9 is 17,541 sq. ft., covers the additions to B Building and the adjacent areas. SU 10 is 16,969 sq. ft., covers the original portion of B Building and adjacent areas. SU 11 is 16,752 sq. ft., covers the northern portion of R Building, the courtyard between R, SW, and B Buildings and includes PRS 252, B Building Stack. As with SUs 2 and 3, a portion of the PRS 437 Hot Waste line as well as PRS 425, runs through this SU, but are excluded. SU 12 is 10,313 sq. ft, including sidewalls. It was established to follow the Hot Waste Line, including PRSs 425, 437 and a portion of 438, through SW Building. In order to layout the required trench wall surveys, this SU was split out separately from the surrounding SUs and laid open.

C4/82

Item 5 Cont	**Changes from Pre-Ex SUD:** SUs were laid out fairly uniformly over the R/SW footprint, with SU5 positioned over historic tritium, Th-229, U 233/234, U235, and U238 areas and SU6 over tritium and Sr-90 areas (based upon historical information). The COCs associated with this layout were adjusted accordingly with the aforementioned for the Post-Excavation SUD. Areas are as listed below. SU13 was added due to the excavation extending to the South more than originally expected and the SU size constraints specified by MARSSIM. Refer to Attachment II. SU14 was added and SU1, SU2, and SU4 were reconfigured due to logistical issues, laboratory issues, and a power substation removal. Refer to Attachment III for further explanation. SU1 – 16,579 sq. ft. SU2 – 10,440 sq. ft. SU3 – 13,647 sq. ft. SU4 – 14,606 sq. ft. SU5 – 5,740 sq. ft. SU6 – 8,260 sq. ft. SU7 – 16,617 sq. ft. SU8 – 21,419 sq. ft. SU11 – 13,689 sq. ft. SU12 – 15,085 sq. ft. SU13 – 16,544 sq. ft. SU14 – 1,705 sq. ft.

28/50

Item 6a	Calculations / Rad

1. Calculate the (s) for each COC listed above: See Appendix B.

2. Number of Samples (N): See Appendix B.

Spreadsheet Calculated = 9 samples based upon the data for each of SU 1 through 12.

SU1 Scanning MDC (Area Factor) corrected = 382 samples

SU2 Scanning MDC (Area Factor) corrected = 464 samples

SU3 Scanning MDC (Area Factor) corrected = 428 samples

SU4 Scanning MDC (Area Factor) corrected = 561 samples

SU5 Scanning MDC (Area Factor) corrected = 520 samples

SU6 Scanning MDC (Area Factor) corrected = 534 samples

SU7 Scanning MDC (Area Factor) corrected = 473 samples

SU8 Scanning MDC (Area Factor) corrected = 350 samples

SU9 Scanning MDC (Area Factor) corrected = n/a - Pu-238 not COC in SU-9

SU10 Scanning MDC (Area Factor) corrected = n/a - Pu-238 not COC in SU-10

SU11 Scanning MDC (Area Factor) corrected = 519 samples

SU12 Scanning MDC (Area Factor) corrected = 319 samples

Visual Sample Plan (VSP) 15 foot triangular grid:

SU1 Calculated= 9 Selected Samples (on Map) = 67 including 2 biased samples

SU2 Calculated = 9 Selected Samples (on Map) = 87 including 9 biased samples.

SU3 Calculated = 9 Selected Samples (on Map) = 90 including 17 biased samples.

SU4 Calculated = 9 Selected Samples (on Map) = 94 including 1 biased samples

SU5 Calculated = 9 Selected Samples (on Map) = 85 with 0 biased samples.

C6/82

SU6 Calculated = 9 Selected Samples (on Map) = 88 with 0 biased samples.

SU7 Calculated = 9 Selected Samples (on Map) = 83 including 5 biased samples.

SU8 Calculated = 9 Selected Samples (on Map) = 75 including 16 biased samples.

SU9 Calculated = 8 Selected Samples (on Map) = 92 with 0 biased sample.

SU10 Calculated = 8 Selected Samples (on Map) = 87 with 0 biased samples.

SU11 Calculated = 9 Selected Samples (on Map) = 86 including 1 biased sample.

SU12 Calculated = 9 Selected Samples (on Map) = 53 with 0 biased samples.

The determination of the number of samples is consistent with section 3.7 of the standard VSAP, which provides a default grid spacing for SUs where PU-238 is the primary driver in the removal action.

Sample locations were selected by VSP with sampling goals of finding a Hot Spot utilizing a 15-foot triangular grid with a random starting point. Additional samples chosen via judgmental sampling. Sample locations will be surveyed at the time of sampling or closely following.

A total of 1000 sample locations will be assessed.

Note: Due to safety concerns of placing an individual in the excavation of piping such as the hot waste lines, which are expected to be up to 15 feet below grade, FSS side wall sampling will be accomplished by scraping the sidewall with an excavator bucket and subsequent sampling of the material in the bucket in accordance with the procedures established the standard VSAP, Final, August 2004, Section 4.4 Special Considerations.

C7/82

Changes if any, from Pre-ex SUD:

This Post-Ex SUD only applies to Survey Units 1-8 and 11-14. SU areas and sample numbers were changed as follows:

Spreadsheet Calculated = 9 samples based upon the data for each of SU 1-8 and 11-14 (see spreadsheets in Attachment II and Attachment III).

SU1 Scanning MDC (Area Factor) corrected = 513 samples
SU2 Scanning MDC (Area Factor) corrected = 323 samples
SU3 Scanning MDC (Area Factor) corrected = 423 samples
SU4 Scanning MDC (Area Factor) corrected = 452 samples
SU5 Scanning MDC (Area Factor) corrected = 178 samples
SU6 Scanning MDC (Area Factor) corrected = 256 samples
SU7 Scanning MDC (Area Factor) corrected = 515 samples
SU8 Scanning MDC (Area Factor) corrected = 350 samples
SU11 Scanning MDC (Area Factor) corrected = 424 samples
SU12 Scanning MDC (Area Factor) corrected = 467 samples
SU13 Scanning MDC (Area Factor) corrected = 512 samples
SU14 Scanning MDC (Area Factor) corrected = 53 samples

Visual Sample Plan (VSP) 15 foot triangular grid (consistent with Section 3.7 of the Standard VSAP):

SU1 Calculated= 9 Selected Samples (on Map) = 83
SU2 Calculated = 9 Selected Samples (on Map) = 54
SU3 Calculated = 9 Selected Samples (on Map) = 72
SU4 Calculated = 9 Selected Samples (on Map) = 73
SU5 Calculated = 9 Selected Samples (on Map) = 31 plus one biased sample
SU6 Calculated = 9 Selected Samples (on Map) = 42
SU7 Calculated = 9 Selected Samples (on Map) = 85
SU8 Calculated = 9 Selected Samples (on Map) = 110
SU11 Calculated = 8 Selected Samples (on Map) = 68
SU12 Calculated = 8 Selected Samples (on Map) = 76
SU13 Calculated = 8 Selected Samples (on Map) = 83
SU14 Calculated = 9 Selected Samples (on Map) = 10

A total of 788 (including one bias) samples will be taken in SU 1-8 and 11-14.

Item 6b	Calculations/Chem, Std dev, Number of Samples	NA, See Item 2

Changes if any, from Pre-ex SUD:

No chemicals or metals will be analyzed for in SU 1-4, 6-8, and 11-14. One biased sample in SU5 will be analyzed for metals.

CB/82

Item 7	Grid spacing	From Appendix B. Triangular 15 foot grid, laid out by Visual Sample Plan.
	Changes if any, from Pre-ex SUD: None	
Item 8	QA/QC: 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	

C9/82

Item 9	Bias/judgment samples (Additional bias samples are always within the discretion of the EPA.)	Biased sample locations have been designated as follows: Two locations have been designated in SU 1. They include one at the PRS 253 T West Stack and one at the PRS 143 EG-1 Diesel Fuel Tank. The PRS 143 sample will be analyzed for TPH. **Note:** The T West Stack and foundation will be removed and verification performed under separate work plan and SUD. The EG-1 Diesel Fuel Tank was removed under the BUSTR program. Verification sampling done under that program will be submitted as an appendix to the data report for this SUD. Nine locations have been designated in SU 2. They include one each at PRSs 133, 135, 139, 142, 144, 327, 328 as well as two along the portion of the SW underground exhaust duct which runs through this SU. Seventeen locations have been identified in SU 3. They include one each at PRSs 136, 137, 138, 249, 250, as well as three along the portion of the SW underground exhaust duct which runs through this SU. Also nine were designated in the SW-20 complex and will be analyzed for energetics. One location has been designated in SU 4. This located at PRS 145. No biased samples have been designated in SUs 5 and 6. Five locations have been designated in SU 7. Four are located along the portion of the R underground exhaust duct which runs through this SU and one is located along the portion of the SW underground exhaust duct which runs through this SU. Sixteen biased samples have designated in SU 8. They include one at PRS 134, two at PRS 140, five at PRS 141, one at PRS 209, five at PRS 234 (will be analyzed for TPH), and one at PRS 329. One location has been designated in SU 9. It is located at PRS 244 and will be analyzed for VOCs. Fifteen locations have been designated in SU 10. They are located at PRSs 129 and 130 as well as along the solvent lines into B Building and around the solvent room inside the B footprint, and will be analyzed for VOCs. One location has been designated in SU 11. It is located at PRS 252. No biased samples have been designated in SU 12.

C1982

	Changes from Pre-Ex SUD: Due to the massive extent of excavation, no biased samples will be taken (see Table I for COCs). Note: T West Stack, which was previously to be verified under the T East and T West Stack SUD, will be now be verified under this SUD as part of SUs 1 and 2. Due to the fact that the area has been excavated to bedrock, which far exceeds what was envisioned in the Pre-Ex SUD, VOCs, TPH, and energetics are being removed as biases. One biased sample in SU5 will be analyzed for metals.

C11/82

Item 10	Not otherwise covered comments

Characterization sampling collected during removal of the slabs, piping, and other in-ground structures, will be used to convert this Pre-excavation SUD into the Post-excavation SUD. The target area map in Appendix E will be used to target specific analytes. The target areas and associated COCs are based on historical sampling, process knowledge and PRSs. Each target area requires at least 7 samples. These samples will be taken at suspect areas, especially at PRS locations, such as piping and tanks. The samples will be analyzed for COCs specific to each target area (see Appendix E). These data will be used by USEPA, OHIO EPA, DOE, and CH2M Hill to develop the Post-excavation SUD. (Note to regulators: If Th-229, Th-230, U233, or U-234 are found, the 15 foot verification grid will be continue to be used due to inability to see these isotopes during walkover surveys. If these isotopes are not found during characterization, consideration will be given to expanding the grid size, due to use of the FIDLER G5 and Axiss instruments for walkover surveys, which together can see all other identified radioactive COCs, during walkover surveys. See Appendix F.)

Site policy requires performance of onsite soil screening (NaI or germanium) on 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.

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, 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. Potentially impacted work areas near the excavation, where excavated material was loaded into haulers, and which are soil surfaces, are sampled within SU1. Potentially impacted work area near the excavation, where excavated materials were loaded into haulers, and which are hard surfaces (e.g., concrete and asphalt), will be surveyed and released per RadCon procedures in accordance with DOE Order 5400.5 and Mound 2000 Work Plan Appendix A Table 1. The RSDS(s) will be included in the data report as documentation. Any final sample location that does not meet the surface release criteria will be submitted to the Core Team for concurrence.

Accessibility for sampling in narrow trenches, such as in SU12, is a constraining factor. Sampling of the excavation walls may be impeded due to excavation wall accessibility by both personnel and equipment. Sidewall sampling will be performed via excavator sampling. Accessibility to the excavation floor by personnel may be impeded due to the width of the excavation not being sufficient to use a man-box for access. Where sufficient volume of soil exists and is accessible with an excavator a soil sample will be taken, otherwise a surface survey (swipe and direct) will be performed utilizing methods available from atop the excavation. Potentially impacted work area atop the excavation, where excavated materials were loaded into haulers, and which are soil surfaces, are sampled as part of the SU. Potentially impacted work area atop the excavation, where excavated materials were loaded into haulers, and which are hard surfaces (i.e., concrete and asphalt), will be surveyed and released per RadCon procedures in accordance with DOE Order 5400.5 and Mound 2000 Work Plan Appendix A Table 1.

In-process sampling events (Characterization and Remedial Action Support Survey (RASS) samples) will be conducted during the entire B/R/SW/68/58 slab remediation. Those samples will undergo gamma and (as needed) alpha spectrometry analysis to guide actions. RASS sampling of the remediated areas will be used to determine if the FSS (verification) sampling could be conducted.

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.

Changes from Pre-Ex SUD: Reference to the AXISS unit has been removed. See Ron Daily letter in Attachment II for details. RASS sampling involved taking samples on a 30-foot grid. (See Attachment II for results). RASS sampling and waste characterization, as related to Target Areas defined in the Pre-Ex SUD, were considered in the development of the new SUs for this Post-Ex SUD. A 15 foot verification grid was laid out over the excavated, loadout, decon, and travel paths within the project boundaries. A FIDLER walkover will be performed and reported in each SU. There are locations within the excavation that consist of bedrock (shale) surfaces. The Standard VSAP in Section 4.4 says that detailed information on how to implement the approach to bedrock surfaces will be address in the Post-Ex SUD. The following is the detailed approach for this SUD: All potentially impacted areas, including those on asphalt and concrete, are included within this SUD for sampling. Where such sample points fall on a hard surface, a direct reading and a swipe will be taken as stated in the obstruction statement of the Standard VSAP. There are no sidewalls in SU 2-8 & 11-13 as was anticipated in the Pre-Ex SUD.

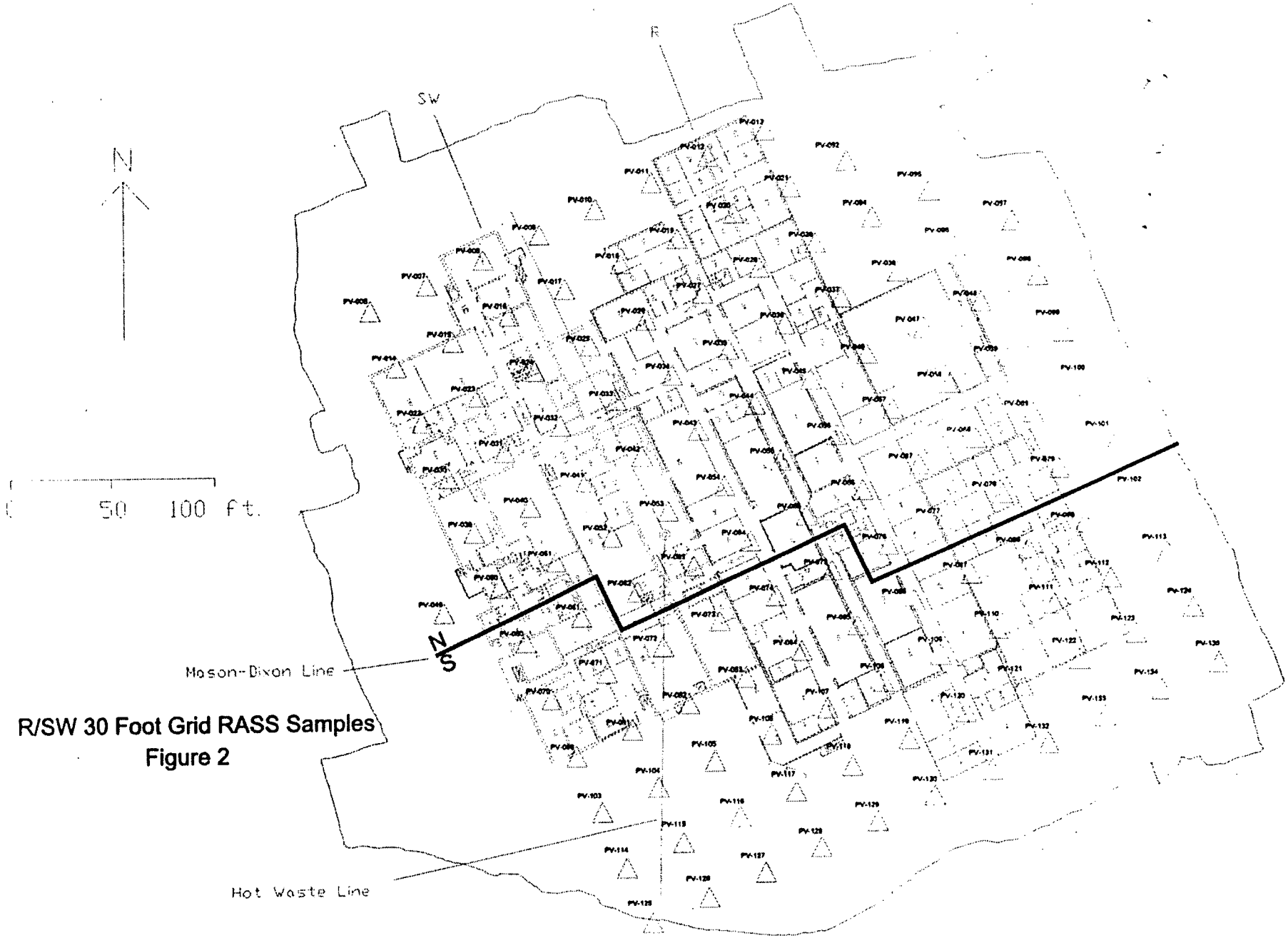
MH-12 is located within SU1 of the SUD. The excavation, verification sampling and backfill will occur as a continuous process to avoid runoff from the R/SW area into the adjacent PRS 124. This excavation is expected to be at least 23 feet deep, therefore sidewall sampling may apply.

