Department of Energy

Ohio Field Office
Fernald Closure Project
175 Tri-County Parkway
Springdale, Ohio 45246
(513) 648-3155

AUG 30 2005

Mr. James A. Saric, Remedial Project Manager
United States Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0314-05

Mr. Thomas Schneider, Project Manager
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF THE FINAL CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR AREA 4B - PART ONE

References:
1) Letter, J. Saric to J. Reising, "Area 4B, Part 1 CDL and Certification PSP," dated August 16, 2005

2) Letter DOE-0306-05, "Transmittal of Responses to Ohio Environmental Protection Agency Comments on the Draft Certification Design Letter and Certification Project Specific Plan for Area 4B - Part One," dated August 22, 2005

Enclosed for your approval is the final Certification Design Letter and Certification Project Specific Plan (PSP) for Area 4B - Part One. The U.S. Environmental Protection Agency has already approved this document as mentioned in Reference 1. The Ohio Environmental Protection Agency comment responses noted in Reference 2 have been incorporated into this final PSP.

If you have any questions or require additional information, please contact Johnny Reising at (513) 648-3139.

Sincerely,

Johnny Reising

for William J. Taylor
Director

FCP:Reising

Enclosure

cc w/enclosure:
D. Pfister, OH/FCP
J. Reising, OH/FCP
T. Schneider, OEPA-Dayton (three copies of enclosure)
G. Jablonowski, USEPA-V, SR-6J
F. Bell, ATSDR
M. Cullerton, Tetra Tech
M. Shupe, HSI GeoTrans
R. Vandegrift, ODH
AR Coordinator, Fluor Fernald, Inc./MS78

cc w/o enclosure:
K. Alkema, Fluor Fernald, Inc./MS01
J. Chiou, Fluor Fernald, Inc./MS88
F. Johnston, Fluor Fernald, Inc./MS99
C. Murphy, Fluor Fernald, Inc./MS77
ECDC, Fluor Fernald, Inc./MS52-7

CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR AREA 4B - PART ONE

FERNALD CLOSURE PROJECT
FERNALD, OHIO

AUGUST 2005

U.S. DEPARTMENT OF ENERGY

20810-PSP-0008
REVISON 0

CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR AREA 4B - PART ONE

Document Number 20810-PSP-0008
Revision 0

August 2005

APPROVAL:

Jyh-Dong Chiou, Project Manager Environmental Closure Project	Date 8/25/05
Frank Miller, Characterization Manager Environmental Closure Project	Date 8/25/05
Tom Buhrlage, Sampling Manager for T.B. Environmental Closure Project	Date 8/25/05
Reinhard Friske, Quality Assurance/Quality Control Safety, Health and Quality	Date 8/25/05

FERNALD CLOSURE PROJECT

Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, Ohio 45253-8704

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LIST OF ACRONYMS AND ABBREVIATIONS

ASCOC	area-specific constituent of concern
ASL	analytical support level
BTV	benchmark toxicity value
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CRDL	contract required detection limit
CU	certification unit
DOE	U.S. Department of Energy
ECOC	ecological constituent of concern
EPA	U.S. Environmental Protection Agency
FACTS	Fernald Analytical Computerized Tracking System
FAL	Field Activity Log
FCP	Fernald Closure Project
FRL	final remediation level
GC	gas chromatography
GC/MS	gas chromatography mass spectroscopy
HWMU	hazardous waste management unit
ICP/MS	inductively coupled plasma/mass spectroscopy
LCS	liquid scintillation counting
MDC	Main Drainage Corridors
MDL	minimum detection level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
PCB	polychlorinated biphenyl
pCi/g	picoCuries per gram
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	Target Analyte List
UCL	Upper Confidence Limit
UST	underground storage tank
V/FCN	Variance/Field Change Notice
VOC	volatile organic compound
VSL	validation support level
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization
yd^3	cubic yards

EXECUTIVE SUMMARY

This document is a combination of the Certification Design Letter (CDL) and Certification Sampling Project Specific Plan (PSP) for Area 4B - Part One into one document. This document describes the certification design, sampling, analysis, and validation for Area 4B - Part One. Certification demonstrates that risk based, area-specific constituents of concern (ASCOCs) meet the final remediation levels. The following information is included:

- The original boundary of Area 4B (Figure 1-1);
- The boundary of Area 4B - Part One (Figure 1-2) and a description of the areas to be certified under the guidance of this CDL and Certification PSP;
- A discussion of historical data from the area proposed for certification;
- A discussion of the ASCOC selection process and list of ASCOCs assigned to Area 4B;
- A presentation of the certification unit (CU) boundaries and proposed sampling strategy;
- Details of certification sampling, analysis, and validation that will take place;
- The analytical requirements and the statistical methodology that will be employed; and
- The proposed schedule for the certification activities.

The scope of this CDL and Certification PSP is limited to the certification of Area 4B - Part One, as shown on Figure 1-2. Remediation was complete in Area 4B in 2005, thus initiating the certification process described in this CDL and Certification PSP. Field sampling in Area 4B is scheduled to begin immediately following approval of this document.

The certification design presented in this CDL and Certification PSP follows the general approach outlined in Section 3.4 of the Sitewide Excavation Plan (DOE 1998). The selection of Area 4B ASCOCs was accomplished using constituent of concern (COC) lists in the Operable Unit 5 Record of Decision (DOE 1996), previous investigation data, and process knowledge. Twenty-one CUs have been defined for this CDL and Certification PSP. Total uranium, thorium-228, thorium-232, radium-226, and radium-228 (the sitewide primary radiological COCs) are considered ASCOCs in each CU. Secondary COCs are identified for specific CUs within the certification area, including those for closure of Hazardous Waste Management Units 4, 18, 28, 46, 47, 49, and 50 as well as Underground Storage Tanks 11, 12, and 13.

1.0 INTRODUCTION

This Certification Design Letter (CDL)/Certification Sampling Project Specific Plan (PSP) describes the certification design, sampling, analysis, and validation necessary to demonstrate that soil in Area 4B - Part One have met the final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). Certification demonstrates that risk-based ASCOCs meet the FRLs. The format of this CDL and Certification PSP follows guidelines presented in the Sitewide Excavation Plan (SEP, DOE 1998). Accordingly, this CDL and Certification PSP consists of ten sections:

1.0 Introduction - Presentation of the purpose, objectives, and scope of this CDL and Certification PSP

2.0 Historical and Precertification Data - Discussion of historical soil data and presentation of precertification data from Area 4B

3.0 Area-Specific Constituents of Concern - Discussion of selection criteria and ASCOCs for Area 4B

4.0 Certification Approach - Presentation of design, surveying, sampling and analytical methodologies

5.0 Schedule

6.0 Quality Assurance/Quality Control Requirements - Presents the field Quality Control (QC), analytical methodologies

7.0 Health and Safety

8.0 Disposition of Waste

9.0 Data Management

References

1.1 OBJECTIVES

The primary objectives of this document are to:

- Define the boundaries of the area to be certified under the guidance of this CDL and Certification PSP;
- Present maps for newly acquired real-time data;
- Define the ASCOC selection process and list the selected Area 4B ASCOCs;
- Present the certification unit (CU) boundaries and proposed certification sampling strategy;

- Summarize the analytical requirements and the statistical methodology that will be employed; and
- Present the proposed schedule for the certification activities.
- Provides details of certification sampling, analysis and validation that will take place in the area.

1.2 SCOPE AND AREA DESCRIPTION

The scope of this CDL and Certification PSP includes details of certification sampling, analysis, and validation that will take place in Area 4B - Part One. The Area 4B certification area has been reduced for the scope of this CDL and Certification PSP due to the location of the Main Drainage Corridors (MDC) and the field location of the run-on/run-off controls, which were based on the current area topography. Figure 1-1 depicts the original layout of Area 4B and Figure 1-2 depicts the area to be certified under this CDL and Certification PSP.

Area 4B is located in the southeast quadrant of the Former Production Area and is bound by Area 3B to the north, "E" Street to the east, 1st Street to the south, and "B" Street to the west, as shown on Figure 1-1. Predominant structures formerly located in Area 4B include Plant 2, Plant 3, Plant 8, Pilot Plant, and Lab Building. Area 4B - Part One also includes a high-leachability zone where the total uranium FRL is 20 milligrams per kilogram (mg/kg), and the following hazardous waste management units (HWMUs): 4 (Drum Storage Area Near Lab Building Loading Dock), 18 (Plant 8 West Pad), 28 (Trane Thermal Liquid Incinerator, which includes Building 39 B, Oil Handling Tank, and Pad 74W), 46 (UNH Tanks - NFS Storage Area), 47 (UNH Tanks - North of Plant 2A), 49 (UNH Tanks - Digestion Area), and 50 (UNH Tanks - Raffinate Building). The entire Area 4B is approximately 25 acres. However, as discussed above, only approximately 15.1 acres will be included in the scope of this CDL and Certification PSP (Figure 1-2). The Area 4B - Part One perimeter to the south and to the west outside of the run-on control ditches, as well as HWMUs 5, 17, and 22 will be included in the scope of Area 4B - Part Two certification effort. Figure 1-3 depicts the topography of Area 4B - Part One.

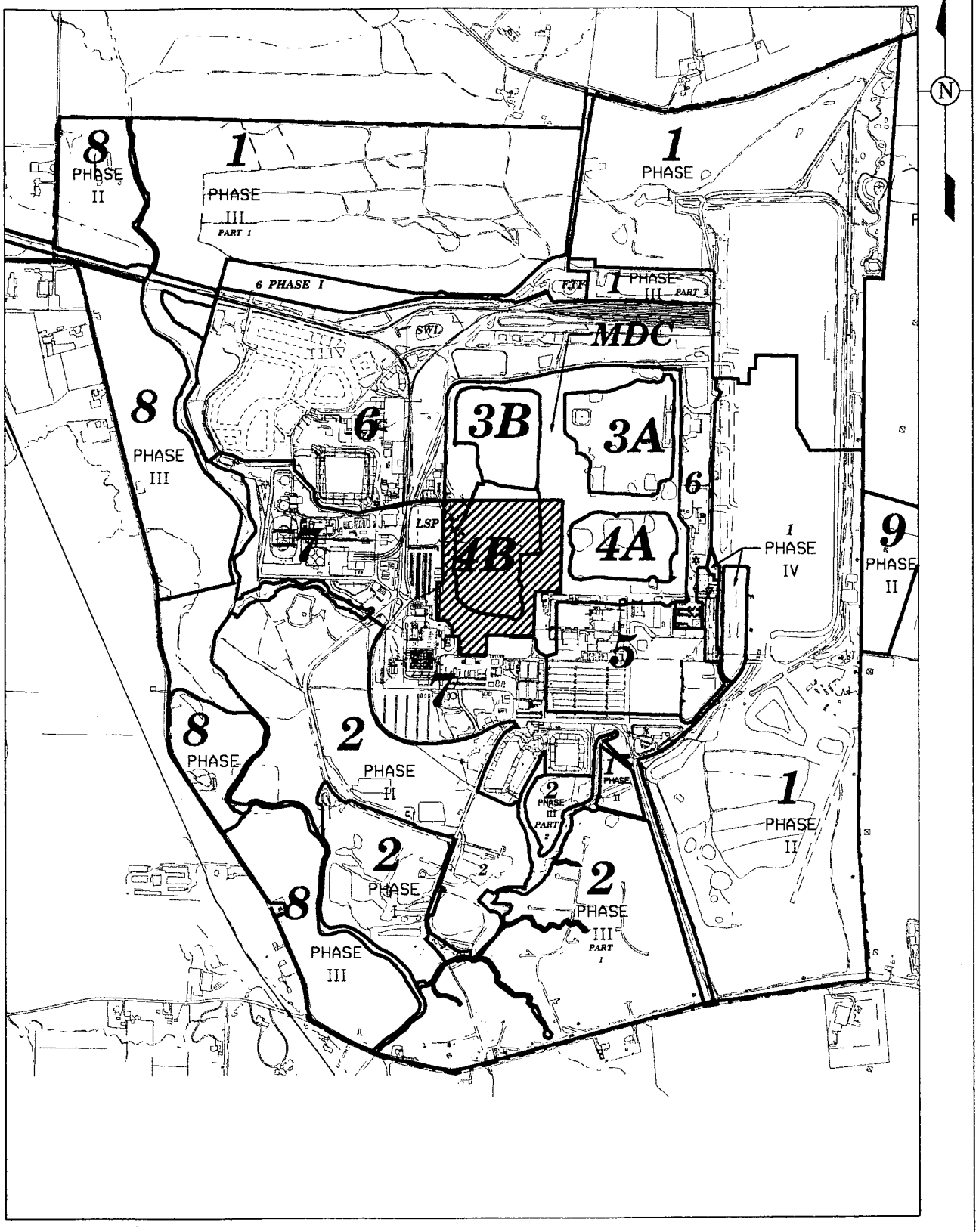
1.3 KEY PROJECT PERSONNEL

Key project personnel responsible for performance of the project are listed in Table 1-1.