Isotopic Detection, Curium -244 (Cm-244)

Ronald R. Daily, Mound Radiological Manager, advises that for the purpose of the isotopic detection of Curium -244 (Cm-244), the Miamisburg Closure Project will utilize its daughter product of Plutonium 240. Cm-244 has only an 18.11-year half-life while Pu-240 has a 6.6 thousand year half-life.

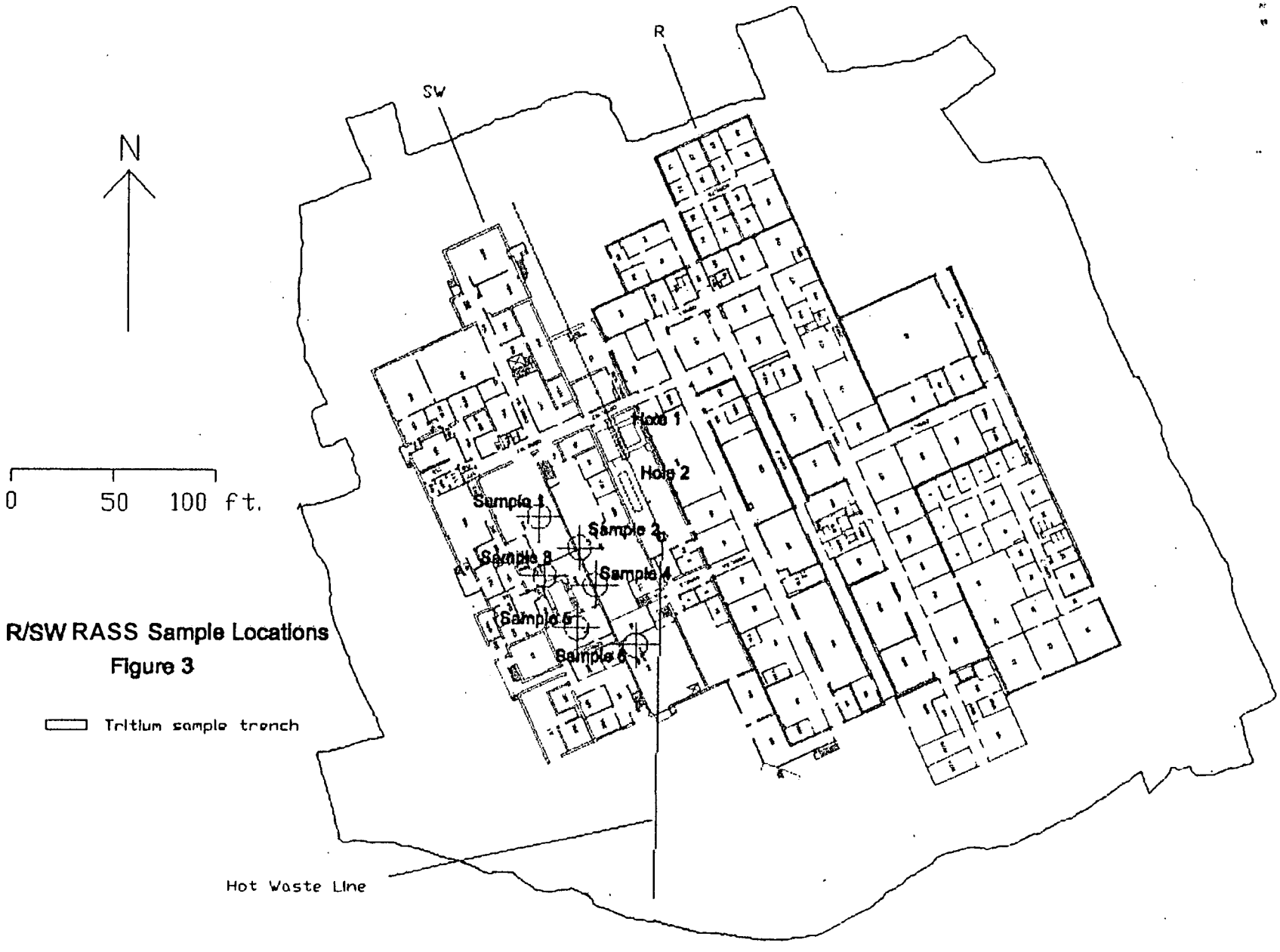
Laboratory results for Pu-239 and Pu-240 are reported as (Pu-239/240) and therefore any detection of Pu-239/240 will be considered a detection of Cm-244.

C13/82



R/SW 30 Foot Grid RASS Samples
Figure 2

C14/82



R/SW RASS Sample Locations
Figure 3

015/82

R/SW RASS SAMPLE RESULTS
30 Foot Grid
Onsite Long-Count Gamma Spec

Description	Sample #	Mason-Dixon	Sample ID	PU-238 Reading*	MDA
			CO	55	
R/SW PV 12/16/05 #006	6	N	GL09204	3.24	20.35
R/SW PV 12/16/05 #007	7	N	GL09205	21.67	25.9
122205 R/SW-08 PV	8	N	GL09327	8.88	13.33
R/SW PV 12/16/05 #009	9	N	GL09214	1.06	15.36
R/SW PV 12/16/05 #010	10	N	GL09215	3.31	15.83
R/SW 012006-011 Resample	11	N	GL09566	0	14.02
R/SW PV 12/16/05 #012	12	N	GL09217	2.93	13.15
R/SW PV 12/16/05 #013	13	N	GL09224	0	14.23
R/SW PV 12/16/05 #014	14	N	GL09206	4.4	22.54
R/SW PV 12/16/05 #015	15	N	GL09218	1.91	20.82
R/SW PV 12/16/05 #016	16	N	GL09219	1.41	15.4
R/SW PV 12/16/05 #017	17	N	GL09207	0.21	11.83
R/SW PV 12/16/05 #018	18	N	GL09208	0	13.77
R/SW PV 12/16/05 #019	19	N	GL09209	0	19.17
R/SW PV 12/16/05 #020	20	N	GL09210	0	16.35
R/SW PV 12/16/05 #021	21	N	GL09211	3.5	12.53
R/SW PV 12/16/05 #022	22	N	GL09220	0	16.7
R/SW PV 12/16/05 #023	23	N	GL09221	8.76	16.4
R/SW PV 12/16/05 #024	24	N	GL09567	10.45	13.71
R/SW PV 12/16/05 #025	25	N	GL09213	37.9	17.03
R/SW PV 12/16/05 #026	26	N	GL09222	21.47	13.02
R/SW PV 12/16/05 #027	27	N	GL09223	0	18.34
R/SW 012006-028 Resample	28	N	GL09568	0	15.86
R/SW 012006-029 Resample	29	N	GL09569	10.71	12.96
R/SW PV 12/16/05 #030	30	N	GL09247	1.29	13.66
R/SW PV 12/16/05 #031	31	N	GL09248	41.97	12.01
010906 32 Resample #1	32	N	GL09416	0	14.52
R/SW PV 12/16/05 #033	33	N	GL09226	29.1	20.58
R/SW 012006-034 Resample	34	N	GL09571	1.03	14.9
R/SW 012006-035 Resample	35	N	GL09572	7.58	15.49
R/SW 012006-036 Resample	36	N	GL09570	1.34	13.39
R/SW 012006-037 Resample	37	N	GL09574	10.66	11.52
R/SW PV 12/16/05 #038	38	N	GL09235	1.66	11.84
R/SW PV 12/16/05 #039	39	N	GL09250	4.23	15.96
R/SW 012006-040 Resample	40	N	GL09576	0	16.25
R/SW 012006-041 Resample	41	N	GL09599	8.47	11.21
122205 R/SW-42 PV	42	N	GL09315	6.15	14.68
R/SW 012006-043 Resample	43	N	GL09575	2.04	15.65
R/SW 012006-044 Resample	44	N	GL09573	0	12.27
R/SW 012006-045 Resample	45	N	GL09234	25.29	31.64
122205 R/SW-46 PV	46	N	GL09316	0	16.04
122205 R/SW-47 PV	47	N	GL09317	12.05	17.83
122205 R/SW-48 PV	48	N	GL09318	0	15.62
R/SW PV 12/17/05 #049	49	N	GL09253	0.5	10.73
122205 R/SW-50 PV	50	N	GL09319	0.57	11.49

* Note: Results above CO will be removed prior to verification sampling

C16/82

R/SW RASS SAMPLE RESULTS
30 Foot Grid
Onsite Long-Count Gamma Spec

Description	Sample #	Mason-Dixon	Sample ID	PU-238 Reading*	MDA
			CO	55	
122205 R/SW-51 PV	51	N	GL09320	33.09	14.18
R/SW PV 12/17/05 #052	52	N	GL09254	1.57	13.04
R/SW PV 12/17/05 #053	53	N	GL09229	0	18.65
R/SW 012006-054 Resample	54	N	GL09578	2.72	13.19
R/SW 012006-055 Resample	55	N	GL09579	0	14.56
R/SW PV 12/17/05 #056	56	N	GL09230	0	17.66
R/SW PV 12/17/05 #057	57	N	GL09231	0	18.06
122205 R/SW-58 PV	58	N	GL09322	4.06	12.29
122205 R/SW-59 PV	59	N	GL09323	2.84	12.03
122205 R/SW-60 PV	60	S	GL09586	**277.5**	94.52
122205 R/SW-61 PV	61	S	GL09587	20.35	14.88
122205 R/SW-62 PV	62	N	GL09324	6.99	12.87
R/SW 012006-063 Resample	63	N	GL09580	5.16	14.07
R/SW 012006-064 Resample	64	N	GL09581	0.44	11.57
R/SW 012006-065 Resample	65	N	GL09582	8.33	16.34
122205 R/SW-66 PV	66	N	GL09329	5.54	11.73
R/SW PV 12/16/05 #067	67	N	GL09233	12.52	14.38
122205 R/SW-68 PV	68	N	GL09330	0	13.42
122205 R/SW-69 PV	69	N	GL09326	0	13.29
122206 R/SW-70 PV	70	S	GL09588	13.02	14.72
122206-071 R/SW	71	S	GL09589	**6479**	31.9
122206-072 R/SW	72	S	GL09590	**57.39**	17.44
011906 R/SW 073	73	S	GL09565	5.6	11.51
011906 R/SW 074	74	S	GL09522	5.57	10.99
011906 R/SW 075	75	S	GL09523	28.68	14.46
R/SW PV12/17/05 #076	76	N	GL09242	0	13.37
R/SW PV12/17/05 #077	77	N	GL09243	0	13.52
122205 R/SW-78 PV	78	N	GL09331	2.96	9.6
122205 R/SW-79 PV	79	N	GL09332	6.21	10.27
R/SW 012006-080 Resample	80	S	GL09583	16.39	12.22
122206-081 R/SW	81	S	GL09591	**62.72**	14.06
R/SW 012006-082 Resample	82	S	GL09584	10.82	13.24
R/SW 012006-083 Resample	83	S	GL09594	2.37	13.91
R/SW 012006-084 Resample	84	S	GL09595	6.42	19.22
R/SW 012006-085 Resample	85	S	GL09596	3.65	15.45
R/SW 012006-086 Resample	86	S	GL09597	4.58	18.09
R/SW 012006-087 Resample	87	S	GL09598	0	14.85
011906 R/SW-088	88	S	GL09529	2.72	14.02
011906 R/SW-089	89	S	GL09530	5.3	13.97
R/SW PV12/17/05 #092	92	N	GL09255	0	9.32
R/SW PV12/17/05 #094	94	N	GL09256	0	9.2
122205 R/SW-95 PV	95	N	GL09333	2.98	12.78
R/SW PV12/17/05 #096	96	N	GL09258	12.97	10.18
R/SW PV12/17/05 #097	97	N	GL09244	0	13
122205 R/SW-98 PV	98	N	GL09334	5.91	12.02

* Note: Results above CO will be removed prior to verification sampling

C17/82

R/SW RASS SAMPLE RESULTS
30 Foot Grid
Onsite Long-Count Gamma Spec

CO 55

Description	Sample #	Mason-Dixon	Sample ID	PU-238 Reading*	MDA
R/SW PV12/17/05 #099	99	N	GL09259	0	8.91
R/SW PV12/17/05 #100	100	N	GL09245	0	21.42
R/SW PV12/17/05 #101	101	N	GL09246	0	13.09
011906 R/SW-102	102	S	GL09531	3.48	8.67
R/SW 012006-103 Resample	103	S	GL09585	232	19.79
011906 R/SW-104	104	S	GL09533	6.13	12.92
011906 R/SW-105	105	S	GL09534	25.56	13.58
011906 R/SW-106	106	S	GL09535	1.94	11.26
011906 R/SW-107	107	S	GL09536	1.6	11.24
011906 R/SW-108	108	S	GL09537	21.16	10.68
011906 R/SW-109	109	S	GL09538	6.69	11.44
011906 R/SW-110	110	S	GL09539	20.79	10.02
011906 R/SW-111	111	S	GL09541	11.53	10.09
011906 R/SW-112	112	S	GL09540	4.4	12.95
011906 R/SW-113	113	S	GL09542	3.97	9.37
011906 R/SW-114	114	S	GL09543	0	11.26
011906 R/SW-115	115	S	GL09544	55.17	12.7
011906 R/SW-116	116	S	GL09545	8.33	12.33
011906 R/SW-117	117	S	GL09546	12.59	10.36
011906 R/SW-118	118	S	GL09547	0	12.2
011906 R/SW-119	119	S	GL09548	0	14.45
011906 R/SW-120	120	S	GL09549	4.95	12.54
011906 R/SW-121	121	S	GL09550	4.57	13.46
011906 R/SW-122	122	S	GL09551	6.08	12.59
011906 R/SW-123	123	S	GL09552	3.32	10.03
011906 R/SW-124	124	S	GL09553	3.18	11.59
011906 R/SW-125	125	S	GL09554	6.28	13.49
011906 R/SW-126	126	S	GL09555	0	10.99
011906 R/SW-127	127	S	GL09556	0.28	13.46
011906 R/SW-128	128	S	GL09559	1.75	14.15
011906 R/SW-129	129	S	GL09557	3.38	9.62
011906 R/SW-130	130	S	GL09558	0.88	14.54
011906 R/SW-131	131	S	GL09560	2.9	12.55
011906 R/SW-132	132	S	GL09561	47.72	15.35
011906 R/SW-133	133	S	GL09562	18.01	11.61
011906 R/SW-134	134	S	GL09563	3.45	12.29
011906 R/SW-135	135	S	GL09564	0	9.15

* Note: Results above CO will be removed prior to verification sampling

C18/82

SW Soil Results
Offsite Tritium Analysis
Sampled 9/13/05

Location	Moisture %	Tritium pCi/g	MDC pCi/g	Lab Qualifier
SW Hole #1 0-2'	15.3	361	0.6	J
SW Hole #1 2-4'	10.6	98	0.6	J
SW Hole #2 0-2'	7.3	24.7	0.6	J
SW Hole #2 2-4"	10	537	0.6	
SW Soil Sample #1 4-6'	14.1	224	0.6	J
SW Soil Sample #3 4-6'	18.8	48	0.6	J
SW Soil Sample #4 4-6'	14.6	9.9	0.6	J
SW Soil Sample #6 4-6'	33.7	130	0.7	J

J = Result is greater than sample detection limit but less than stated reporting limit.

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07461
File ID: 1SC02482.s0
Priority: Yes

Description\Location
SW Hole #1 0-2"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.07
Cs-137		0.36	0.06
Pb-210	*	0.61	0.82
Ra-226		1.16	0.99
Ac-227 (D)	*	0.14	0.26
Th-230	*	0	8.73
Th-232 (D)		0.37	0.28
Pu-238	*	0	16.12
Am-241	*	0	0.1

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.03 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

c20/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07464
File ID: 1SC02485.s0
Priority: Yes

Description\Location
SW Hole #[redacted] 2-4"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.03	0.06
Cs-137	*	0	0.06
Pb-210	*	0.09	0.81
Ra-226		1.68	0.75
Ac-227 (D)	*	0.07	0.25
Th-230	*	2.36	8.27
Th-232 (D)		0.48	0.22
Pu-238	*	0	16.24
Am-241	*	0.01	0.09

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.03 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C21/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: G1.07463
File ID: 1SC02484.s0
Priority: Yes

Description\Location
SW Hole #2 0-2"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.1
Cs-137	*	0.02	0.05
Pb-210	*	0	0.95
Ra-226		1.45	1
Ac-227 (D)	*	0	0.31
Th-230	*	3.43	9.95
Th-232 (D)		0.52	0.25
Pu-238	*	4.13	19.06
Am-241	*	0	0.11

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

$\sum_{DOT}$ 0.03 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C22/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07466
File ID: 1SC02487.s0
Priority: Yes

Description\Location
SW Hole #2 2-4"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.08
Cs-137		0.08	0.08
Pb-210		0.94	0.72
Ra-226	*	0.55	0.86
Ac-227 (D)	*	0.09	0.28
Th-230	*	1.69	7.56
Th-232 (D)		0.28	0.28
Pu-238	*	3.08	13.54
Am-241	*	0.02	0.08

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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials

C23/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07462
File ID: 1SC02483.s0
Priority: Yes

Description\Location
SW Soil Sample #1 4-6"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.09
Cs-137		3.08	0.1
Pb-210	*	0.47	1.27
Ra-226		3.36	1.18
Ac-227 (D)	*	0.25	0.59
Th-230	*	0	12.3
Th-232 (D)		0.59	0.34
Pu-238	*	4	22.08
Am-241	*	0	0.13

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

$\sum_{DOT}$ 0.04 nCi/g

Instrument type: High Purity Germanium

$\sum_{DOT}$ 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C24/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07465
File ID: 1SC02486.s0
Priority: Yes

Description\Location
SW Soil Sample #2 4-6"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.09
Cs-137		0.13	0.07
Pb-210	*	0.34	1.19
Ra-226		2.43	1.17
Ac-227 (D)		2.11	0.37
Th-230	*	12.26	12.63
Th-232 (D)		0.52	0.18
Pu-238		89.52	29.14
Am-241		0.53	0.17

Not analyzed for tritium
cqa 3-1-06

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.11 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C25/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07467
File ID: 1SC02488.s0
Priority: Yes

Description\Location
SW Soil Sample #3 4-6"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.1
Cs-137		0.33	0.09
Pb-210	*	0	1.06
Ra-226	*	0.43	1.09
Ac-227 (D)		0.61	0.29
Th-230	*	0.38	9.79
Th-232 (D)		0.74	0.17
Pu-238	*	11.5	19.81
Am-241	*	0.1	0.11

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.03 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C26/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07468
File ID: 1SC02489.s0
Priority: Yes

Description\Location
SW Soil Sample #4 4-6"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.07
Cs-137	*	0	0.06
Pb-210	*	0.95	1.6
Ra-226		2.68	1.42
Ac-227 (D)		11.3	0.52
Th-230	*	0	21.36
Th-232 (D)		0.26	0.25
Pu-238	*	2.98	29.83
Am-241	*	0	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:

Date: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C 27/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07469
File ID: 1SC02490.s0
Priority: Yes

Description\Location
SW Soil Sample #5 4-6"
Long Count

Collector: 5349
Date Received: 9/13/05
Date Collected: 9/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0.02	0.07
Cs-137	*	0.02	0.07
Pb-210	*	1.17	1.24
Ra-226		2.42	1.11
Ac-227 (D)		3.06	0.32
Th-230	*	0	14.19
Th-232 (D)		0.58	0.25
Pu-238		162.1	136
Am-241		0.71	0.17

Not analyzed for tritium cgk 8-1-06

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.18 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: 9/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C28/82

SOIL ANALYSIS REPORT

Field Sample ID:
Lab Sample ID: GL07470
File ID: 1SC02491.s0
Priority: Yes

Description\Location
SW Soil Sample #6 4-6'
Long Count

Collector: 5349
Date Received: 09/13/05
Date Collected: 09/13/05

Radionuclide		Activity (pCi/g)	MDA
Co-60	*	0	0.07
Cs-137	*	0.01	0.05
Pb-210	*	0	0.76
Ra-226		1.11	0.86
Ac-227 (D)		0.61	0.25
Th-230	*	3.02	8.02
Th-232 (D)		0.37	0.21
Pu-238	*	7.16	14.35
Am-241		0.1	0.08

Other Nuclides

Radionuclide	Activity (pCi/g)	MDA

Σ_{DOT} 0.03 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: 09/14/05 Counted By: 5288 Analyzed By: 5288 Initials [redacted]

C29/82

ATTACHMENT III

CHANGES FROM R/SW/B POST-EX SUD THAT APPLY TO SU1, SU2, SU4, AND NEW SU14

Explanation for Attachment III

Figure 1: R/SW Figure 1 Revised

Table 1: Revised Comparison Table for SUs

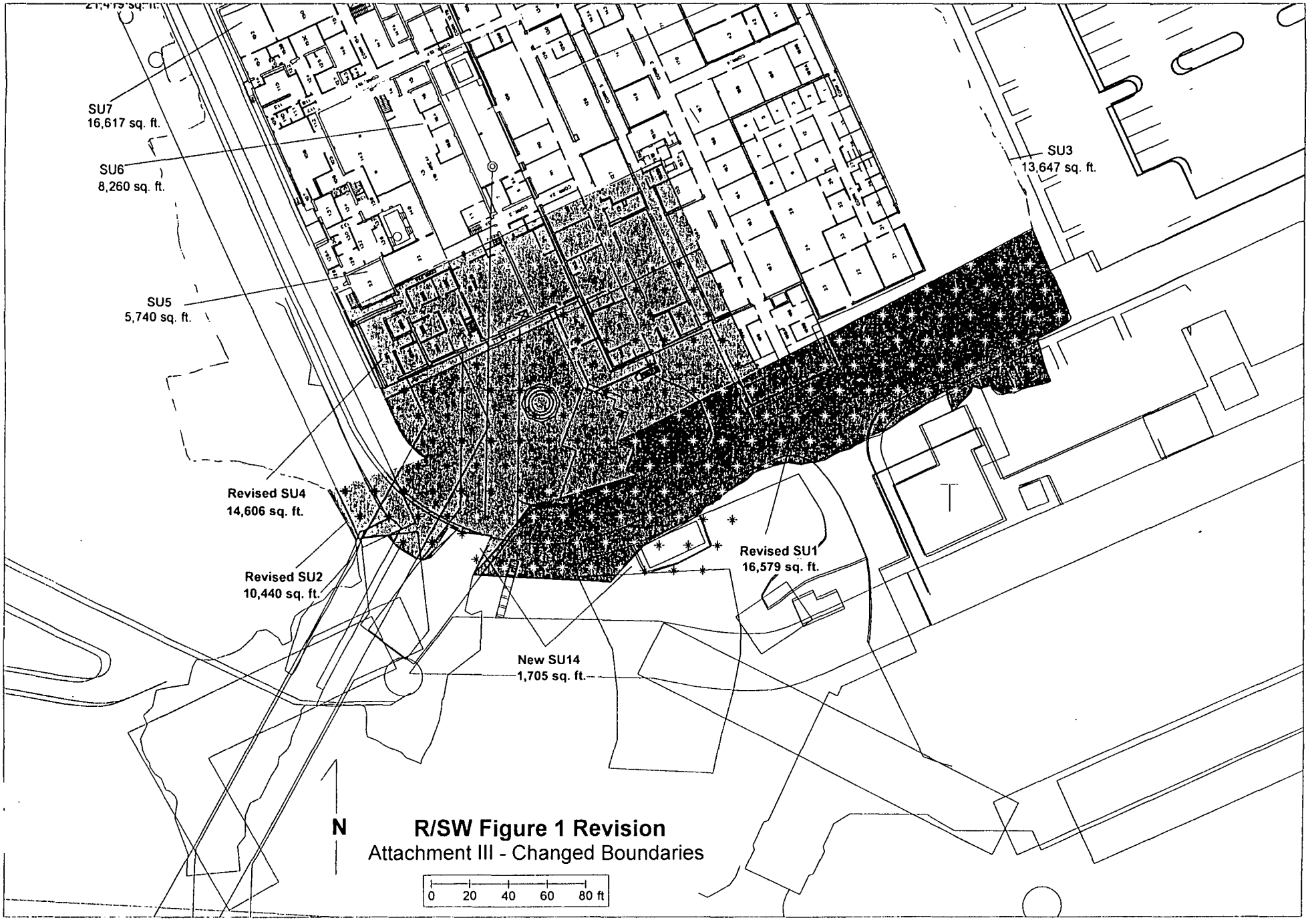
Revised MARSSIM spreadsheet calculations for SU1, SU2, SU4, and SU14

Table 2: Sample Coordinates and Location Labels

C 30/82

Attachment III Explanation

Due to logistical difficulties and to enable proper implementation of runoff controls (the construction of a berm) to protect SU2 of PRS 124, the western small portion of the newly added SU14 was developed to include the area and survey locations previously covered by SU2 of PRS 124 (locations 104 and 105). The eastern section of the newly added SU14 was developed due to the removal of the electrical substation and the subsequent excavation extending further than previously anticipated. In addition, the aforementioned sample locations (104 and 105) in PRS 124 SU2 were improperly handled at the offsite lab rendering tritium analysis unobtainable. In an effort to properly evaluate the soils in the area, the boundary of R/SW/B SU2 was redeveloped and tritium added as a COC. Due the redevelopment of SU2, SU1 and SU4 were revised as well.



R/SW Figure 1 Revision
Attachment III - Changed Boundaries

C 32/52

R/SW/B Revised (Comparison) Survey Unit List

Table 1

Pre Ex SUD			Post Ex SUD					Appendix III See associated Revised Figure 1 drawing				
SU#	COC	Proposed Area of Verification (sq ft)	SU#	COC	Offsite Analysis	Number of Locations	Actual Area of Verification (sq ft)	SU#	COC	Offsite Analysis	Number of Locations	Actual Area of Verification (sq ft)
1	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	12,347	1	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	90	17,898	1	n/c	n/c	83	16,579
2	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	14,978	2	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	74	14,673	2	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232, Tritium	Gamma spec iso-Pu iso-Th Tritium	54	10,440
3	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	13,807	3	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	72	13,647	3	n/c	n/c	n/c	n/c
4	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	18,103	4	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	46	9,040	4	n/c	n/c	73	14,606
5	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	16,784	5	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232, Tritium, Th-229, U-233/234, U-235, U-238	Gamma spec iso-Pu iso-Th iso-U Tritium	31	5,740	5	n/c	n/c	n/c	n/c
6	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	17,247	6	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232, Tritium, Sr-90	Gamma spec iso-Pu iso-Th Tritium Gross Beta	42	8,260	6	n/c	n/c	n/c	n/c
7	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	15,289	7	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	85	16,617	7	n/c	n/c	n/c	n/c
8	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	11,316	8	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	110	21,419	8	n/c	n/c	n/c	n/c
9	Ac-227, Bi-207, Bi-210m, Co-60, Pb-210, Tritium, Metals	17,541	9*	Ac-227, Pb-210, Be	Gamma spec Beryllium	n/c	n/c	9*	n/c	n/c	n/c	n/c
10	Ac-227, Bi-207, Bi-210m, Co-60, Pb-210, Tritium, Metals	16,969	10*	Ac-227, Pb-210, Be	Gamma spec Beryllium	n/c	n/c	10*	n/c	n/c	n/c	n/c
11	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	16,752	11	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	68	13,689	11	n/c	n/c	n/c	n/c
12	Ac-227, Am-241, Bi-207, Bi-210m, Cm-244, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Sr-90, Th-228, Th-229, Th-230, Th-232, Tritium, U-233/234, U-235, U238, Metals	10,313	12	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	76	15,085	12	n/c	n/c	n/c	n/c
			NEW 13	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	83	16,544	NEW 13	n/c	n/c	n/c	n/c
								NEW 14	Ac-227, Am-241, Bi-207, Bi-210m, Co-60, Cs-137, Pa-231, Pb-210, Pu-238, Pu-239/240, Ra-226, Th-228, Th-230, Th-232	Gamma spec iso-Pu iso-Th	10	1,705

n/c - no change
* SU9 and 10 sampled under previous partial Post-Ex SUD
Changes highlighted in Yellow

C33/82

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.212	Ac-227+D	4.6	(pCi/g)
0.182	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
0.0138	Cs-137+D	3.8	(pCi/g)
0.0174	Co-60	0.7	(pCi/g)
	Cm-244	92	(pCi/g)
0.373	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
0.388	Pu-238	55	(pCi/g)
0.0098	Pu-239/240	62	(pCi/g)
	Pa-231	27.2	(pCi/g)
0.328	Pa-231+D	4	(pCi/g)
0.527	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
0.279	Th-228+D	2.6	(pCi/g)
	Th-229+D	5.06	(pCi/g)
	Th-230	83.8	(pCi/g)
0.284	Th-230+D	2.8	(pCi/g)
	Th-232	73.4	(pCi/g)
0.276	Th-232+D	73.4	(pCi/g)
	Tritium	7.58E+04	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-233/234	103	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	15.01	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	42.3	(pCi/g)
	U-238+D	2.09	(pCi/g)
0.0082	Bi-207	1.2	(pCi/g)
0.0085	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(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	0.26 (s)		
Sign p	0.971284		

Estimate (N) - Sign Test

DCGL	1
LBGR	0.50
Delta	0.50
(s)	0.26
Rel Shift	1.933
(N)	9.00

Pu-238 Area Factor (N) 513

Calculate the Total Effective (s)

15-foot Triangular Grid is to be used per the Standard VSAP
N=83

Sample Grid Spacing

SU Area	1,540	m^2	SU Area	16,579	ft^2
Grid Length	12.2	m	Grid Length	39.9	ft
Grid Height	10.5	m	Grid Height	34.6	ft

Area R/SW/B **Survey Unit** SU 1

Std. Dev. unchanged from Pre-Ex SUD
Square footage revised

C34/82

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.212	Ac-227+D	4.6	(pCi/g)
0.182	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
0.0138	Cs-137+D	3.8	(pCi/g)
0.0174	Co-60	0.7	(pCi/g)
	Cm-244	92	(pCi/g)
0.373	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
0.388	Pu-238	55	(pCi/g)
0.0098	Pu-239/240	62	(pCi/g)
	Pa-231	27.2	(pCi/g)
0.328	Pa-231+D	4	(pCi/g)
0.527	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
0.279	Th-228+D	2.6	(pCi/g)
	Th-229+D	5.06	(pCi/g)
	Th-230	83.8	(pCi/g)
0.284	Th-230+D	2.8	(pCi/g)
	Th-232	73.4	(pCi/g)
0.276	Th-232+D	73.4	(pCi/g)
18.2	Tritium	7.58E+04	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-233/234	103	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	15.01	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	42.3	(pCi/g)
	U-238+D	2.09	(pCi/g)
0.0082	Bi-207	1.2	(pCi/g)
0.0085	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(pCi/g)
	Sr-90	94.72	(pCi/g)

Std. Dev. unchanged from Pre-Ex SUD
COCs and square footage revised

Type I Error	0.05		
$Z_{1\text{-alpha}}$	1.645		
Type II Error	0.2		
$Z_{1\text{-beta}}$	0.842		
Effective	0.26	*(s)*	
Sign p	0.971284	Pu-238 Area Factor (N)	323

Calculate the Total Effective (s)

Estimate (N) - Sign Test

DCGL	1
LBGR	0.50
Delta	0.50
(s)	0.26
Rel Shift	1.933
(N)	9.00

15-foot Triangular Grid is to be used per the Standard VSAP
N=54

Sample Grid Spacing

SU Area	970	m^2	SU Area	10,440	ft^2
Grid Length	9.7	m	Grid Length	31.7	ft
Grid Height	8.4	m	Grid Height	27.4	ft

Area R/SW/B **Survey Unit** SU 2

C35/02

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.212	Ac-227+D	4.6	(pCi/g)
0.182	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
0.0138	Cs-137+D	3.8	(pCi/g)
0.0174	Co-60	0.7	(pCi/g)
	Cm-244	92	(pCi/g)
0.373	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
0.388	Pu-238	55	(pCi/g)
0.0098	Pu-239/240	62	(pCi/g)
	Pa-231	27.2	(pCi/g)
0.328	Pa-231+D	4	(pCi/g)
0.527	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
0.279	Th-228+D	2.6	(pCi/g)
	Th-229+D	5.06	(pCi/g)
	Th-230	83.8	(pCi/g)
0.284	Th-230+D	2.8	(pCi/g)
	Th-232	73.4	(pCi/g)
0.276	Th-232+D	73.4	(pCi/g)
	Tritium	7.58E+04	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-233/234	103	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	15.01	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	42.3	(pCi/g)
	U-238+D	2.09	(pCi/g)
0.0082	Bi-207	1.2	(pCi/g)
0.0085	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(pCi/g)
	Sr-90	94.72	(pCi/g)

Std. Dev. unchanged from Pre-Ex SUD
Square footage revised

Type I Error	0.05		
$Z_{1\text{-alpha}}$	1.645		
Type II Error	0.2		
$Z_{1\text{-beta}}$	0.842		
Effective	0.26 (s)		
Sign p	0.971284	Pu-238 Area Factor (N)	452

Calculate the Total Effective (s)

Estimate (N) - Sign Test	
DCGL	1
LBGR	0.50
Delta	0.50
(s)	0.26
Rel Shift	1.933
(N)	9.00

15-foot Triangular Grid is to be used per the Standard VSAP
N=73

Sample Grid Spacing

SU Area	1,357	m^2	SU Area	14,606	ft^2
Grid Length	11.4	m	Grid Length	37.5	ft
Grid Height	9.9	m	Grid Height	32.5	ft

Area R/SW/B **Survey Unit** SU 4

C39/82

Sample Standard Deviation (s)	Radionuclide	Cleanup Objective	Units
0.212	Ac-227+D	4.6	(pCi/g)
0.182	Am-241	63	(pCi/g)
	Ce-141	38	(pCi/g)
0.0138	Cs-137+D	3.8	(pCi/g)
0.0174	Co-60	0.7	(pCi/g)
	Cm-244	92	(pCi/g)
0.373	Pb-210+D	7.4	(pCi/g)
	Np-237+D	10.4	(pCi/g)
	Ni-95	2.5	(pCi/g)
0.388	Pu-238	55	(pCi/g)
0.0098	Pu-239/240	62	(pCi/g)
	Pa-231	27.2	(pCi/g)
0.328	Pa-231+D	4	(pCi/g)
0.527	Ra-226+D	2.9	(pCi/g)
	Ra-228	2.1	(pCi/g)
0.279	Th-228+D	2.6	(pCi/g)
	Th-229+D	5.06	(pCi/g)
	Th-230	83.8	(pCi/g)
0.284	Th-230+D	2.8	(pCi/g)
	Th-232	73.4	(pCi/g)
0.276	Th-232+D	73.4	(pCi/g)
	Tritium	7.58E+04	(pCi/g)
	U-233+D	4.8	(pCi/g)
	U-233/234	103	(pCi/g)
	U-234	106.1	(pCi/g)
	U-234+D	2	(pCi/g)
	U-235	15.01	(pCi/g)
	U-235+D	3.2	(pCi/g)
	U-238	42.3	(pCi/g)
	U-238+D	2.09	(pCi/g)
0.0082	Bi-207	1.2	(pCi/g)
0.0085	Bi-210m	8.3	(pCi/g)
	Tc-99	2140	(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	0.26	(s)	
Sign p	0.971284		