TABLE 1-1
KEY PROJECT PERSONNEL

Title	Primary	Alternate
DOE Contact	Johnny Reising	TBD
Project Manager	Jyh-Dong Chiou	Rich Abitz
Characterization Manager	Frank Miller	Greg Lupton
Field Sampling Manager	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton/Eric Harman
WAO Contact	Christa Walls	Linda Barlow
Laboratory Contact	Amy Meyer	Heather Medley
Area 4B Data Management Contact	Greg Lupton	Krista Flaugh
Data Validation Contact	James Chambers	Baohe Chen
Field Data Validation Contact	Dee Dee Early	James Chambers
FACTS/SED Database Contact	Kym Lockard	Susan Marsh
QA/QC Contact	Reinhard Friske	Darren Wessel
Safety and Health Contact	Gregg Johnson	Pete Bolig/Jeff Middaugh

DOE - U.S. Department of Energy
FACTS - Fernald Analytical Computerized Tracking System
QA/QC - Quality Assurance/Quality Control
SED - Sitewide Environmental Database
WAO - Waste Acceptance Organization



LEGEND:

-·-·- FCP BOUNDARY

SCALE

1200 600 0 1200 FEET

FIGURE 1-1. AREA 4B LOCATION MAP

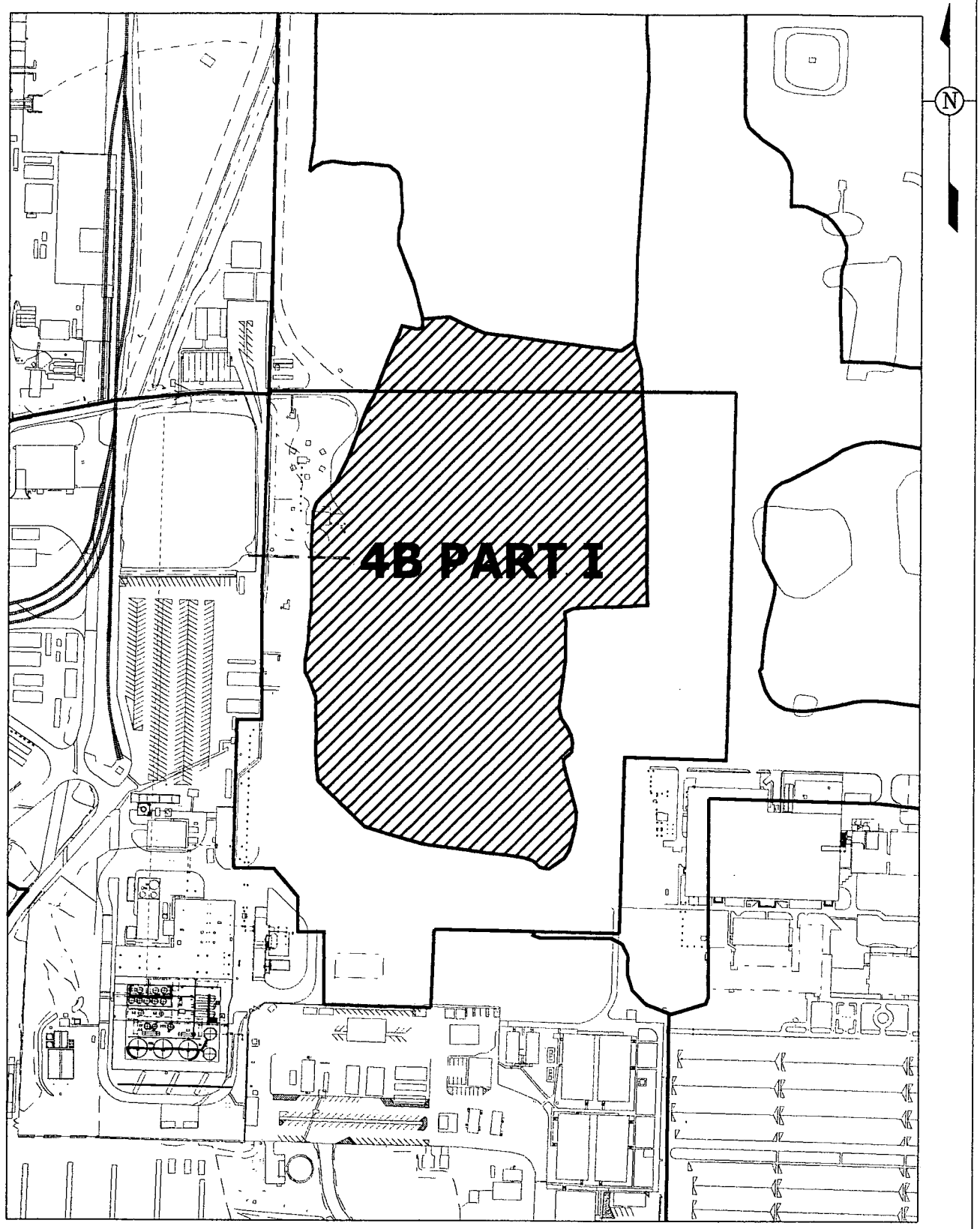


FIGURE 1-2. AREA 4B - PART ONE CERTIFICATION AREA

TECUMSEH SURVEYING, INC.
4948 CINCINNATI-BROOKVILLE ROAD
SHANDON, OHIO 45013
TELEPHONE: 513 738-2134
FAX: 513 738-2756

FLUOR FERNALD, INC.
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
EXCAVATION 4B

REVISIONS:

Designed By:	Drawn By: F.A.M.	Checked By:	Approved By:

Date: 08-28-2005
Scale: 1" = 60'
Project No.
4B TOPOGRAPHIC SURFACE
Sheet No. 1 OF 1

Figure 1-3. Area 4B - Part One Topography

2.0 HISTORICAL AND PRECERTIFICATION DATA

In accordance with the SEP, prior to conducting precertification and certification activities, all soil demonstrated to contain contamination above the associated FRLs or other applicable action levels must be evaluated for remedial actions.

In addition to the Predesign Investigations, the Remedial Investigation Reports (RI, DOE 1995a and 1995b), and Feasibility Study Reports (FS, DOE 1995c and 1995d) for Operable Units (OU) 3 and 5 were used for remedial design of Area 4B. Final grade excavation monitoring/sampling and real-time scanning/sampling data have been collected pursuant to the RI/FS and remedial activities.

Before initiating the certification process, all historical soil data within the Area 4B certification area was pulled from the Sitewide Environmental Database (SED), and is summarized in Section 2.1. Based on the results of sampling and scanning activities summarized below, it has been determined that no further remedial actions are necessary to remove above-FRL or above-waste acceptance criteria (WAC) soil.

2.1 AREA 4B

2.1.1 Area 4B - Part One Historical, Predesign and Excavation Control

All historical data are discussed in the Implementation Plan for Area 3B/4B/5 (DOE 2004a). This includes data collected during the RI/FS and during two separate predesign investigations; PSP for Delineating Known Exceedances of the On-Site Disposal Facility WAC in Areas 3B/4B/5 (DOE 2002) and PSP for Area 4B Potentially Characteristic Area and West of the Pilot Plant Predesign Investigation (DOE 2001). Data were also collected during the remediation/excavation activities for excavation control and following the remediation/excavation activities for precertification per the PSP for Excavation Control of Areas 3B, 4B, and 5 (Supplement to 20300-PSP-0011) (DOE 2004b).

Below is a brief discussion of the remediation/excavation activities of above-WAC and HWMU areas in Area 4B.