Estimate (N) - Sign Test

DCGL	1
LBGR	0.50
Delta	0.50
(s)	0.26
Rel Shift	1.933
(N)	9.00

Pu-238 Area Factor (N) 53

Calculate the Total Effective (s)

15-foot Triangular Grid is to be used per the Standard VSAP
N=10

Sample Grid Spacing

SU Area	158	m^2	SU Area	1,705	ft^2
Grid Length	3.9	m	Grid Length	12.8	ft
Grid Height	3.4	m	Grid Height	11.1	ft

Area R/SW/B **Survey Unit** SU 14

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Attachment III Sample Coordinates and Location Labels

Location Label	Easting	Northing
SU1-RSW-1	1464761.941	598741.080
SU1-RSW-2	1464776.941	598741.080
SU1-RSW-3	1464791.941	598741.080
SU1-RSW-4	1464806.941	598741.080
SU1-RSW-5	1464821.941	598741.080
SU1-RSW-7	1464769.441	598754.070
SU1-RSW-8	1464784.441	598754.070
SU1-RSW-9	1464799.441	598754.070
SU1-RSW-10	1464814.441	598754.070
SU1-RSW-11	1464829.441	598754.070
SU1-RSW-14	1464776.941	598767.061
SU1-RSW-15	1464791.941	598767.061
SU1-RSW-16	1464806.941	598767.061
SU1-RSW-17	1464821.941	598767.061
SU1-RSW-18	1464836.941	598767.061
SU1-RSW-19	1464851.941	598767.061
SU1-RSW-22	1464814.441	598780.051
SU1-RSW-23	1464829.441	598780.051
SU1-RSW-24	1464844.441	598780.051
SU1-RSW-25	1464859.441	598780.051
SU1-RSW-26	1464874.441	598780.051
SU1-RSW-29	1464836.941	598793.042
SU1-RSW-30	1464851.941	598793.042
SU1-RSW-31	1464866.941	598793.042
SU1-RSW-32	1464881.941	598793.042
SU1-RSW-33	1464896.941	598793.042
SU1-RSW-34	1464829.441	598806.032
SU1-RSW-35	1464844.441	598806.032
SU1-RSW-36	1464859.441	598806.032
SU1-RSW-37	1464874.441	598806.032
SU1-RSW-38	1464889.441	598806.032
SU1-RSW-39	1464904.441	598806.032
SU1-RSW-40	1464919.441	598806.032
SU1-RSW-41	1464934.441	598806.032
SU1-RSW-42	1464851.941	598819.022
SU1-RSW-43	1464866.941	598819.022
SU1-RSW-44	1464881.941	598819.022
SU1-RSW-45	1464896.941	598819.022
SU1-RSW-46	1464911.941	598819.022
SU1-RSW-47	1464926.941	598819.022
SU1-RSW-48	1464941.941	598819.022
SU1-RSW-49	1464956.941	598819.022
SU1-RSW-50	1464874.441	598832.013
SU1-RSW-51	1464889.441	598832.013
SU1-RSW-52	1464904.441	598832.013
SU1-RSW-53	1464919.441	598832.013
SU1-RSW-54	1464934.441	598832.013
SU1-RSW-55	1464949.441	598832.013
SU1-RSW-56	1464964.441	598832.013
SU1-RSW-57	1464979.441	598832.013
SU1-RSW-58	1464994.441	598832.013

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Attachment III Sample Coordinates and Location Labels

Location Label	Easting	Northing
SU1-RSW-59	1465024.441	598832.013
SU1-RSW-60	1464911.941	598845.003
SU1-RSW-61	1464926.941	598845.003
SU1-RSW-62	1464941.941	598845.003
SU1-RSW-63	1464956.941	598845.003
SU1-RSW-64	1464971.941	598845.003
SU1-RSW-65	1464986.941	598845.003
SU1-RSW-66	1465001.941	598845.003
SU1-RSW-67	1465016.941	598845.003
SU1-RSW-68	1465031.941	598845.003
SU1-RSW-69	1464934.441	598857.993
SU1-RSW-70	1464949.441	598857.993
SU1-RSW-71	1464964.441	598857.993
SU1-RSW-72	1464979.441	598857.993
SU1-RSW-73	1464994.441	598857.993
SU1-RSW-74	1465009.441	598857.993
SU1-RSW-75	1465024.441	598857.993
SU1-RSW-76	1464956.941	598870.984
SU1-RSW-77	1464971.941	598870.984
SU1-RSW-78	1464986.941	598870.984
SU1-RSW-79	1465001.941	598870.984
SU1-RSW-80	1465016.941	598870.984
SU1-RSW-81	1465031.941	598870.984
SU1-RSW-82	1465046.941	598870.984
SU1-RSW-83	1464979.441	598883.974
SU1-RSW-84	1464994.441	598883.974
SU1-RSW-85	1465009.441	598883.974
SU1-RSW-86	1465024.441	598883.974
SU1-RSW-87	1465039.441	598883.974
SU1-RSW-88	1465001.941	598896.965
SU1-RSW-89	1465016.941	598896.965
SU1-RSW-90	1465031.941	598896.965
SU2-RSW-6	1464754.441	598754.070
SU2-RSW-12	1464746.941	598767.061
SU2-RSW-13	1464761.941	598767.061
SU2-RSW-20	1464784.441	598780.051
SU2-RSW-21	1464799.441	598780.051
SU2-RSW-27	1464806.941	598793.042
SU2-RSW-28	1464821.941	598793.042
SU2-RSW-91	1464709.441	598832.013
SU2-RSW-93	1464709.441	598754.070
SU2-RSW-94	1464724.441	598754.070
SU2-RSW-95	1464686.941	598767.061
SU2-RSW-96	1464701.941	598767.061
SU2-RSW-97	1464716.941	598767.061
SU2-RSW-98	1464731.941	598767.061
SU2-RSW-99	1464679.441	598780.051
SU2-RSW-100	1464694.441	598780.051
SU2-RSW-101	1464709.441	598780.051
SU2-RSW-102	1464724.441	598780.051

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Attachment III Sample Coordinates and Location Labels

Location Label	Easting	Northing
SU2-RSW-103	1464739.441	598780.051
SU2-RSW-104	1464754.441	598780.051
SU2-RSW-105	1464769.441	598780.051
SU2-RSW-106	1464716.941	598793.042
SU2-RSW-107	1464731.941	598793.042
SU2-RSW-108	1464746.941	598793.042
SU2-RSW-109	1464761.941	598793.042
SU2-RSW-110	1464776.941	598793.042
SU2-RSW-111	1464791.941	598793.042
SU2-RSW-112	1464724.441	598806.032
SU2-RSW-113	1464739.441	598806.032
SU2-RSW-114	1464754.441	598806.032
SU2-RSW-115	1464769.441	598806.032
SU2-RSW-116	1464784.441	598806.032
SU2-RSW-117	1464799.441	598806.032
SU2-RSW-118	1464814.441	598806.032
SU2-RSW-119	1464716.941	598819.022
SU2-RSW-120	1464731.941	598819.022
SU2-RSW-121	1464746.941	598819.022
SU2-RSW-122	1464761.941	598819.022
SU2-RSW-123	1464776.941	598819.022
SU2-RSW-124	1464791.941	598819.022
SU2-RSW-125	1464806.941	598819.022
SU2-RSW-126	1464821.941	598819.022
SU2-RSW-128	1464724.441	598832.013
SU2-RSW-129	1464739.441	598832.013
SU2-RSW-130	1464754.441	598832.013
SU2-RSW-131	1464769.441	598832.013
SU2-RSW-132	1464784.441	598832.013
SU2-RSW-133	1464799.441	598832.013
SU2-RSW-138	1464746.941	598845.003
SU2-RSW-139	1464761.941	598845.003
SU2-RSW-140	1464776.941	598845.003
SU2-RSW-141	1464791.941	598845.003
SU2-RSW-148	1464769.441	598857.993
SU2-RSW-149	1464784.441	598857.993
SU4-RSW-92	1464791.941	598870.984
SU4-RSW-127	1464836.941	598819.022
SU4-RSW-134	1464814.441	598832.013
SU4-RSW-135	1464829.441	598832.013
SU4-RSW-136	1464844.441	598832.013
SU4-RSW-137	1464859.441	598832.013
SU4-RSW-142	1464806.941	598845.003
SU4-RSW-143	1464821.941	598845.003
SU4-RSW-144	1464836.941	598845.003
SU4-RSW-145	1464851.941	598845.003
SU4-RSW-146	1464866.941	598845.003
SU4-RSW-147	1464881.941	598845.003
SU4-RSW-150	1464799.441	598857.993
SU4-RSW-151	1464814.441	598857.993

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Attachment III Sample Coordinates and Location Labels

Location Label	Easting	Northing
SU4-RSW-152	1464829.441	598857.993
SU4-RSW-153	1464844.441	598857.993
SU4-RSW-154	1464859.441	598857.993
SU4-RSW-155	1464874.441	598857.993
SU4-RSW-156	1464806.941	598870.984
SU4-RSW-157	1464821.941	598870.984
SU4-RSW-158	1464836.941	598870.984
SU4-RSW-159	1464851.941	598870.984
SU4-RSW-160	1464866.941	598870.984
SU4-RSW-161	1464829.441	598883.974
SU4-RSW-162	1464844.441	598883.974
SU4-RSW-163	1464859.441	598883.974
SU4-RSW-164	1464851.941	598896.965
SU4-RSW-237	1464701.941	598845.003
SU4-RSW-238	1464716.941	598845.003
SU4-RSW-239	1464731.941	598845.003
SU4-RSW-240	1464694.441	598857.993
SU4-RSW-241	1464709.441	598857.993
SU4-RSW-242	1464724.441	598857.993
SU4-RSW-243	1464739.441	598857.993
SU4-RSW-244	1464754.441	598857.993
SU4-RSW-245	1464686.941	598870.984
SU4-RSW-246	1464701.941	598870.984
SU4-RSW-247	1464716.941	598870.984
SU4-RSW-248	1464731.941	598870.984
SU4-RSW-249	1464746.941	598870.984
SU4-RSW-250	1464761.941	598870.984
SU4-RSW-251	1464776.941	598870.984
SU4-RSW-252	1464709.441	598883.974
SU4-RSW-253	1464724.441	598883.974
SU4-RSW-254	1464739.441	598883.974
SU4-RSW-255	1464754.441	598883.974
SU4-RSW-256	1464769.441	598883.974
SU4-RSW-257	1464784.441	598883.974
SU4-RSW-258	1464799.441	598883.974
SU4-RSW-259	1464814.441	598883.974
SU4-RSW-260	1464731.941	598896.965
SU4-RSW-261	1464746.941	598896.965
SU4-RSW-262	1464761.941	598896.965
SU4-RSW-263	1464776.941	598896.965
SU4-RSW-264	1464791.941	598896.965
SU4-RSW-265	1464806.941	598896.965
SU4-RSW-266	1464821.941	598896.965
SU4-RSW-267	1464836.941	598896.965
SU4-RSW-268	1464769.441	598909.955
SU4-RSW-269	1464784.441	598909.955
SU4-RSW-270	1464799.441	598909.955
SU4-RSW-271	1464814.441	598909.955
SU4-RSW-272	1464829.441	598909.955
SU4-RSW-273	1464844.441	598909.955
SU4-RSW-274	1464859.441	598909.955

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Attachment III Sample Coordinates and Location Labels

Location Label	Easting	Northing
SU4-RSW-275	1464791.941	598922.945
SU4-RSW-276	1464806.941	598922.945
SU4-RSW-277	1464821.941	598922.945
SU4-RSW-278	1464836.941	598922.945
SU4-RSW-279	1464851.941	598922.945
SU4-RSW-280	1464814.441	598935.936
SU4-RSW-281	1464829.441	598935.936
SU4-RSW-282	1464844.441	598935.936
SU14-RSW-779	1464747.250	598745.207
SU14-RSW-780	1464739.750	598758.198
SU14-RSW-781	1464834.335	598739.385
SU14-RSW-782	1464849.335	598739.385
SU14-RSW-783	1464864.335	598739.385
SU14-RSW-784	1464841.835	598752.375
SU14-RSW-785	1464856.835	598752.375
SU14-RSW-786	1464871.835	598752.375
SU14-RSW-787	1464864.335	598765.365
SU14-RSW-788	1464879.335	598765.365

Survey Unit Design (SUD)

Project: **R, SW, 58, 68, and B Soils**

Review & Approval

Project Engineer: Bob Ransbottom R.C. Ransbottom

Reviewer: Bob Coblentz _____

Reviewer: Connie Kline Connie Kline

document	Title
AM	R, SW, 58, and 68 Slab Removal Action
AM	B Building Removal Action
WP	Demolition of Building B/R/SW/68/58 Slabs/Below Grade Structures
VSAP	Standard Verification Sampling & Analysis Plan, Final, August 2004

Pre-Excavation or X **Post-Excavation**? **Survey Units 9 and 10** Date: **5/18/2005**

Summary of Changes (for Post-Excavation SUDs ONLY) (see following pages for details)	YES	NO
1. Did the COC(s) change?	X	
2. Did the grid size or N change?	X	
3. Did the classification change?		X
4. Were bias/judgmental samples collected?	X	
5. Other significant change?		None

C43/82

SUD Worksheet

Item 1

Summary of historic **information** relevant to SU:

The Removal Action associated with this SUD addressed identified contamination areas with contaminants of concern (COCs) **above the cleanup objective (CO).**

R and SW were used for various radiological processes through the years. The R, SW, 58, and 68 slab Action Memorandum COCs include Actinium-227, Americium-241, Bismuth-207, Cesium-137, Lead-210, Proactinium-231, Plutonium-238, Plutonium-239/240, Radium-226, Strontium-90, Thorium-228, Thorium-230, Thorium-232, Tritium, Uranium-233, Uranium-234, and Uranium-238. Isotopes associated with polonium processing also include Bi-210m and Co-60. Th-229 was associated with U-233 processing. Curium-244 has been found during recent R Building drain sampling.

B Building was used for Actinium and Polonium radioisotopic research on animals. The B Building Action Memorandum COCs include Actinium-227, Lead-210, Tritium, and Berylium. The tritium is due to B Building's proximity to R/SW and the Berylium is due to processes in the building. Isotopes associated with polonium processing also include Bi-207, Bi-210m and Co-60. In addition, a solvent shed was associated with B Building, so organic COCs include Trichloroethene, 1,2 trans-Dichloroethene, and 1,2 cis-Dichloroethene.

Item 2

Summary of historic **data** relevant to SU:

See Appendix A

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)	Tritium (A-014)	Strontium-90 (A-015)	Metals & Mercury (A-031)	VOCs (A-001)	Explosives (A-010)

File Name:

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Analyses of COCs in surface soil are to be performed per Mound Methods Compendium as applicable. Compendium Method A-012 is Isotopic Uranium, Isotopic Plutonium, and Isotopic Thorium by Alpha Spectrometry. Cm-244 analysis is performed using the method found in Appendix G. Compendium Method A-015 is Gamma Spectrometry. A-014 is analysis by liquid scintillation for Tritium and A-016 is analysis for Strontium-90. Note that alpha spec data will supercede gamma spec data for isotopes where the former is more sensitive (e.g., Th-230, Pu-238). Analysis for Volatile Organic Compounds (VOCs) is by Operation A-002, for Explosives is A-001, for TPH is A-023, and for metals is A-031. (See Appendix D for the Target Analyte Lists for A-001, A-010, A-023, and A-031).
Surface samples/analysis are to be in accordance with MD-80036 OP 30005, 30007, 30040 for the Fidler and 90022 for the AXISS. (Note: Fidler G5 and Axiss instruments are both to be used for walkover surveys. See table in Appendix F for reference.)

Changes if any, from Pre-exc SUD:

The AXISS will not be used for walkover surveys. See memo Actinide X-Ray In-Situ Scanning System "AXISS" by Ron Daily in Attachment II, Appendix L.
The FIDLER will be used and if any elevated readings are found, additional soil will be removed and the area resurveyed.

Note: Attachment II, Appendix H contains survey and sample analysis results obtained during excavation (RASS data). Included are results from sampling for VOCs in SU-10. No results are above screening levels. Therefore, verification samples in SU-9 and 10 will not be analyzed for VOCs. Metals were erroneously included as COCs for SU-9 and 10. Therefore, verification samples in SU-9 and 10 will not be analyzed for metals. Analysis of RASS samples of post excavation soil at the south boundary of the B slab nearest to R and SW, revealed very low levels of tritium (See Appendix H). Therefore, tritium is being removed as a COC for Survey Units 9 and 10.

Item 3b

Chem basis for std dev, AM COCs/New COCs

Changes, if any, from Pre-Ex SUD:

No changes

Item 4

Classify Areas & provide justification

The 181,447 sq. ft area covered in this SUD includes the footprints of R, SW, B, and 68 Buildings, as well as part of the Hot Waste Drain system and the loadout areas and roadways around the buildings. The H Building area is excluded since it was previously verified to be clean and is not being used as a loadout or storage area for the R/SW/B demolition. All of the above buildings housed various processes that were radiological or chemical in nature. As a result, all SUs are Class 1 due to the known presence of radiological contamination in the buildings above the areas, known contamination in pipe lines below the buildings, and possible cross-contamination from the demolition and load-out of debris.