There were originally 11 designed above-WAC areas in Area 4B; however, as discussed in Section 1, only a portion of Area 4B is being certified therefore, only seven of the original above-WAC areas are within the certification area boundary. Three of the above-WAC areas were located within Plant 2, two within Plant 8, and two within the Lab Building. Northwest and Southwest Plant 2 were above-WAC for technetium-99 and uranium, and Northeast Plant 2 was above-WAC for uranium. North Plant 8 was above-WAC for technetium-99 and uranium, and Central Plant 8 was above-WAC for technetium-99. The Lab Building Loading Dock was above-WAC for technetium-99 and uranium, and the Lab Building North Courtyard was above-WAC for uranium. Above-WAC areas in the Pilot Plant (Northwest Central,

Southwest, and South) and one in the Laboratory (Southwest) will be included in the certification of Area 4B - Part Two.

All of the above-WAC material was removed during the remediation/excavation activities in Area 4B. During remediation/excavation activities in Area 4B the above-WAC areas in Plant 2 and Plant 8 were expanded laterally and vertically due to the presence of visible product material. Additional excavation was performed until all of the product material was removed. Once all of the above-WAC material was removed from these areas, the excavation proceeded to remove the remaining above-FRL material.

The final above-WAC soil volume removed from Area 4B was 82,535 (bank) cubic yards (yd^3). The final above-FRL soil and concrete volume removed from Area 4B was 588,143 (bank) yd^3. Figure 2-1 shows a color gradient map of Area 4B that compares the final excavation grade to that of the design grade. This figure demonstrates that all planned soil excavation has been performed within the scaled down certification area of Area 4B.

Three underground storage tanks (UST) were listed in Section 3.6.2.1 of the Area 3B/4B/5 Implementation Plan as being within the original Area 3B boundaries; however, because the certification boundary for Area 3B was reduced, the three USTs (11, 12, and 13) are now within the boundaries of Area 4B (see Figure 4-1). Additionally, as discussed in Section 3.6.2.2 of the Area 3B/4B/5 Implementation Plan, Decontamination and Dismantlement discovered what was thought to be an UST during demolition of Plant 8. Upon further investigation, it was determined that it was a sump used to collect leaks, spills, hose-down clean-up water, and wastewater from the Hydrometallurgical (wet) Process Area of Plant 8 and not an UST. Therefore, it is not necessary to follow UST closure requirements for this sump.

Originally, there were five HWMUs listed in Section 2.1.4 of the Area 3B/4B/5 Implementation Plan; however, as discussed above, only a portion of Area 4B is being certified. Therefore, only two (HWMUs 4 and 18) of the original five HWMUs are within the certification area boundary. HWMUs 5 and 22 are now located in Area 4B - Part Two, and HWMU 17 is now in Area MDC South. Therefore, these HWMUs will be closed during the certification of those two areas.

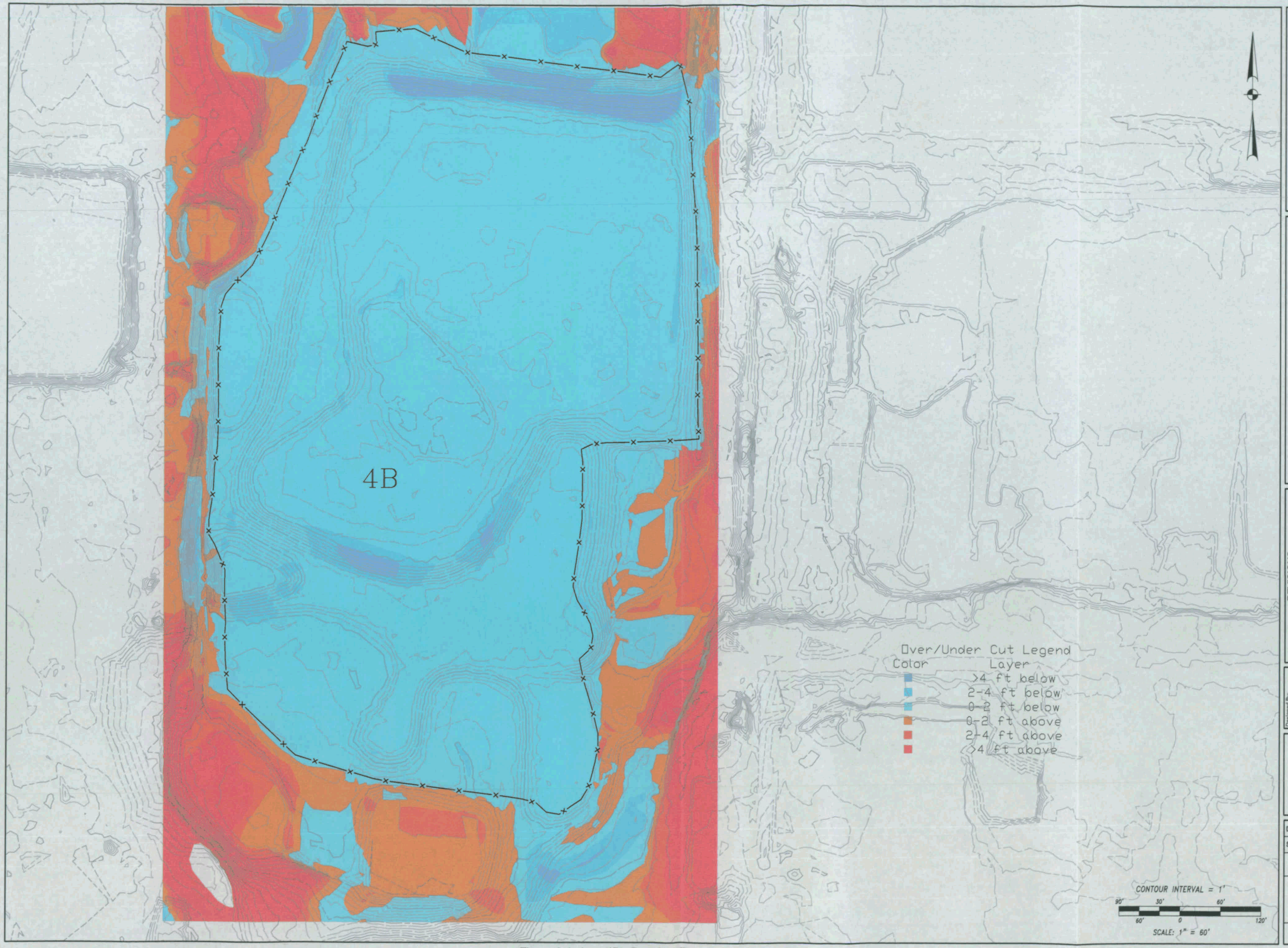
Additionally, as discussed in Letter DOE-0005-05 dated October 1, 2004, Final Remediation Level Development and Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Unit Closure (DOE 2004c), a meeting was held between DOE and Ohio Environmental Protection Agency (OEPA). As discussed in the meeting, DOE agrees to close HWMUs 28, and 46 through 50 as part of the joint RCRA/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process and the footprints of these units will be specifically sampled during certification to verify that the HWMU-specific constituents of concern (COCs) meet approved soil FRLs similar to the first 14 units

listed in Table 2-1 of the SEP. These six HWMUs were originally listed in the SEP as being closed by the Facilities Closure and Demolition Project; however, based on the agreement discussed above, these HWMUs will in the same manner as required for the Facilities Closure and Demolition Project HWMUs as described in the SEP.

2.1.2 Precertification Data

According to guidelines established in Section 3.3.3 of the SEP, precertification activities were conducted to evaluate residual radiological contamination patterns as specified in the PSP Guidelines for General Characterization for Sitewide Soil Remediation (DOE 2005). Prior to conducting a precertification real-time scan, Area 4B was scanned with a magnetometer to determine if residual debris remained following excavation activities. Minor occurrences of metallic objects were located and were either excavated or hand picked from the area.

All areas in Area 4B passed the requirements of precertification. The results of the precertification scans are presented on data maps in Appendix A.



FLUOR FERNALD, INC.
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
EXCAVATION 4B

TECUMSEH SURVEYING, INC.
4948 CINCINNATI-BROOKVILLE ROAD
SHANDON, OHIO 45013
TELEPHONE: 513 738-2134
FAX: 513 738-2756

REVISIONS:

Designed By:
Drawn By: F.A.M.
Checked By:
Approved By:

Date: 06-17-2005
Scale: 1" = 60'
Project No.
4B TOPOGRAPHIC SURFACE 05-17-2005 LIDAR
Sheet No. 1 OF 1

Figure 2-1. Area 4B - Part One Final Grade Contours

3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

In the OU5 Record of Decision (ROD, DOE 1996), there are 80 soil COCs with established FRLs. These COCs were retained for further investigation based on a screening process that considered the presence of the constituent in site soil and the potential risk to a receptor exposed to soil containing this contaminant. In spite of the conservative nature of this COC retention process, many of the COCs with established FRLs have a limited distribution in site soil or the presence of the COC is based on high contract required detection limits (CRDLs). When FRLs were established for these COCs in the OU5 ROD, the FRLs were initially screened against site data presented on spatial maps to establish a picture of potential remediation areas.

By reviewing existing RI/FS data presented on spatial distribution maps, the sitewide list of soil COCs in the OU5 ROD was reduced from 80 to 30. This reduction was possible because the majority of the COCs with FRLs listed in the OU5 ROD have no detections above their corresponding FRL, thus eliminating them from further consideration. The 30 remaining sitewide COCs account for over 99 percent of the combined risk to a site receptor model, and they comprise the list from which all of the remediation ASCOCs are drawn. When planning certification for a remediation area, additional selection criteria are used to derive a subset of these 30 COCs. This subset of COCs is passed along to the certification process.

3.1 SELECTION CRITERIA

The selection process for retaining ASCOCs for a remediation area is driven by applying a set of decision criteria. A soil contaminant will be retained as an ASCOC if:

- It is listed as a soil COC in the OU5 ROD, and it is listed as an ASCOC in Table 2-7 of the SEP for the Remediation Area of interest;
- It is listed as a COC for a HWMU or UST that lies within the certification area boundary;
- It can be traced to site use in the remediation area of interest, either through process knowledge or known release of the constituent to the environment;
- Analytical results indicate that a contaminant is present above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs;
- Physical characteristics of the contaminant, such as degradation rate and volatility, indicate it is likely to persist in the soil between time of release and remediation; or
- The contaminant is one of the sitewide primary COCs (total uranium, radium-226, radium-228, thorium-238, and thorium-232).

Using the above process, the ASCOCs were refined to those listed in Table 2-7 of the SEP. The list of ASCOCs is also presented in Table 3-1 with their respective FRLs.

3.1.1 ASCOC Selection

Each COC on the Remediation Area 4 ASCOC list (Table 3-1) was evaluated for its relevance to Area 4B. Table 3-2 presents the reasoning for either retaining or eliminating the ASCOC. Table 3-3 presents the final list of ASCOCs that will be analyzed in Area 4B - Part One. Table 3-4 summarizes by CU the ASCOCs for Area 4B - Part One.

TABLE 3-1
AREA 4 ASCOC LIST[a]

ASCOC	FRL/(*BTV*)[b]
Radionuclides	
Total Uranium[c]	20 mg/kg
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
Cesium-137	1.4 pCi/g
Plutonium-238	78 pCi/g
Strontium-90	14 pCi/g
Technetium-99	30.0 pCi/g
Thorium-230	280 pCi/g
Organic	
Aroclor-1254	0.13 mg/kg
Aroclor-1260	0.13 mg/kg
Benzo(a)pyrene	2.0 mg/kg
Bromodichloromethane	4.0 mg/kg
Dieldrin	0.015 mg/kg
Fluoride	78,000 mg/kg
Tetrachloroethene	3.6 mg/kg
Metals	
Arsenic	12.0 mg/kg
Beryllium	1.5 mg/kg
Lead	400 mg/kg
Ecological	
Antimony	96 mg/kg/(*10 mg/kg*)

[a] As listed in Table 2-7 of the SEP.
[b] Benchmark toxicity value (BTV) applies to Ecological COCs.
[c] The total uranium FRL is lower in the defined high leachability zones.

pCi/g - picoCuries per gram

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TABLE 3-2
ASCOC LIST FOR AREA 4B - PART ONE

ASCOC	Retained as ASCOC?	Justification	CU(s)
Radionuclides			
Total Uranium	Yes	Primary Radionuclide	All
Radium-226	Yes	Primary Radionuclide	All
Radium-228	Yes	Primary Radionuclide	All
Thorium-228	Yes	Primary Radionuclide	All
Thorium-232	Yes	Primary Radionuclide	All
Cesium-137	No	Not detected at concentrations above the FRL	None
Plutonium-238	No	Not detected at concentrations above the FRL	None
Strontium-90	No	Only one above-FRL concentrations detected within Area 4B. This single exceedance was located within the excavation footprint in the 0 to 0.5-foot interval and will therefore not be retained as a secondary COC.	None
Technetium-99	Yes	Above-FRL and above-WAC concentrations within Area 4B	All
Thorium-230	No	Only one above-FRL concentrations detected within Area 4B. This single exceedance was located within the excavation footprint in the 0 to 0.5-foot interval and will therefore not be retained as a secondary COC.	None
Organic			
1,1,1-Tricholoroethane	Yes	HWMU 28, UST 11, and UST 13 specific COC	H28, U11, U13
Aroclor-1254	Yes	Above-FRL concentrations within Area 4B	All
Aroclor-1260	No	Not detected at concentrations above the FRL	None
Benzo(a)pyrene	No	Not detected at concentrations above the FRL	None
Benzene	Yes	HWMU 4, UST 11, 12, and 13 specific COC	H04, U11, U12, U13
Bromodichloromethane	No	Not detected at concentrations above the FRL	None
Dieldrin	No	Not detected at concentrations above the FRL	None
Ethylbenzene	Yes	UST 11 and 13 specific COC	U11, U13
Fluoride	No	Not detected at concentrations above the FRL	None
Methyl Ethyl Ketone	Yes	HWMU 18 specific COC	H18
Methyl Isobutyl Ketone	Yes	UST 11 and 13 specific COC	U11, U13
Tetrachloroethene	Yes	Not detected at concentrations above the FRL; HWMU 4 specific COC	H04
Toluene	Yes	HWMU 4, UST 11, and UST 13 specific COC	H04, U11, U13
Xylene	Yes	HWMU 18, UST 11, and UST 13 specific COC	H18, U11, U13