Selection	Class	Scan Coverage guidelines
SU s 1 -12	1	100%
N/A	2	
N/A	3	

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Changes if any, from Pre-exc SUD:

This Post-Ex SUD only applies to Survey Units 9 and 10. No changes to classification.

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Item 5		
	Subdivide areas into SUs See Appendix A for Data See Appendix B for SUs	The area is divided into 12 Survey Units (SUs). The SUs were first situated according to the processes that occurred in each area, but were limited in size to less than the 17,500 sq. ft. threshold. SU 1 is 12,347 sq. ft. and is located to the west and south of SW Building and includes the roadway as well as PRS 143, R/SW/T Bldg. Stack Diesel Fuel Storage Tank (EG-1) and PRS 253 T West Stack. A portion of the SW underground exhaust duct to T West stack lies in the SU. The EG-1 diesel tank was removed under the BUSTR program. Resulting soil sample analysis results will be presented along with the data report for this SUD. The T West stack foundation will be removed under a separate work plan and SUD. SU 2 is 14,978 sq. ft. and covers the western portion of R Building and the eastern portion of SW Building and includes SW-8, SW-13, and R-108 as well as PRSs 133, 135, 139, 142, 144, 327, and 328. SU 2 also includes a portion of the PRS 131 red and yellow drain system. The PRS 437 Hot Waste line runs through this SU but is broken out under SU 12. SU 3 is 13,807 sq. ft., covers the western portion of SW and includes the PRS 132 Old and New Cave areas , the SW-20 complex, as well as PRSs 136, 137, 138, 249, and 250. A portion of the SW underground exhaust duct to T West stack lies in the SU. As with SU 2, a portion of the PRS 437 Hot Waste line runs through this SU, but is excluded. SU 4 is 18,103 sq. ft., covers the middle portion of R Building and includes the majority of the PRS 131 red and yellow drain system as well as PRSs 145 and 146. This area slightly exceeds the 17,500 sq. ft. threshold, but it is totally surrounded by other SUs and includes a clearly definable potion of R Building. SU 5 is 16,784 sq. ft. and includes the northeast portion of R Building and the associated loadout area. SU 6 is 17,247 sq. ft. and includes the southeast portion of R Building and the associated loadout area as well as the Building 68 pad. SU 7 is 15,289 sq. ft., covers the southern portion of R Building and includes the R Building underground exhaust duct to T West stack. SU 8 is 11,316 sq. ft. and covers the area under and adjacent to Building 58. It includes Rooms SW-149/149A as well as PRSs 134, 140, 141, 209, 234, 251, and 329. As with SUs 2 and 3, a portion of the PRS 437 Hot Waste line and the PRS 425 portion of the Hot Waste line run through this SU, but is excluded. SU 9 is 17,541 sq. ft., covers the additions to B Building and the adjacent areas. SU 10 is 16,969 sq. ft., covers the original portion of B Building and adjacent areas. SU 11 is 16,752 sq. ft., covers the northern portion of R Building, the courtyard between R, SW, and B Buildings and includes PRS 252, B Building Stack. As with SUs 2 and 3, a portion of the PRS 437 Hot Waste line as well as PRS 425, runs through this SU, but are excluded. SU 12 is 10,313 sq. ft, including sidewalls. It was established to follow the Hot Waste Line, including PRSs 425, 437 and a portion of 438, through SW Building. In order to layout the required trench wall surveys, this SU was split out separately from the surrounding SUs and laid open.

Changes from Pre-Ex SUD:

For clarification, PRSs 129/130, and 244 were binned NFA by the Core Team 5/14/97 and 12/17/96 respectively (See Attachment II, Appendix M). These PRSs are not included in this SUD verification. However, part of the area under the former B slab (SU 9) was evaluated for VOCs, due to the proximity to PRSs 129/130 (see Attachment II, Appendix K, Item 2.).

CH7/82

Item 6a

Calculations / Rad

1. Calculate the (s) for each COC listed above: See Appendix B.

2. Number of Samples (N): See Appendix B.

Spreadsheet Calculated = 9 samples based upon the data for each of SU 1 through 12.

SU1 Scanning MDC (Area Factor) corrected = 382 samples

SU2 Scanning MDC (Area Factor) corrected = 464 samples

SU3 Scanning MDC (Area Factor) corrected = 428 samples

SU4 Scanning MDC (Area Factor) corrected = 561 samples

SU5 Scanning MDC (Area Factor) corrected = 520 samples

SU6 Scanning MDC (Area Factor) corrected = 534 samples

SU7 Scanning MDC (Area Factor) corrected = 473 samples

SU8 Scanning MDC (Area Factor) corrected = 350 samples

SU9 Scanning MDC (Area Factor) corrected = n/a - Pu-238 not COC in SU-9

SU10 Scanning MDC (Area Factor) corrected = n/a - Pu-238 not COC in SU-10

SU11 Scanning MDC (Area Factor) corrected = 519 samples

SU12 Scanning MDC (Area Factor) corrected = 319 samples

Visual Sample Plan (VSP) 15 foot triangular grid:

SU1 Calculated= 9 Selected Samples (on Map) = 67 including 2 biased samples

SU2 Calculated = 9 Selected Samples (on Map) = 87 including 9 biased samples.

SU3 Calculated = 9 Selected Samples (on Map) = 90 including 17 biased samples.

SU4 Calculated = 9 Selected Samples (on Map) = 94 including 1 biased samples

SU5 Calculated = 9 Selected Samples (on Map) = 85 with 0 biased samples.

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SU6 Calculated = 9 Selected Samples (on Map) = 88 with 0 biased samples.

SU7 Calculated = 9 Selected Samples (on Map) = 83 including 5 biased samples.

SU8 Calculated = 9 Selected Samples (on Map) = 75 including 16 biased samples.

SU9 Calculated = 8 Selected Samples (on Map) = 92 with 0 biased sample.

SU10 Calculated = 8 Selected Samples (on Map) = 87 with 0 biased samples.

SU11 Calculated = 9 Selected Samples (on Map) = 86 including 1 biased sample.

SU12 Calculated = 9 Selected Samples (on Map) = 53 with 0 biased samples .

The determination of the number of samples is consistent with section 3.7 of the standard VSAP, which provides a default grid spacing for SUs where PU-238 is the primary driver in the removal action.

Sample locations were selected by VSP with sampling goals of finding a Hot Spot utilizing a 15-foot triangular grid with a random starting point. Additional samples chosen via judgmental sampling. Sample locations will be surveyed at the time of sampling or closely following.

A total of 1000 sample locations will be assessed.

Note: Due to safety concerns of placing an individual in the excavation of piping such as the hot waste lines, which are expected to be up to 15 feet below grade, FSS side wall sampling will be accomplished by scraping the sidewall with an excavator bucket and subsequent sampling of the material in the bucket in accordance with the procedures established the standard VSAP, Final, August 2004, Section 4.4 Special Considerations.

Changes if any, from Pre-exc SUD:

This Post-Ex SUD only applies to Survey Units 9 and 10. Pu is not a COC on SU 9 & 10, therefore the MDC factor Pu is not used for these survey units. Biased locations for VOCs were removed from SU 9 and 10. A default 15' grid was used because we cannot scan for tritium. A total of 176 sample locations will be assessed in SU-9 and 10 (88 samples in each).

Item 6b	Calculations/Chem, Std dev, Number of Samples	NA, See Item 2

Changes if any, from Pre-exc SUD:

This Post-Ex SUD only applies to Survey Units 9 and 10. Pu is not a COC on SU 9 & 10, therefore the MDC factor Pu is not used for these survey units. Biased locations for VOCs were removed from SU 9 and 10. A default 15' grid was used because we cannot scan for tritium. A total of 176 sample locations will be assessed in SU-9 and 10.

Item 7	Grid spacing	From Appendix B. Triangular 15 foot grid, laid out by Visual Sample Plan.

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7	Changes if any, from Pre-exc SUD: None
Item 8	QA/QC: 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
Item 9	Bias/judgement samples (Additional bias samples are always within the discretion of the EPA.) Biased sample locations have been designated as follows: Two locations have been designated in SU 1. They include one at the PRS 253 T West Stack and one at the PRS 143 EG-1 Diesel Fuel Tank. The PRS 143 sample will be analyzed for TPH. **Note:** The T West Stack and foundation will be removed and verification performed under separate work plan and SUD. The EG-1 Diesel Fuel Tank was removed under the BUSTR program. Verification sampling done under that program will be submitted as an appendix to the data report for this SUD. Nine locations have been designated in SU 2. They include one each at PRSs 133, 135. 139, 142, 144, 327, 328 as well as two along the portion of the SW underground exhaust duct which

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runs through this SU.

Seventeen locations have been identified in SU 3. They include one each at PRSs 136, 137, 138, 249, 250, as well as three along the portion of the SW underground exhaust duct which runs through this SU. Also nine were designated in the SW-20 complex and will be analyzed for energetics.

One location has been designated in SU 4. This located at PRS 145.

No biased samples have been designated in SUs 5 and 6.

Five locations have been designated in SU 7. Four are located along the portion of the R underground exhaust duct which runs through this SU and one is located along the portion of the SW underground exhaust duct which runs through this SU.

Sixteen biased samples have designated in SU 8. They include one at PRS 134, two at PRS 140, five at PRS 141, one at PRS 209, five at PRS 234 (will be analyzed for TPH), and one at PRS 329.

One location has been designated in SU 9. It is located at PRS 244 and will be analyzed for VOCs.

Fifteen locations have been designated in SU 10. They are located at PRSs 129 and 130 as well as along the solvent lines into B Building and around the solvent room inside the B footprint, and will be analyzed for VOCs.

One location has been designated in SU 11. It is located at PRS 252.

No biased samples have been designated in SU 12.

Changes from Pre-Ex SUD: SU 9 – VOC samples collected and reported (See Attachment II, Appendix K). No further VOC samples are planned. PRS 244 was previously binned NFA; therefore no biased samples will be taken at that location.
SU 10 - VOC samples collected and reported (See Attachment II Appendix K). No further VOC samples are planned. PRSs 129 and 130 were previously binned NFA; therefore no biased samples will be taken at those locations.

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File Name:

Item 10	Not otherwise covered comments

Characterization sampling collected during removal of the slabs, piping, and other in-ground structures, will be used to convert this Pre-excavation SUD into the Post-excavation SUD. The target area map in Appendix E will be used to target specific analytes. The target areas and associated COCs are based on historical sampling, process knowledge and PRSs. Each target area requires at least 7 samples. These samples will be taken at suspect areas, especially at PRS locations, such as piping and tanks. The samples will be analyzed for COCs specific to each target area (see Appendix E). These data will be used by USEPA, OHIO EPA, DOE, and CH2M Hill to develop the Post-excavation SUD. (Note to regulators: If Th-229, Th-230, U233, or U234 are found, the 15 foot verification grid will be continue to be used due to inability to see these isotopes during walkover surveys. If these isotopes are not found during characterization, consideration will be given to expanding the grid size, due to use of the Fidler G5 and Axiss instruments for walkover surveys, which together can see all other identified radioactive COCs, during walkover surveys. See Appendix F.)

Site policy requires performance of onsite soil screening (NaI or germanium) on 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.

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, 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. Potentially impacted work areas near the excavation, where excavated material was loaded into haulers, and which are soil surfaces, are sampled within SU1. Potentially impacted work area near the excavation, where excavated materials were loaded into haulers, and which are hard surfaces (e.g., concrete and asphalt), will be surveyed and released per RadCon procedures in accordance with DOE Order 5400.5 and Mound 2000 Work Plan Appendix A Table 1 The RSDS(s) will be included in the data report as documentation. Any final sample location that does not meet the surface release criteria will be submitted to the Core Team for concurrence.

Accessibility for sampling in narrow trenches, such as in SU12, is a constraining factor. Sampling of the excavation walls may be impeded due to excavation wall accessibility by both personnel and equipment. Sidewall sampling will be performed via excavator sampling. Accessibility to the excavation floor by personnel may be impeded due to the width of the excavation not being sufficient to use a man-box for access. Where sufficient volume of soil exists and is accessible with an excavator a soil sample will be taken, otherwise a surface survey (swipe and direct) will be performed utilizing methods available from atop the excavation. Potentially impacted work area atop the excavation, where excavated materials were loaded into haulers, and which are soil surfaces, are sampled as part of the SU. Potentially impacted work area atop the excavation, where excavated materials were loaded into haulers, and which are hard surfaces (i.e., concrete and asphalt), will be surveyed and released per RadCon procedures in accordance with DOE Order 5400.5 and Mound 2000 Work Plan Appendix A Table 1.

In-process sampling events (Characterization and Remedial Action Support Survey (RASS) samples) will be conducted during the entire B/R/SW/68/58 slab remediation. Those samples will undergo gamma and (as needed) alpha spectrometry analysis to guide actions. RASS sampling of the remediated areas will be used to determine if the FSS (verification) sampling could be conducted.

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.

CJ 2/8/2

Changes from Pre-Ex SUD: Reference to the AXISS unit has been removed. See Attachment II Appendix L for details. Other than the VOC samples taken, no RASS samples were collected and analyzed. Because SU 9 and 10 are believed to have no elevated soil levels, and rad surveys of underground pipes and of concrete debris indicated no elevated levels, CH2 intends to proceed with verification per Attachment II.

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File Name:

1. RSDS Sheets Documenting Rad Surveys of Removed Piping

SUMMARY OF RESULTS

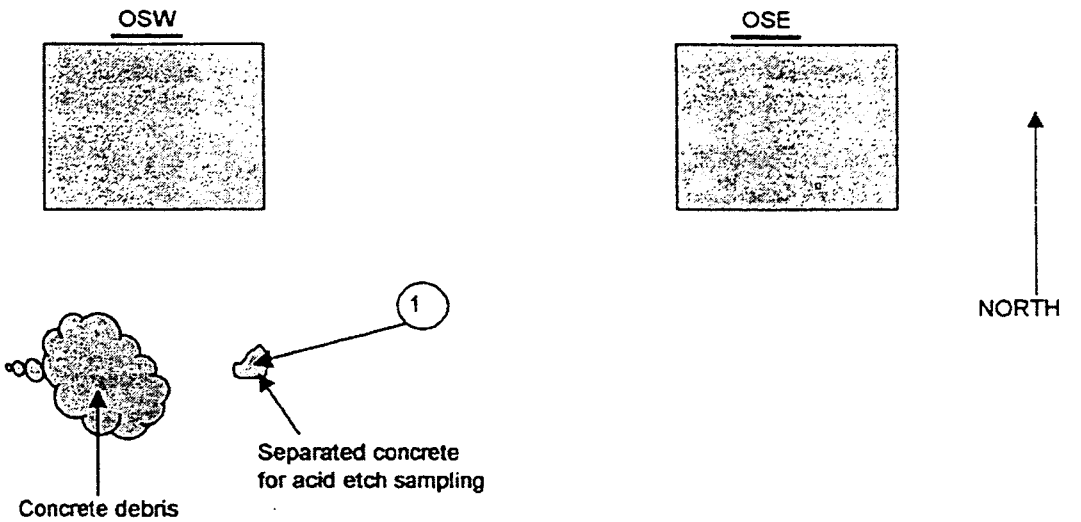
RSDS# 05-TF-0127 details isotopic analysis of an acid etch taken from an area at B Slab where surface scans indicated contamination on concrete debris. All results are below DOE-5400.5 limits.

RSDS# 05-R/SW-0203 details surveys taken on ends of piping excavated from beneath B Slab. All results are below DOE-5400.5 limits

RADIOLOGICAL SURVEY DATA SHEET

LOCATION (BLDG /AREA/ROOM)	SURVEY NO
B-Building Footprint	05-TF-0127
PURPOSE: Acid Etch sampling of concrete footer surface	RWP NO: N/A
	DATE: 3/21/2005
	TIME: 9:00

MAP / DRAWING



Direct measurement prior to etching: 500 dpm/100cm2 alpha; 700 dpm/100cm2 beta
No detectable activity on acid etch location after sample collected.

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	5767/5798	8/10/2005
3030	5901	2/21/2006
	NA	

[redacted]	7707	3/30/05
	5781	3/30/05

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Survey No.
05-TF-0127

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm^2)				
Sample #	β/γ	Alpha	Tritium	Comments
1	26	0	N/A	acid etch location
		A		
		N		

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

COMMENTS: None

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.