TABLE 3-2
ASCOC LIST FOR AREA 4B - PART ONE
(Continued)

Metals			
Arsenic	Yes	UST 11 and UST 13 specific COC. Two above-FRL concentrations detected within Area 4B	U11, U13
Barium	Yes	HWMU 46, 47, 49, 50, UST 11, and 13 specific COC	H46, H47, H49, H50, U11, U13
Beryllium	Yes	Above-FRL concentrations detected within Area 4B	All
Chromium	Yes	HWMU 46, 47, 49, 50, UST 11, and 13 specific COC	H46, H47, H49, H50, U11, U13
Lead	Yes	One above-FRL concentrations detected within Area 4B HWMU 18, 28, 46, 47, 49, 50, UST 11, 12, and 13 specific COC	H18, H28, H46, H47, H49, H50, U11, U12, U13
Mercury	Yes	One above-FRL concentrations detected within Area 4B HWMU 46, 47, 49, 50, UST 11 and 13 specific COC	H46, H47, H49, H50, U11, U13
Selenium	Yes	UST 11 and 13 specific COC	U11, U13
Ecological			
Antimony	No	Not an ECOC in Area 4B per Appendix C of the SEP	None

ECOC - ecological constituent of concern

TABLE 3-3
AREA 4B - PART ONE ASCOC LIST[a]

ASCOC	FRL/Residential Generic Cleanup Number
Radionuclides	
Total Uranium [b]	20 mg/kg
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
Technetium-99	30.0 pCi/g [c]
Organic	
1,1,1-Tricholoroethane	4.3 mg/kg
Aroclor-1254	0.13 mg/kg
Benzene	850 mg/kg
Ethylbenzene	5,100 mg/kg
Methyl Ethyl Ketone	23.5 mg/kg [d]
Methyl Isobutyl Ketone	8.44 mg/kg [e]
Tetrachloroethene	3.6 mg/kg
Toluene	100,000 mg/kg
Xylene	920,000 mg/kg
Metals	
Arsenic	12.0 mg/kg
Barium	68,000 mg/kg
Beryllium	1.5 mg/kg
Chromium	300 mg/kg [f]
Lead	400 mg/kg
Mercury	7.5 mg/kg
Selenium	5,400 mg/kg

[a] As listed in Table 2-7 of the SEP.

[b] The total uranium FRL is lower in the defined high leachability zones.

[c] FRL is actually for 1,1,2-trichloroethane because 1,1,1-trichloroethane does not have a FRL.

[d] Methyl Ethyl Ketone does not have an associated soil FRL. 23.5 mg/kg is listed as a General Cleanup Number on Table 1 of the June 2004 *Closure Plan Review Guidance for RCRA Facilities* under the 20 DAF column, written by the OEPA Division of Hazardous Waste Management (OEPA 2004).

[e] Methyl Isobutyl Ketone does not have an associated soil FRL. 8.44 mg/kg is listed as a General Cleanup Number on Table 1 of the June 2004 *Closure Plan Review Guidance for RCRA Facilities* under the 20 DAF column.

[f] The FRL is actually for hexavalent chromium because total chromium does not have a FRL.

TABLE 3-4
AREA 4B - PART ONE ASCOCs BY CU

	ASCOCs																				
CU	Total Uranium	Radium-226	Radium-228	Thorium-228	Thorium-232	Technetium-99	Arsenic	Barium	Beryllium	Chromium	Lead	Mercury	Selenium	1,1,1-Tricholoroethane	Aroclor-1254	Benzene	Ethylbenzene	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Tetrachloroethene	Toluene	Xylene
1-H04	X	X	X	X	X	X			X						X	X				X	X	
2-H18	X	X	X	X	X	X			X		X				X			X				X
3-H28	X	X	X	X	X	X			X		X			X	X							
4-H46	X	X	X	X	X	X		X	X	X	X	X			X							
5-H47	X	X	X	X	X	X		X	X	X	X	X			X							
6-H49	X	X	X	X	X	X		X	X	X	X	X			X							
7-H50	X	X	X	X	X	X		X	X	X	X	X			X							
8	X	X	X	X	X	X			X						X							
9	X	X	X	X	X	X			X						X							
10	X	X	X	X	X	X			X						X							
11	X	X	X	X	X	X			X						X							
12	X	X	X	X	X	X			X						X							
13	X	X	X	X	X	X			X						X							
14	X	X	X	X	X	X			X						X							
15	X	X	X	X	X	X			X						X							
16	X	X	X	X	X	X			X						X							
17	X	X	X	X	X	X			X						X							
18	X	X	X	X	X	X			X						X							
19-U11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
20-U12	X	X	X	X	X	X			X		X				X	X						
21-U13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X

4.0 CERTIFICATION APPROACH

4.1 CERTIFICATION DESIGN

The certification design for Area 4B - Part One follows the general approach outlined in Section 3.4 of the SEP. The design for Area 4B - Part One is depicted on Figure 4-1 and the sample locations are depicted in Figure 4-2. As discussed in Section 3.0 of this document, the five primary ASCOCs (total uranium, radium-226, radium-228, thorium-228, and thorium-232) will be retained in each CU. Additional secondary COCs are identified for specific CUs within the certification area as well as unique COCs for the seven HWMUs and three USTs.

Many factors were taken into consideration when determining the boundaries for each CU within Area 4B. These factors include: areas defined as high leachability zones, historical land use, proximity to other areas of the site, [illegible] COC data, and pr[illegible]xistence of HWMUs and/or USTs. Additionally, since Area 4B falls within the former production area, it is considered to be an impacted area, and will therefore be comprised of Group 1 CUs to allow for more concentrated sampling and ensure excavation activities had no effect on the soil.

4.1.1 Certification Unit Design

Area 4B - Part One consists of 21 Group 1 CUs that were designed around the high-leachability area. As shown of Figure 4-1, all of the CUs are entirely within the high leachability area.

Due to the presence of HWMUs 4, 18, 28, 46, 47, 49, and 50, and USTs 11, 12, and 13 in Area 4B - Part One, the certification effort must include demonstration of soil FRL attainment, HWMU, and UST closure. Per Section 2.2.5 of the SEP:

- Each HWMU/UST footprint will form a distinct CU.
- At least eight locations will be sampled in each HWMU/UST.
- Samples will be analyzed for the COCs identified for each particular HWMU and UST in Table 2-1 and 2-2 of the SEP.

It should be noted that HMWU 28 is a noncontiguous CU that consists of three separate areas. These three areas are spread out enough that 12 samples are being collected in order to provide sufficient coverage of the HWMU.

4.1.2 Sample Location Design

The selection of certification sampling locations was conducted according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs with the exception of the seven HWMU CUs and the three UST CUs, which will have eight approximatly equal sub-CUs (CU 3-H28 has 12 sub-CUs). Sample locations were then generated by randomly selecting an easting and northing coordinate within the boundaries of each sub-CU, then testing those locations against the minimum distance criteria for the CU. If the minimum distance criteria were not met, an alternative random location was selected for that sub-CU, and all the locations were re-tested. This process continued, until all random locations met the minimum distance criteria.

All Area 4B sub-CUs and planned certification sampling locations are shown on Figures 4-2 through 4-11. Samples will be collected for analysis from 0 to 6 inches in each CU. Four of the 16 sample locations (one location from each quadrant of the non-HWMU CUs) are designated with a "V," indicating archive sample locations. No archive sample locations are planned for the HWMU or UST CUs. Archive samples will not be collected unless they are needed for additional analysis. One sample location in each CU is designated with a "D," indicating a field duplicate sample collection location.

Prior to commencement of certification sampling field activities, all certification sample locations will be surveyed and field verified to make sure no surface obstacles will prevent sample collection at the planned location. Locations may be moved if a subsurface obstacle prevents sample collection. Requirements for moving a certification sample location are discussed below in Section 4.3.1.

4.2 SURVEYING

Before certification sampling activities begin, the North American Datum of 1983 (NAD83) State Planar coordinates for each selected sampling location (with the exception of the archive sample locations) will be surveyed and identified in the field with a flag. All locations will be field verified to ensure no surface obstacles will prevent collection at each of the planned locations.

The Area 4B - Part One CU boundaries are shown on Figure 4-1, and the certification sampling locations for CUs eight through 18 are shown on Figure 4-2. The sample locations for the seven HWMU footprints (4, 18, 28, 46, 47, 49, and 50) are shown on Figure 4-3 (CU 1-H04), Figure 4-4 (CU 2-H18), Figures 4-5A and 4-5B (CU 3-H28), Figure 4-6 (CU 4-H46), Figure 4-7 (CU 5-H47), Figure 4-8 (CU 6-H49), and Figure 4-9 (CU 7-H50). The sample locations for the three UST footprints are shown on Figure 4-10 (CU 19-U11 and CU 20-U12) and Figure 4-11 (CU 21-U13). All certification sample locations meet the minimum distance criterion. All sample location information can be found in Appendix C.

4.3 PHYSICAL SOIL SAMPLE COLLECTION

4.3.1 Sample Collection

Soil samples will be collected in accordance with procedure SMPL-01, Solids Sampling. Surface samples will be collected using 3-inch diameter, 6-inch long, plastic liners, or an alternate method as identified in SMPL-01, as long as sufficient volume is collected from the appropriate depth to perform the prescribed analyses. Ultimately, the method of sample collection will be left to the discretion of the Field Sampling Lead. Following sample collection, each soil core shall be divided, if necessary, and placed into the proper sample containers. Upon completion of sample collection, the boreholes will be collapsed and no additional abandonment is necessary.

Quality control sample requirements will include a duplicate field sample, a trip blank, and a container blank and/or rinsate, and will be collected per procedure SMPL-21, Collection of Field Quality Control Samples. For the duplicate field sample, twice the soil volume (a second core) will be collected at one location in the CU, and will not be homogenized with the original sample. The location that requires the collection of a duplicate sample is identified in Appendix C. A trip blank will be collected each day that volatile organic compound (VOC) samples are collected, or one per 20 VOC samples that are collected, or one per cooler that will be shipped, whichever is more frequent. Depending on the sample collection method used, container blanks or rinsates will be collected. A container blank will be collected prior to sample collection and at the conclusion of sample collection for the entire Area 4B - Part One. All samples will be assigned unique sample identification numbers. Additional information regarding quality control requirements can be found in Section 4.1.

If a subsurface obstacle prevents sample collection at the specified location, it can be moved according to the following guidelines:

- The distance moved must be as small as possible (less than 3 feet);
- It must remain within the boundary of the same CU and sub-CU, and must still meet the minimum distance criterion;
- If the distance moved is greater than 3 feet, the move must be documented in a Variance/Field Change Notice (V/FCN), considered as significant, which will be approved by the agencies prior to collection.
- Anytime a location is moved, the appropriate figure should be used to determine the best direction to move the point to adhere to the above guidelines. The Characterization Manager or designee should be contacted when a sample location is moved. All final sampling locations will be documented in the Area 4B - Part One Certification Report.

Customer sample numbers and FACTS identification numbers will be assigned to all samples collected. The sample labels will be completed with sample collection information, and technicians will complete a Field Activity Log (FAL), a Sample Collection Log, and a Chain of Custody/Request for Analysis form in the field prior to submittal of the samples.

All soil samples from the CU with like analyses (including the field duplicate) will be batched and submitted to the Sample Processing Laboratory (SPL) under one set of Chain of Custody/Request for Analysis forms which will represent one analytical release. The container blank and/or rinsate will be listed on a separate Chain of Custody/Request for Analysis form. No alpha/beta screens will be required, as historical information can be used for shipping purposes.

4.3.2 Equipment Decontamination

Decontamination is performed to prevent the introduction of contaminants from sampling equipment to subsequent soil samples. Field Technicians will ensure that sampling equipment (core tubes and caps) has been decontaminated prior to transport to the field. As described in SMPL-01, all sampling equipment will have been decontaminated before it is transported to the field site, and the 6-inch core liners will be decontaminated using the Level II [Section K.11 of the Sitewide CERCLA Quality Assurance Project Plan (SCQ)] procedure upon receipt from the manufacturer. Decontamination is also necessary in the field if sampling equipment is reused. If an alternate sampling method is used, equipment will be decontaminated between collection of sample intervals, and again after the sampling performed under this CDL and Certification PSP is completed. Following decontamination, clean disposable wipes may be used to replace air-drying of the equipment.

4.3.3 Physical Sample Identification

Each soil certification sample will be assigned a unique sample identification number as *Remediation Area-C##-Location^Analysis-QC,* where:

A4B = Sample collected from Remediation Area 4B

C## = Certification unit from which sample was collected

H## = HWMU number (if applicable) from which sample was collected

U## = UST number (if applicable) from which sample was collected

Location = Sample location number within the CU [1 through 16 (8 for each HWMU with the exception of HWMU 28, which has 12 sample locations)]

Analysis = "R" indicates radiological analysis; "M" indicates metals analysis; "P" indicates polychlorinated biphenyl (PCB) analysis; and "L" indicates VOC analysis.

QC = Quality control sample, if applicable. A "D" indicates a field duplicate sample; "Y1" indicates the first container blank sample; "X1" indicates the first rinsate sample; "TB1" indicates the first trip blank collected, and each additional trip blank collected will be consecutively numbered.