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RSDS 05-TF-0127
Page 3 & 4

Laboratory ID#:	0501842
Project/function:	B. Building
Submitted:	Mar 21, 2005
Submitted by:	L. Hopkins
Point of Contact:	B. Coblentz
RSDS#:	N/A
Date:	Mar 30, 2005

Lab ID	0501842		
Sample Location	B-Bldg Etch #1		
Isotope	dpm/sample	Uncertainty +/-	LDL
Pu-238	0.46	0.27	0.42
Pu-239/240	<LDL	<LDL	0.42
Th-227	1.37	0.42	0.77
Th-228	3.26	0.65	0.77
Th-230	8.62	1.16	0.28
Th-232	3.37	0.65	0.28
U-233/234	7.25	2.48	1.96
U-235	<LDL	<LDL	3.23
U-238	3.46	1.69	3.23
Po-210	134.63	12.96	2.60

[redacted]

1585 — HP #
3-30-05 — Date

7783 — HP #
3/30/5 — Date

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B-Building Concrete Acid Etch Data Analysis

Group 3 (5000 dpm)		Group 2 (1000 dpm)		Group 1 (100 dpm)	
Po-210	134.63	Th-230	3.37	Th-227	1.37
U-233	7.25			Th-228	3.26
U-238	3.45			Th-230	8.62
				Pu-238	0.46
Total:	145.33	Total:	3.37	Total:	13.25
Fraction of Total Sample:	0.897376	Fraction of Total Sample:	0.020809	Fraction of Total Sample:	0.081815

Maximum Gross Alpha Measurement:	560 dpm/100cm2
Group 1 Contribution:	46 dpm/100cm2
Group 2 Contribution:	12 dpm/100cm2
Group 3 Contribution:	503 dpm/100cm2

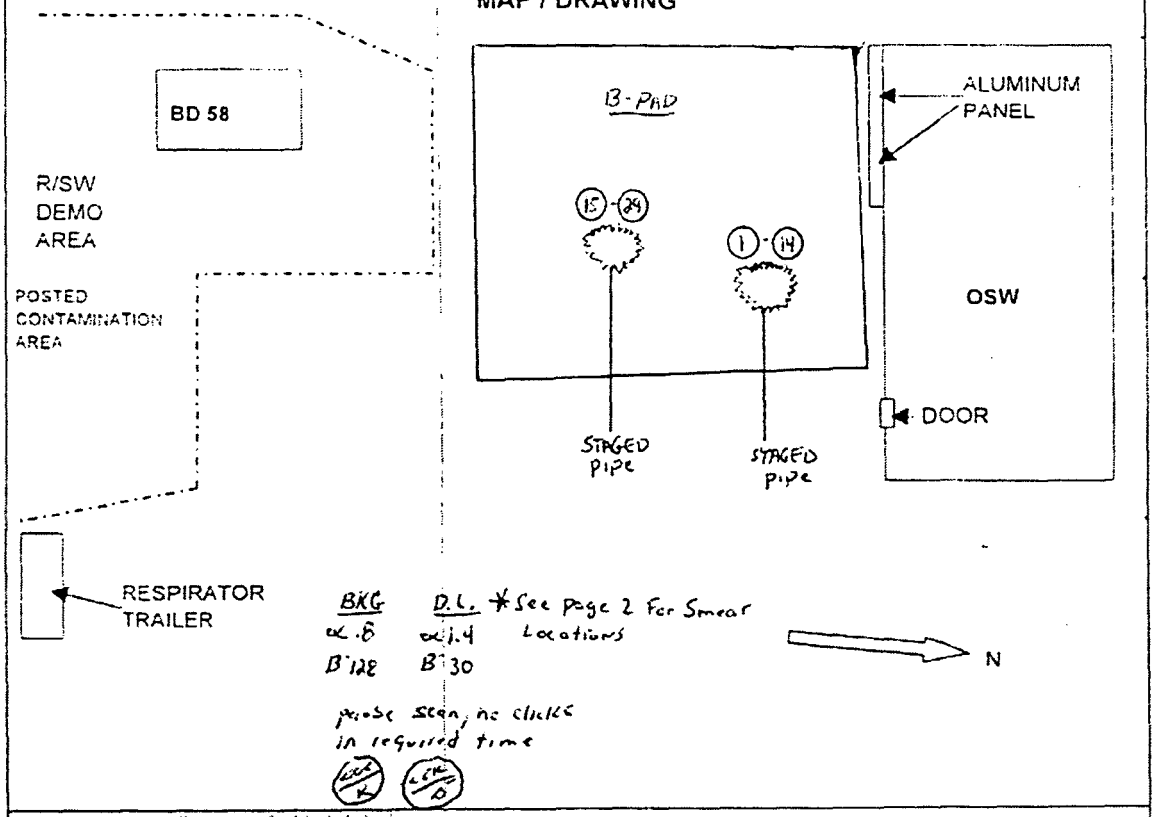
$$\frac{46}{100} + \frac{12}{1000} + \frac{503}{5000} = 0.5703$$

The sum of the ratios of 0.5703 is < 1.0, therefore acceptable for release

RADIOLOGICAL SURVEY DATA SHEET

LOCATION/EQUIPMENT/ROOM: B-PAD	SURVEY NO: 05-R1SW 0203
PURPOSE: Survey of pipe found while digging PAD	SUPERVISOR: N/A
	DATE: 3/11/05
	TIME: 1300

MAP / DRAWING



BKG: α .8, β 128
D.L.: α 1.4, β 30
*See page 2 for Smear Locations

please scan, no clicks in required time

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

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
i360	5690/5729	11/3/05
See	Attached	SHEETS
↓	↓	↓

[redacted]

7299	3/11/05
6012	3/11/05

ML-9620 (2-98)

COPY

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Survey No. 05-R15W 0203

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	See	ATTACHed	SheeTS	PiPeingOUTSIDe
2				
3				
4				
5				
6				
7				
8				INSIDe PiPe
9				
10				
11				
12				
13				
14				
15				PiPe OUTSIDE
16				
17				
18				
19				INSIDe PiPe
20				
21				
22				
23				PiPe OUTSIDe
24				
25				
26				PiPe INSIDe
27				
28				
29				
	N		A	

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

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 or 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-9520A (4-98)

COPY

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Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR054
Batch Ended: 3/11/05 15:38

Crosstalk correction performed.

Recalibration Date: 11/03/05
Serial Number: 26966-1

Batch ID: 05-R/SW-0203 M. SIZEMORE (29) AG

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		3.49	2.86	
A2	2	0.00	2.27		5.55	3.10	
A3	3	0.00	2.16		0.00	1.27	
A4	4	0.00	2.04		0.00	1.78	
B1	5	1.69	1.93		0.00	1.64	
B2	6	0.00	2.13		3.45	2.91	
B3	7	0.00	1.95		0.10	2.17	
B4	8	0.00	1.87		0.00	1.20	
C1	9	1.83	2.41		2.99	3.32	
C2	10	0.00	2.25		4.97	3.57	
C3	11	0.00	2.12		1.52	2.65	
C4	12	1.51	2.10		2.33	2.86	
D1	13	1.15	2.19		0.00	1.53	
D2	14	2.02	2.24		0.98	2.19	
D3	15	0.00	1.95		0.00	2.04	
D4	16	0.00	2.15		0.00	1.44	
A1	17	0.00	2.17		0.00	1.83	
A2	18	1.73	2.26		4.13	2.83	
A3	19	0.00	2.18		0.48	1.76	
A4	20	0.00	2.05		1.15	2.16	
B1	21	0.00	2.01		3.20	2.77	
B2	22	1.49	2.07		0.00	2.08	
B3	23	0.00	1.96		1.32	2.50	
B4	24	0.00	1.89		0.00	1.65	
C1	25	0.00	2.34		0.00	1.97	
C2	26	0.00	2.16		0.00	1.96	
C3	27	0.00	2.11		0.22	2.31	
C4	28	0.00	2.05		0.00	1.35	
D1	29	0.00	2.21		0.30	2.52	

AR

11 Mar 2005 17:48 ALPHA/BETA - 1.09 ~~Page #1~~ MS 3/12
Protocol #: 6 PW H3 #403727 User : 2138

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5	- 18.6	0	0.0	7.86
Region B:	2.0	- 18.6	0	0.0	7.37
Region C:	40.0	- 2000	0	0.0	11.40

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
05-R/SW-0203 M. SIZEMORE (29) AG
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT6.dat
Count Data Filename: C:\DATA\SDATA6.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	7.86	7.37	11.40	630.42	5	B		0.00
0	2.00	556.56	536.77	0.00	615.17	0		1156.17	109.88
1	2.00	0.00	0.00	0.00	396.27	0		0.00	0.00
2	2.00	0.00	0.00	0.00	344.76	0		0.00	0.00
3	2.00	0.00	0.00	0.10	517.78	9		0.00	0.00
4	2.00	0.00	0.00	0.60	476.29	0		0.00	0.00
5	2.00	1.98	2.47	0.00	396.34	0		5.34	12.93
6	2.00	0.00	0.00	0.00	456.13	0		0.00	0.00
7	2.00	0.00	0.00	0.00	253.59	0		0.00	0.00
8	2.00	0.00	0.00	0.00	411.08	14		0.00	0.00
9	2.00	0.00	0.00	0.00	304.00	0		0.00	0.00
10	2.00	0.00	0.00	0.00	393.25	0		0.00	0.00
11	2.00	0.00	0.00	0.10	342.93	0		0.00	0.00
12	2.00	0.00	0.00	0.00	195.09	14		0.00	0.00
13	2.00	0.00	0.00	0.00	465.95	0		0.00	0.00
14	2.00	0.00	0.00	0.10	448.10	14		0.00	0.00
15	2.00	0.64	0.60	4.10	319.05	12		2.06	14.58
16	2.00	0.00	0.00	0.00	488.19	0		0.00	0.00
17	2.00	0.00	0.00	0.60	408.43	20		0.00	0.00
18	2.00	1.39	1.63	1.10	442.18	5		3.49	11.71
19	2.00	0.00	0.00	0.10	609.15	0		0.00	0.00
20	2.00	0.64	0.76	0.00	377.37	12		1.79	12.67
21	2.00	0.00	0.00	0.00	431.38	0		0.00	0.00
22	2.00	0.00	0.00	0.00	583.85	0		0.00	0.00
23	2.00	0.00	0.00	0.57	339.25	60		0.00	0.00
24	2.00	0.00	0.00	0.00	479.59	0		0.00	0.00
25	2.00	0.00	0.00	0.00	405.85	8		0.00	0.00
26	2.00	0.00	0.00	0.00	443.45	15		0.00	0.00
27	2.00	0.00	0.00	2.10	514.99	0		0.00	0.00
28	2.00	1.44	1.83	0.60	478.13	0		3.43	11.14
29	2.00	0.00	0.00	0.00	560.97	14		0.00	0.00

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2. Preliminary Soil Sample Results Taken and Biased Sample Locations for VOCs

SUMMARY OF RESULTS

Soil samples were taken at locations called out in the pre-excavation SUD for biased sampling for VOCs at B Slab. No results were above the cleanup objective or hazard index for each analyte.

B Building Sub-foundation Soil
VOA Sampled 1/20/05
Blank Cells=Non-Detect

	PQL	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	B-09	B-10	B-11	B-12	B-13	B-14	B-15	Blank	SSL	CO	HI
Analyte	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
1,1,1-Trichloroethane	5.8																			3.31E+06
1,1,2,2-Tetrachloroethane	12																		8.88E+03	
1,1,2-Trichloroethane	5.8																		1.90E+04	8.18E+06
1,1,-Dichloroethene	5.8																			
1,1-Dichloroethane	5.8																			1.06E+07
1,2-Dichlorobenzene	5.8																			1.92e
1,2-Dichloroethane	5.8																		7.61E+03	1.97E+07
1,2-Dichloroethene (total)	12																	255.0524		
1,2-Dichloropropane	12																		4.38E+05	2.16E+04
1,3-Dichlorobenzene	5.8																			6.38E+06
1,4-Dichlorobenzene	5.8	*0.49*													*0.89*	*0.6*	*0.47*		1.24E+06	1.54E+12
2-Butanone	23																			9.30E+06
2-Hexanone	5.8																			
4-methyl-2-pentanone	23																			
Acetone	23																			1.92E+08
Benzene	5.8																		5.42E+05	4.90E+05
Bromodichloromethane	5.8																		4.81E+05	4.26E+06
Bromoform	5.8																		3.77E+06	4.26E+06
Bromomethane	12										*1.2*									1.26E+04
Carbon disulfide	5.8																			1.16E+06
Carbon tetrachloride	5.8																		5.38E+03	5.62E+03
Chlorobenzene	5.8																			4.89E+05
Chloroethane	12								*1.4*											1.60E+05
Chloroform	5.8																		5.15E+03	1.50E+06
Chloromethane	12																		2.71E+04	1.58E+05
cis-1,3-Dichloropropene	5.8																			
Dibromochloromethane	12																		3.55E+05	4.26E+06
Ethylbenzene	5.8																			4.80E+02
Methylene chloride	5.8	*5.7*	*3.7*	*4.1*	*3.7*	*4.7*	*3.6*	27	33		36	*3.5*	*3.0*	*3.2*	40	*3.5*	*3.8*			
Styrene	5.8																			1.45E+07
Tetrachloroethene	5.8																		1.87E+05	2.13E+06
Toluene	5.8																			2.50E+05
trans-1,3-Dichloropropene	12																			
Trichloroethene	5.8	9.0	*4.0*	6.2	15	19	16	14	9.5	*4.5*	6.0	*5.0*	*3.8*	*4.6*	27	14		62.1748	5.25E+04	4.40E+05
Vinyl chloride	5.8																		4.14E+00	1.19E+05
Xylenes(total)	12																			4.26E+07
Sys. Monitoring Cmpds	% Recovery																			
1,2-Dichloroethane-d4	72-134	110	106	102	106	109	106	94	107	108	111	109	110	114	110	116	113			
4-Bromofluorobenzene	68-150	110	106	109	101	98	94	104	102	104	101	85	120	127	116	90	90			
Dibromofluoromethane	78-130	99	97	97	93	94	86	94	111	95	110	34	81	90	104	11	95			
Toluene-d3	80-130	102	98	103	106	107	94	104	102	107	108	100	117	118	101	94	96			

Blank cells are non-detects below instrument detection levels
Italics indicate detections below PQL
PQL - Practical Quantitation Level

3. Analysis Results of Purple Material Found Under Slab Cap

SUMMARY OF RESULTS

During removal of the B Slab, a small area of purple discoloration was found between the slab and what appeared to be a slab cap in the area of the former plastic injection molding area (See map). Samples were taken and the analysis shows no results over the cleanup objective or hazard index of each analyte.

K 13 OF 17

C66/82

B Bldg Sub Pad "Purple" Soil
Semivolatiles
Sampled 3/29/05
Blank Cells=Non-Detect

Analysis Results of Purple Stained Material at B Slab

	PQL	BP-23905		BP-23905		Cleanup Objective	Hazard Index
Dilution		1	Flag	100	Flag	1.00E-06	1
Analyte	µg/kg	µg/kg		µg/kg		µg/kg	µg/kg
Phenol	370						
bis (2-Chloroethyl)-ether	370						
2-Chlorophenol	370						
1,3-Dichlorobenzene	370						
1,4-Dichlorobenzene	370						
1,2-Dichlorobenzene	370						
2-Methylphenol	370						
2,2'-oxybis(1-Chloropropane)	370						
4-Methylphenol	730	1.30E+05	E	1.10E+05	D		1.06E+06
N-Nitrosodi-n-propyl-amine	370						
Hexachloroethane	370						
Nitrobenzene	370						
Isophorene	370						
2-Nitrophenol	370						
2,4-Dimethylphenol	370	6.00E+03	E				4.26E+06
bis(2-Chloroethoxy) methane	370						
2,4-Dichlorophenol	370						
1,2,4-Trichlorobenzene	370						
Naphthalene	370						
4-Chloroaniline	370						
Hexachlorobutadiene	370						
4-Chloro-3-methylphenol	370						
2-Methylnaphthalene	370						
Hexachlorocyclopentadiene	1800						
2,4,6-Trichlorophenol	370						
2,4,5-Trichlorophenol	370						
2-Chloronaphthalene	370						
2-Nitroaniline	1800						
Dimethyl phthalate	370						
Acenaphthylene	370						
2,6-Dinitrotoluene	370						
3-Nitroaniline	1800						
Acenaphthene	370						
2,4,-Dinitrophenol	1800						
4-Nitrophenol	1800						
Dibenzofuran	370						
2,4-Dinitrotoluene	370						
Diethyl phthalate	370						
Fluorene	370						
4-Chlorophenyl phenyl ether	370						
4-Nitroaniline	1800						
4,6,-Dinitro-2-methylphenol	1800						
N-Nitrosodiphenylamine	370						
4-Bromophenyl phenyl ether	370						
Hexachlorobenzene	370						
Pentachlorophenol	1800						
Phenanthrene	370						
Anthracene	370						
Carbazole	370						
Di-n-butyl phthalate	370						
Fluoranthene	370	7.30E+01	J			8.50E+06	8.25E+06
Pyrene	370	6.80E+02				6.40E+06	6.39E+06
Butyl benzyl phthalate	370	3.10E+02	J				4.26E+07
Benzo(a)anthracene	370	6.40E+02				4.08E+04	
3,3,'-Dichlorobenzidine	1800						
Chrysene	370	6.10E+02				4.08E+04	
bis (2-Ethylhexyl) phthalate	370						
Di-n-octyl phthalate	370						
Benzo(b)fluoranthene	370	5.30E+02				4.08E+04	
Benzo(k)fluoranthene	370	3.90E+02				4.08E+05	
Benzo(a)pyrene	370	3.80E+02				4.08E+03	
Indeno(1,2,3-cd)pyrene	370	2.30E+02	J			4.08E+04	
Benzo(ghi)perylene	370	2.40E+02	J				
Dibenzo (a,h) anthracene	370						

Blank cells indicate analytes that were not detected
"J" flags are for analytes detected but at less than the Practical Quantitation Limit (PQL)
"E" flags are for analytes detected at concentrations above the calibration range
"D" flags are for analytes that determined from diluted samples

Note: No cleanup objective or hazard index exists for Benzo(ghi)perylene
Summary: No analyte exceeds cleanup objective or hazard index, so none will be added to the COC list.

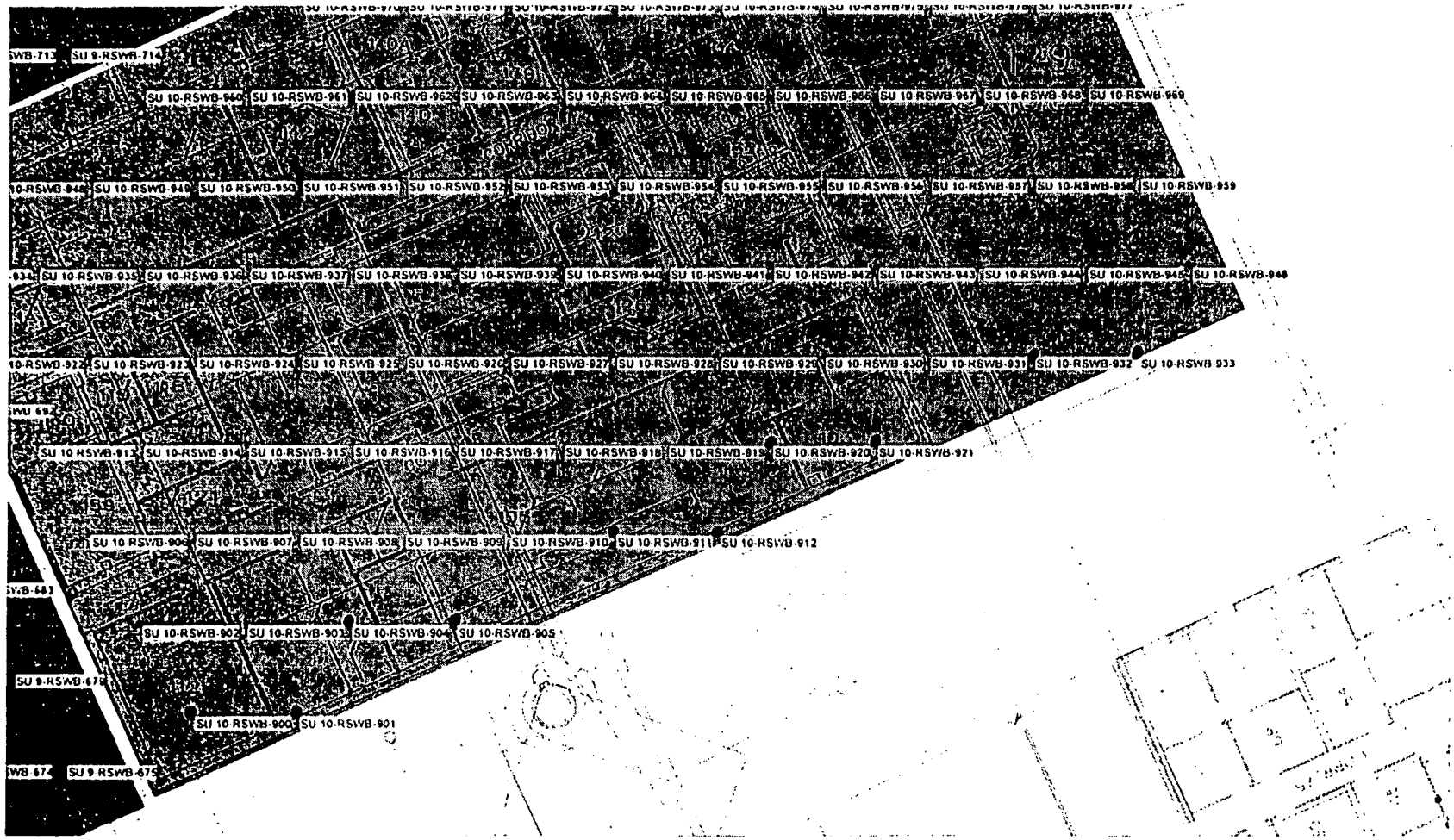
C 67/82

4. Analysis of results for soil at south edge of B Slab

SUMMARY OF RESULTS

Soil samples were taken along a 15-foot grid at the south boundary of B Slab, which is nearest to R and SW Buildings, which would be the source of any tritium. The samples were analyzed for tritium and the results are listed.

C68/82



B TRITIUM SAMPLE LOCATIONS

C69/97

K 16 OF 17

B Building Sub-Foundation Soil
Tritium Results
Sampled May 5, 2005

SAMPLE ID	MDC	H-3 pCi/g
SU10-RSWB-900	0.68	*1.12*
SU10-RSWB-901	0.69	*1.30*
SU10-RSWB-904	0.67	*1.05*
SU10-RSWB-905	0.67	
SU10-RSWB-911	0.69	
SU10-RSWB-912	0.68	*0.83*
SU10-RSWB-920	0.70	*1.12*
SU10-RSWB-921	0.68	
SU10-RSWB-932	0.69	
SU10-RSWB-933	0.69	*0.78*
Blank	0.66	
% Recovery		
Lab Control Sample		91%
SU10-RSWB-900 MS		89%
SU10-RSWB-900 MSD		87%

Blank cells are results < MDC
Italic results are less than Practical Quantitation Levels but > than MDC
MDC - Mininum Detectable Concentration

MS - Matrix Spike
MSD - Matrix Spike Duplicate

Survey Unit Design (SUD)

Final

Project: **T East and T West Stack Soils (PRS 253 and 254)**

Review & Approval

Project Engineer: Bob Ransbottom _____ for

Reviewer: Jim Fontaine _____

Reviewer: _____

document	Title
AM	R, SW, 58, and 68 Slab Removal Action Addendum 1
WP	Demolition and Capping of T East and T West Stack Foundations
VSAP	Standard Verification Sampling & Analysis Plan, Final, August 2004

☐ **Pre-Excavation** or ☒ **Post-Excavation**?

Summary of Changes (for Post-Excavation SUDs ONLY) (see following pages for details)	YES	NO	COMMENTS
1. Did the COC(s) change?	X		No COCs for T East/ T West moved to R/SW/B
2. Did the grid size or N change?	X		No COCs for T East/ T West moved to R/SW/B
3. Did the classification change?	X		No COCs for T East/ T West moved to R/SW/B
4. Were bias/judgmental samples collected?		X	
5. Other significant change?	X		No COCs for T East/ T West moved to R/SW/B

CH/92

SUD Worksheet

Item 1

Summary of historic **information** relevant to SU:

The Removal Action associated with this SUD addressed identified contamination areas with contaminants of concern (COCs) above the cleanup objective (CO).

R, SW, and T were used for various radiological processes. Refer to Action Memorandum, Buildings R, SW, 58, and 68 Slab, Removal Action, Revision 1, Final, June 2003 and Buildings R, SW, 58 and 68 Slab Removal Action, Action Memorandum, Addendum 1, March 2005 for building descriptions and uses.
The R, SW, 58, and 68 slab Action Memorandum Addendum 1 COCs include Actinium-227, Americium-241, Bismuth-207, Cesium-137, Lead-210, Proactinium-231, Plutonium-238, Plutonium-239/240, Radium-226, Silver 108m, Strontium-90, Thorium-228, Thorium-230, Thorium-232, Tritium, Uranium-233, Uranium-234, and Uranium-238. Isotopes associated with polonium processing also include Bi-210m and Co-60.

Item 2

Summary of historic **data** relevant to SU:

See Appendix A

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)	Tritium (A-014)	Strontium -90 (A-016)	Metals & Mercury (A-031)
	See Appendix C										

Analyses of COCs in surface soil are to be performed per Mound Methods Compendium as applicable. Compendium Method A-012 is Isotopic Uranium, Isotopic Plutonium, and Isotopic Thorium by Alpha Spectrometry. Compendium Method A-015 is Gamma Spectrometry. Ag-108m will also be by gamma spectroscopy. A-014 is analysis by liquid scintillation for Tritium. Note that alpha spec data will supercede gamma spec data for isotopes where the former is more sensitive (e.g., Th-230, Pu-238).
Surface samples/analysis are to be in accordance with MD-80036 OP 30005, 30007, 30040 for the Fidler.

C72/80

Changes if any, from Pre-exc SUD: COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack.

Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.

Item 3b

Chem basis for std dev, AM COCs/New COCs NA, none identified.

Item 4

Classify Areas & provide justification

The 10,107 sq. ft area covered in this SUD includes a 15 foot perimeter around the footprints of T East and T West Stacks. Since the T East and T West Stacks were connected to buildings, which housed various processes that were radiological and were known to be radiologically contaminated, all SUs are Class 1. Air Shafts connecting the T East and T West stacks to T Building will be remain and will be surveyed under the T Building VSAP. The portion of Air Shafts connecting the T West Stack to R and SW Buildings that lie outside a 15 foot perimeter of T West Stack will be removed under the R/SW/B Slab removal work plan and verified under the R/SW/S Slab SUD; however the sections that lie within a 15 foot perimeter of the stack will be removed under the T Stack Foundation work Plan and will verified under this SUD.

Selection	Class	Scan Coverage guidelines
SU 1 (T East) & SU-2 (T West Stacks)	1	100%
N/A	2	
N/A	3	

C13/02

Changes if any, from Pre-exc SUD: COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack.

Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.

Item 5	Subdivide areas into SUs See Appendix A for Data See Appendix B for SUs	The area is divided into 2 Survey Units (SUs). Each SU includes its associated stack, fanhouse, and a 15 foot perimeter around the facility. The T West Stack SU-2 includes PRS 253 and encompasses 6,431 sq. ft. The T East Stack SU-1 includes PRS 254 and encompasses 3,676 sq. ft.

Changes if any, from Pre-exc SUD: COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack.

Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.

C14/82

Item 6a

Calculations / Rad

1. Calculate the (s) for each COC listed above: See Appendix B.

2. Number of Samples (N): See Appendix B.

Spreadsheet Calculated = 10 samples based upon the data for each SU.

SU-2 (T West Stack) Scanning MDC (Area Factor) corrected = 199 samples

SU-1 (T East Stack) Scanning MDC (Area Factor) corrected = 114 samples

Visual Sample Plan (VSP) 15 foot triangular grid:

SU-2 (T West Stack) Calculated= 34 Selected Samples; (on Map) = 35 including 1 biased sample.

SU-1 (T East Stack) Calculated = 19 Selected Samples; (on Map) = 20 including 1 biased sample.

The determination of the number of samples is consistent with section 3.7 of the standard VSAP, which provides a default grid spacing for SUs where PU-238 is the primary driver in the removal action.

Sample locations were selected by VSP with sampling goals of finding a Hot Spot utilizing a 15-foot triangular grid with a random starting point. Additional samples chosen via judgmental sampling. Sample locations will be surveyed at the time of sampling or closely following.

A total of 55 sample locations will be assessed.

Changes if any, from Pre-exc SUD: COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack.

Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.

Item 6b	Calculations/Chem, Std dev, Number of Samples	NA, none identified.
	Changes if any, from Pre-exc SUD:	
Item 7	Grid spacing	From Appendix B. Triangular 15 foot grid, laid out by Visual Sample Plan.
	Changes if any, from Pre-exc SUD: COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack. Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.	

2/8/02

Item 8	QA/QC: 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	
Item 9	Bias/judgment samples (Additional bias samples are always within the discretion of the EPA.)	Biased sample locations have been designated as follows: One location was designated at the base of each stack. Note: Biased samples were placed along the removed underground air shafts from R and SW Buildings to the T West Stack in the R, SW, 58, 68, and B Soils SUD. The underground air shafts from T East and T West Stacks to T Building will not be removed. They will be released through surveys performed under requirements of the T Building Removal Action, Action Memo.

27/82

9	**Changes if any, from Pre-exc SUD:** COCs for the T East Stack in the Pre-Ex SUD were by default the same as for the T West Stack. However, prior to demolition, Radiological Controls performed an evaluation of the radiological history of the stack and fanhouse and also performed pre-demolition radiological surveys. After demolition, debris pile surveys were performed on the stack and fanhouse debris. The survey results indicated that the debris met surface release criteria. In-process demolition surveys and RASS samples for T East Stack reveal no contamination exceeding cleanup objectives (see Appendix II). A MARSSIM Final Status Survey was performed in accordance with the T Building Verification Sampling and Analysis Plan on the T Buildings East Headhouse and the horizontal and vertical shaft that led from the Headhouse to the previously demolished T East Stack. (See T Building Final Status Survey Report for Survey Units SYS-01 and SYS-01B). These structures were surveyed for direct activity and removable contamination. No elevated areas were detected. The Core Team has approved the Final Status Survey Report for these Survey Units. No soil remediation was indicated or performed around the T East Stack. Therefore, no COCs have been identified for T East Stack and, by extension, verification sampling is not required. T West Stack verification sampling will be folded into the R/SW/B Post Ex SUD and removed from this SUD.
Item 10	Not otherwise covered comments RASS sampling collected during removal of the slabs and other in-ground structures, will be used to convert this Pre-excavation SUD into the Post-excavation SUD and adjust COCs as appropriate. This data will be used by USEPA, OHIO EPA, DOE, and CH2M Hill to develop the Post-excavation SUD. Site policy requires performance of onsite soil screening (NaI or germanium) on 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. 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, 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. Potentially impacted work areas near the excavation, where excavated material was loaded into haulers, and which are soil surfaces, are sampled within SU1. Potentially impacted work area near the excavation, where excavated materials were loaded into haulers, and which are hard surfaces (e.g., concrete and asphalt), will be surveyed and released per RadCon procedures in accordance with DOE Order 5400.5 and Mound 2000 Work Plan Appendix A Table 1. The RSDS(s) will be included in the data report as documentation. Any final sample location that does not meet the surface release criteria will be submitted to the Core Team for concurrence. In-process sampling events (Characterization and Remedial Action Support Survey (RASS) samples) will be conducted during the T East and T West stack slab removal. Those samples will undergo gamma and (as needed) alpha spectroscopy analysis to guide actions. RASS sampling of the remediated areas will be used to determine if the FSS (verification) sampling could be conducted. 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.

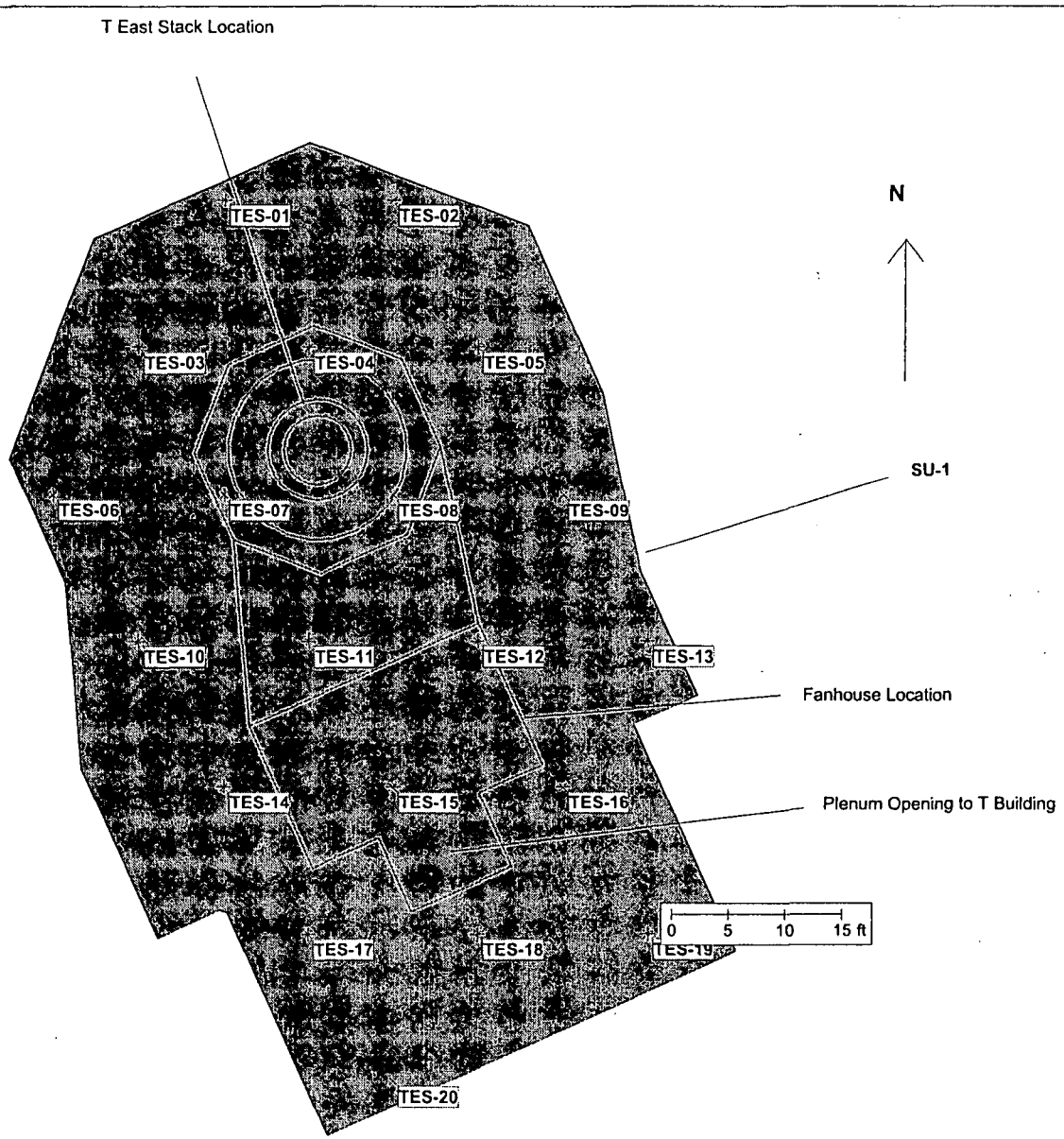
C18/C2

APPENDIX II

ATTACHMENTS FOR POST-EX SUD FOR REVIEW

This attachment presents RASS sample results and other back-up data to justify not performing verification sampling for T East Stack.

- Map for T East Stack RASS sampling
- RASS sample results for T East Stack
- RASS Sample Locations



T EAST STACK SURVEY UNIT 1 with SAMPLE LOCATIONS

T East Stack RASS Samples
Jan. 30, 2006

		Co-60		Cs-137		Pb-210		Ra-226		Ac-227		Th-230*		Th-232		Pu-238		Am-241	
	CO	0.76	pCi/g	3.84	pCi/g	7.45	pCi/g	3.01	pCi/g	4.64	pCi/g	2.8	pCi/g	2.1	pCi/g	55	pCi/g	63.1	pCi/g
Sample ID	Lab ID	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA	Activity	MDA
R/SW TES-01	GL09741	0	0.07	0.03	0.04	0.38	0.55	1.41	0.07	0	0.22	1.28	5.92	0.3	0.2	2.82	13.42	0.02	0.7
R/SW TES-02	GL09742	0	0.05	0.02	0.05	0.51	0.6	1.45	0.63	0.03	0.21	0	6.37	0.43	0.19	3.93	13.14	0.03	0.06
R/SW TES-03	GL09743	0	0.05	0.04	0.04	0.54	0.58	1.38	0.6	0	0.23	1.58	6.27	0.45	0.18	0	13.05	0.03	0.06
R/SW TES-04	GL09744	0.01	0.05	0.08	0.04	0.72	0.5	1.48	0.58	0	0.22	0.45	5.23	0.3	0.18	0.26	12.81	0.01	0.06
R/SW TES-05	GL09745	0.01	0.08	0.03	0.06	0.51	0.75	1.17	0.77	0	0.28	4.45	7.08	0.46	0.25	0.05	12.65	0	0.08
R/SW TES-06	GL09746	0.04	0.07	0.07	0.06	0.72	0.78	1.83	0.77	0.15	0.27	3.92	7.98	0.78	0.14	0.12	14.63	0.01	0.09
R/SW TES-07	GL09747	0	0.1	0.03	0.06	0.51	0.8	1.05	0.92	0.14	0.29	0	8.9	0.67	0.22	0	15.28	0	0.1
R/SW TES-08	GL09748	0.03	0.05	0.01	0.07	0.76	0.74	0.67	0.89	0.1	0.27	1.4	7.4	0.44	0.19	1.87	13.59	0.04	0.08
R/SW TES-09	GL09749	0	0.08	0.03	0.05	0.83	0.6	1.34	0.78	0.04	0.26	5.04	7.3	0.45	0.22	0	13.67	0	0.08
R/SW TES-10	GL09750	0	0.09	0.05	0.05	0.72	0.65	1.08	0.69	0.07	0.26	1.88	7.3	0.59	0.21	0.36	11.83	0.01	0.07
R/SW TES-11	GL09751	0.01	0.08	0.03	0.06	1.35	0.66	1.08	0.81	0.05	0.35	0	7.73	0.17	0.27	0	15.55	0.02	0.08
R/SW TES-12	GL09752	0	0.07	0.04	0.04	0.78	0.61	1.26	0.77	0	0.25	1.82	6.56	0.38	0.22	1.09	14.4	0	0.07
R/SW TES-13	GL09753	0	0.05	0.02	0.04	0.96	0.56	0.9	0.66	0	0.25	0	6.04	0.4	0.19	0	14.15	0.02	0.06
R/SW TES-14	GL09754	0.01	0.07	0	0.07	1.48	0.8	1.45	0.88	0	0.33	0	8.95	0.98	0.13	0	16.16	0	0.09
R/SW TES-15	GL09755	0	0.06	0.05	0.05	0.45	0.68	1.12	0.81	0	0.28	0	7.45	0.33	0.24	7.93	12.04	0.08	0.07
R/SW TES-16	GL09756	0.05	0.06	0.06	0.07	1.16	0.7	2.71	0.89	0.24	0.27	1.79	9.01	0.64	0.22	0	17.29	0	0.1
R/SW TES-17	GL09757	0.02	0.06	0.09	0.06	1.23	0.76	1.8	0.78	0	0.29	1.29	7.53	0.67	0.09	0	14.34	0	0.09
R/SW TES-18	GL09758	0.03	0.05	0.05	0.05	0.85	0.62	1.73	0.73	0.07	0.23	1.03	6.84	0.37	0.19	0	14.71	0	0.07
R/SW TES-19	GL09759	0	0.07	0.05	0.04	0.87	0.51	1.27	0.67	0	0.21	0	6.31	0.3	0.15	0	15.37	0.02	0.06
R/SW TES-20	GL09760	0.01	0.05	0.16	0.05	1.66	0.72	2.18	0.83	0	0.28	1.06	7.43	0.43	0.21	3.42	15.6	0.05	0.08
	Std. Dev.	0.015		0.035		0.359		0.463		0.067		1.528		0.192		2.039		0.021	
	Max	0.05		0.16		1.66		2.71		0.24		5.04		0.98		7.93		0.08	

* Th-230 acceptable if Activity is >CO but < MDA, and MDA <10 pCi/g

Area: SU1

X Coord	Y Coord	Label	Value	Type	Historical
1465349.4440	599102.2770	TES-01		Hotspot	
1465364.4440	599102.2770	TES-02		Hotspot	
1465341.9440	599089.2870	TES-03		Hotspot	
1465356.9440	599089.2870	TES-04		Hotspot	
1465371.9440	599089.2870	TES-05		Hotspot	
1465334.4440	599076.2970	TES-06		Hotspot	
1465349.4440	599076.2970	TES-07		Hotspot	
1465364.4440	599076.2970	TES-08		Hotspot	
1465379.4440	599076.2970	TES-09		Hotspot	
1465341.9440	599063.3060	TES-10		Hotspot	
1465356.9440	599063.3060	TES-11		Hotspot	
1465371.9440	599063.3060	TES-12		Hotspot	
1465386.9440	599063.3060	TES-13		Hotspot	
1465349.4440	599050.3160	TES-14		Hotspot	
1465364.4440	599050.3160	TES-15		Hotspot	
1465379.4440	599050.3160	TES-16		Hotspot	
1465356.9440	599037.3250	TES-17		Hotspot	
1465371.9440	599037.3250	TES-18		Hotspot	
1465386.9440	599037.3250	TES-19		Hotspot	
1465364.4440	599024.3350	TES-20		Hotspot	

C 82/82

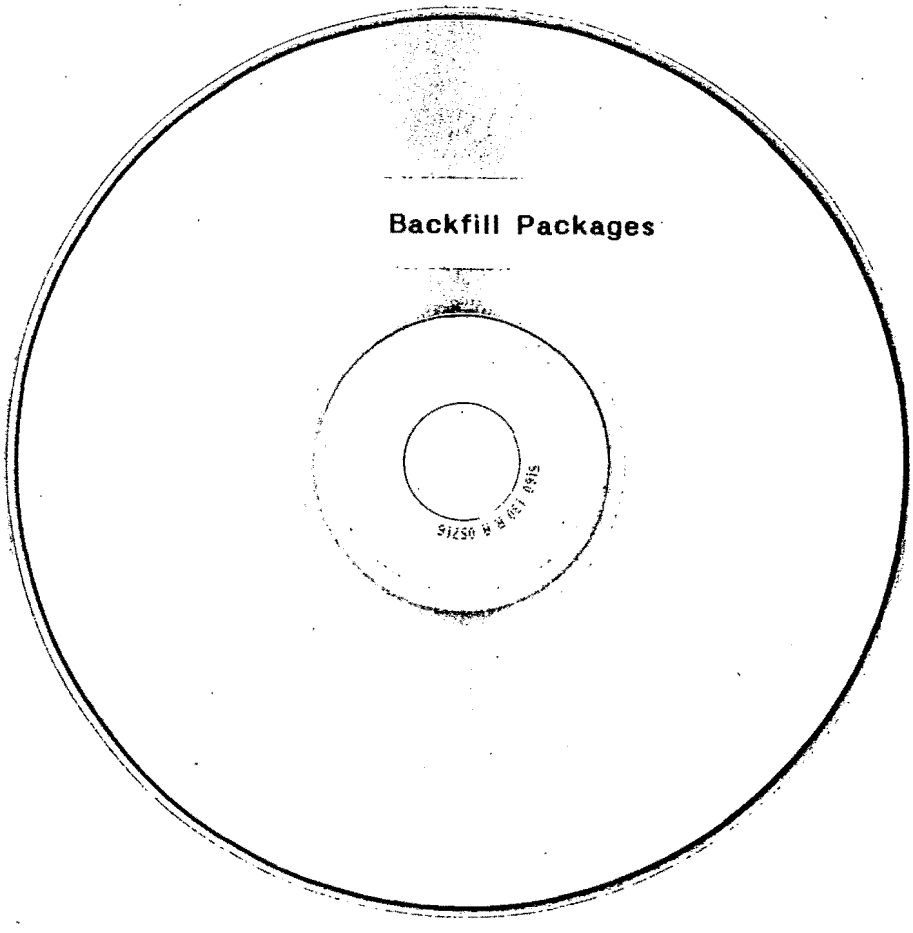
ATTACHMENT D

BACKFILL PACKAGES

- SUs 1, 2, 4, & 14
- SUs 3 & 11-13
- SU5
- SU6
- SUs 7-8
- SUs 9-10

CD of Attachment D

(Backfill Packages)



ATTACHMENT E

BUSTR LETTER & PRS 234 RECOMMENDATION PAGE

Ohio Department of Commerce

Division of State Fire Marshal
Bureau of Underground Storage Tank Regulations
8895 E. Main St. • P.O. Box 687
Reynoldsburg, OH 43068-9009
(614) 752-7938 FAX (614) 752-7942
www.com.state.oh.us

Bob Taft
Governor

Doug White
Director

October 05, 2005

WILLIAM TAYLOR DIRECTOR MCP
US DEPT OF ENERGY
175 TRI COUNTY PARKWAY
SPRINGDALE, OH 45246

SITE: U.S. DEPT OF ENERGY
EMERGENCY GENERATORS 1& 2
1 MOUND AVE
MIAMISBURG OH
MONTGOMERY COUNTY
RELEASE #57000630-N00004

RE: NO FURTHER ACTION STATUS REGARDING CORRECTIVE ACTION REQUIREMENTS

Dear Director Taylor:

The Bureau of Underground Storage Tank Regulations (BUSTR) has reviewed all information submitted for the referenced release. Based on this information, BUSTR requires no further action under Ohio Administrative Code 1301:7-9-13, effective September 1992.

Thank you for your cooperation. If you have any questions, please contact our office at (614) 752-7938.

Sincerely,

Kelly J. Gill
Corrective Action Supervisor

XC: Site File
John Lehew, CH2M HILL
Mark Case, Montgomery County Health Department
Robert L Bobbitt, Miamisburg Fire Dept

EG-1 is PRS 143.
29 June 6

E1/2

MOUND PLANT
PRS 234
FORMER TANK SITE
BUILDING 58 DIESEL FUEL

RECOMMENDATION:

This Potential Release Site (PRS) is the former location of a 3,000 gallon unlined, steel tank that was used to supply diesel fuel to an emergency generator. The tank was identified as a PRS because of its inclusion in the Mound Plant Underground Storage Tank Program Plan and Regulatory Status Review. Components of diesel fuel are the contaminants of concern associated with this PRS.

The tank was removed in December, 1989. During closure and removal, three soil samples were collected from the base, and the east and west walls of the open excavation. Lab analysis for Total Petroleum Hydrocarbon (TPH) indicated no contamination above the detection limit of 5 ppm as compared to the Bureau of Underground Storage Tank Regulations (BUSTR) guideline criteria of 105 ppm. Soil gas samples in the vicinity of PRS 234 detected trichloroethane (111-TCA), trichloroethene (TCE) and toluene. Calculations converting the 10^{-6} Risk Based Guideline Values for these compounds (given in mg contaminant per kg soil) into a corresponding 10^{-6} Risk Based Guideline Values for soil gas concentrations (parts contaminant per parts soil gas) showed the 111 TCA detection was approximately 60 times less than the guideline criteria, the TCE detection approximately 16 times less than the guideline criteria , and the toluene detection approximately 50,000 times less then guideline criteria. Radiological analysis also indicated Pu-238 and Th-232 below their guideline criteria of 25 pCi/g and 5 pCi/g respectively.

Therefore, since the VOC soil gas detections establishing this soils location as a PRS do not show evidence of contamination above guideline criteria and since there is no additional lab data or history to support evidence of contamination, PRS 234 requires NO FURTHER ASSESSMENT.

CONCURRENCE:

DOE/MB: Arthur W. Kleinrath, Remedial Project Manager — 8/20/96 (date)

USEPA: Timothy J. Fischer, Remedial Project Manager — 8/20/96 (date)

OEPA: Brian K. Nickel, Project Manager — 8/20/96 (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from ~~9/15/96~~ 9/16/96 to 10/15/96

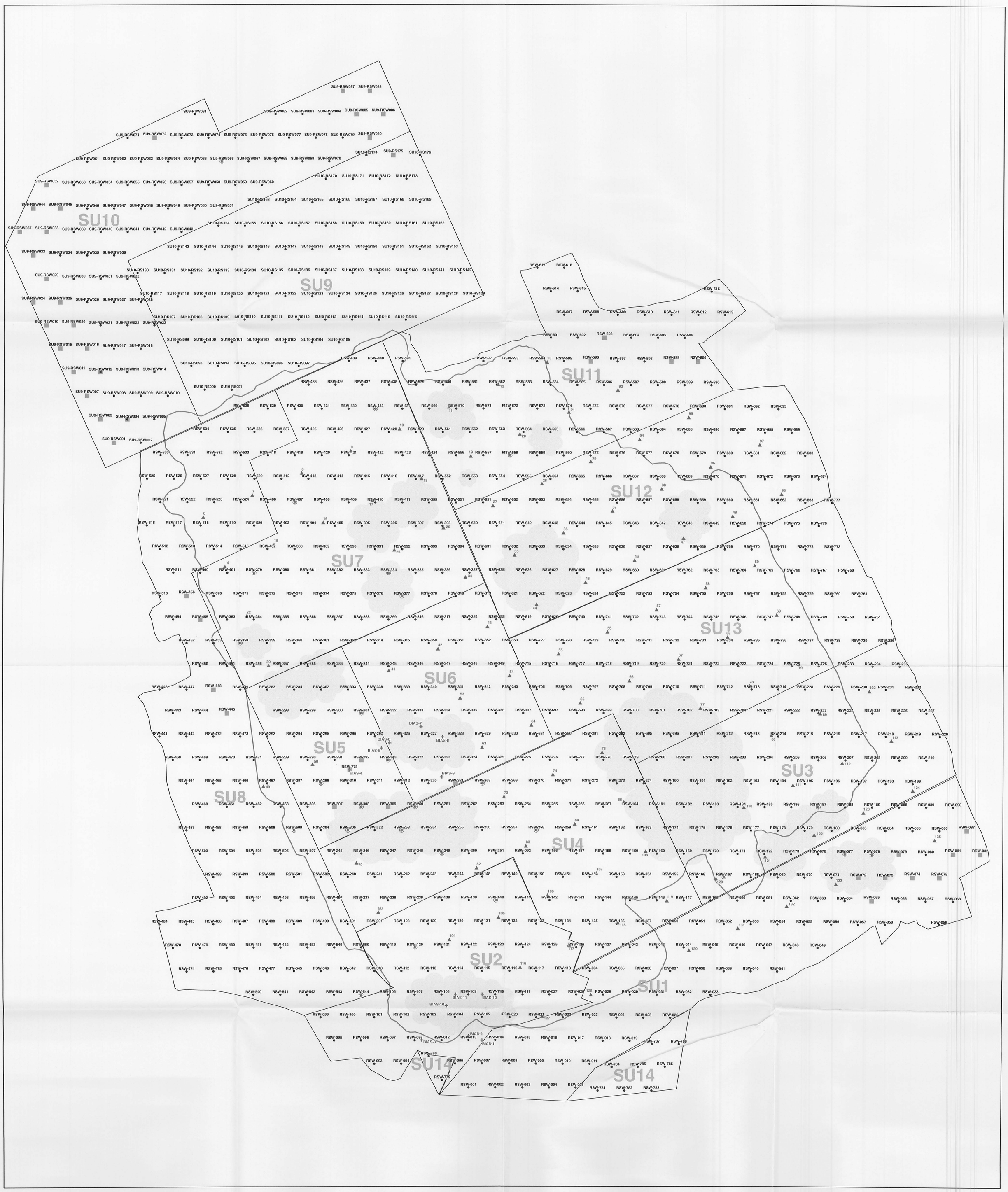
☒ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

Note: PRS 234 is EG-6

26 Jun 6

E2/2



Legend

- Verification Location
- RASS 30 ft. Grid "As Left" Location
- OEPA Bias Sample
- Verification Sample COCs > CO & < HS
- Hard Surface Location
- SU Boundary
- Excavated Boundary
- FIDLER Walkover Indication > 1Kcpm & < 5 Kcpm

25 0 25 50 75 100

Feet

N W E S

MOUND

Environmental Restoration Geographic Information System

Figure 3
RSWB Sample Locations

DATE: 07/12/06 | BY: SSP | APPROVED: *

FILE NAME: e:\arcmap\r_sw\rsw071206.mxd