For example, a field duplicate sample taken from the 2nd sample location from Area 4B CU 1, HWMU 04 for VOC analysis would be identified as A4B-C01-H04-2^L-D. If a rinsate sample is required, the first rinsate sample will be identified as A4B-C-X1-M and A4B-C-X1-R. If the container blank is required, the first sample will be identified as A4B-C-Y1-M, and A4B-C-Y1-R. The first trip blank will be identified as A4B-C-L-TB1. It should be noted that the "^" symbol should not be included in the sample number for container blanks, rinsates, and trip blanks. Additionally, the CU number, HWMU number and/or UST number is not required for trip blanks, rinsates, or container blanks.

4.4 ANALYTICAL METHODOLOGY

All soil samples from the CU with like analyses (including the field duplicate) will be batched and submitted to the SPL under one set of Chain of Custody/Request for Analysis forms which will represent one analytical release. Container blanks will be listed on a separate Chain of Custody/Request for Analysis form but may be batched together in one analytical release.

All samples will be prepared for shipment to off-site laboratories per procedure 9501, Shipping Samples to Off-site Laboratories. Samples will only be shipped to off-site laboratories that are listed on the Fluor Fernald Approved Laboratories List. Historical data from the area will be used to ship the samples off-site. The highest post-excavation total uranium result from Area 4B is 67.1 mg/kg from boring 4BE-SAST-L6-1.

Samples collected for VOC analysis should be shipped to an off-site laboratory within 24 hours of sample collection. As soon as the samples arrive at the laboratory where the analysis will take place, all samples should be prepared for analysis (including homogenization for non-VOC samples), and radiological samples should be sealed to begin the in-growth period for radium analysis. A 30-day turnaround time will be required for analytical data reporting.

The sampling and analytical requirements are listed in Table 4-1 and the Target Analyte Lists (TAL) are shown in Table 4-2.

Laboratory analysis of certification samples will be conducted using an approved analytical method, as discussed in Appendix H of the SEP. Analyses will be conducted to Analytical Support Level (ASL) D or E, where all requirements for ASL E are the same as ASL D except the minimum detection level (MDL) for the selected analytical method must be at least 10 percent of the FRL.

A minimum of 10 percent of the laboratory data will be validated to Validation Support Level (VSL) D with the remainder validated to VSL B. Samples rejected during validation will be re-analyzed, or an archive sample will be collected and submitted for analysis.

4.5 STATISTICAL ANALYSIS

Once data are validated, results will be entered into the SED and a statistical analysis will be performed to evaluate the pass/fail criteria for each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP, and will be the same for Area 4B as has been for previous certification efforts.

Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal, the first criterion compares the 95 percent Upper Confidence Limit (UCL) on the mean of each primary ASCOC to its FRL. On an individual CU basis, any ASCOC with the 95 percent UCL above the FRL results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate the second criterion. The second criterion is related to individual samples. An individual sample cannot be greater than two times the FRL or three times the FRL, based on the area size (see Section 3.4.6 and Figure 3-11 of the SEP for further details). When the given UCL on the mean for each ASCOC is less than its FRL, and the hot spot criterion is met, the CU has met both criteria and will be considered certified.

There are three conditions that could result in a CU failing certification: 1) high variability in the data set, 2) localized contamination, and 3) widespread contamination. Details on the evaluation and responses to these possible outcomes are provided in Section 3.4.5 of the SEP. When all CUs within the scope of this CDL and Certification PSP have passed certification, a Certification Report will be issued. The certification report will be submitted to the U.S. Environmental Protection Agency (EPA) and OEPA to receive acknowledgement that the pertinent OU remedial actions were completed and the individual CUs are certified and ready to be released for interim or final land use. Section 7.4 of the SEP provides additional details and describes the required content of the Certification Report.

TABLE 4-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte[a]	Method[a]	Matrix	Preserve	Hold Time	Container[b]	Minimum Mass/Volume
Rads/Metals/PCBs (TALs A, B, C, D, E, or K)	Gamma Spec and LSC ICP or ICP/MS GC	Solid	Cool, 4° C	12 months 6 months 14 days	Glass with Teflon-lined lid	500 g (1500 g)[c]
VOCs (TAL F, G, H, I, or J)	GC/MS	Solid	Cool, 4° C	48 hours	3 x 1-Encore Sampler[c] plus 1 x 2-oz jar for % moisture	Each full Encore Sampler[c] will hold approx. 5 g
Radiological (TAL A)	Gamma Spec and LSC	Liquid (rinsate[d])	HNO_3 pH<2	6 months	Polyethylene	4 liters
Metals (TAL B, D, E, and K)[e]	ICP or ICP/MS GC	Liquid (rinsate[d])	HNO_3 pH<2	6 months	Polyethylene	500 ml
VOCs (TAL F, G, H, I, and J)[f]	GC/MS	Liquid (trip blank only)	H_2SO_4 pH<2 Cool, 4° C	14 days	3 x 40-ml glass with teflon-lined septa	120 ml (no headspace)

[a] Samples will be analyzed according to ASL D requirements but the minimum detection level may cause some analyses to be considered ASL E.

[b] Sample container types may be changed at the direction of the Field Sampling Lead, as long as the volume requirements, container compatibility requirements, and SCQ requirements are met.

[c] At the direction of the Field Sampling Lead, triple the specified volume must be collected for all samples at one location in the CU in order for the contract laboratory to perform the required quality control analysis. The samples shall be identified on the Chain of Custody/Request for Analysis forms as "designated for laboratory QC".

[d] If "push tubes" are used for sampling, the off-site laboratories will be sent container blanks. If an alternative sample method is used, the Field Technicians will collect a rinsate(s). Neither rinsate samples nor container blanks will be collected for PCBs or VOCs.

[e] All four TALs will be analyzed (i.e., TAL B, D, E, and K) for the metals water samples

[f] All five TALs will be analyzed (i.e., TAL F, G, H, I, and J) for the VOCs water samples

GC/MS - gas chromatography mass spectroscopy
GC - gas chromatography
ICP/MS - inductively coupled plasma/mass spectroscopy
LSC - liquid scintillation counting

TABLE 4-2
TARGET ANALYTE LISTS

20810-PSP-0008-A
(Radiological - ASL D/E*)

Analyte	On-Property FRL/*WAC*	MDL
Total Uranium	20 mg/kg [a]	2.0 mg/kg
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g
Technetium-99	30.0 pCi/g *(29.1 pCi/g)*	2.91 pCi/g [b]

20810-PSP-0008-B
(Metals - ASL D/E*)

Analyte	On-Property FRL	MDL
Beryllium	1.5 mg/kg	0.15 mg/kg

20810-PSP-0008-C
(PCBs - ASL D/E*)

Analyte	On-Property FRL	MDL
Aroclor-1254	0.13 mg/kg	0.013 mg/kg

20810-PSP-0008-D
(Metals - ASL D/E*)

Analyte	On-Property FRL	MDL
Barium	68,000 mg/kg	6,800 mg/kg
Chromium	300 mg/kg [c]	30 mg/kg
Lead	400 mg/kg	40 mg/kg
Mercury	7.5 mg/kg	0.75 mg/kg

20810-PSP-0008-E
(Metals - ASL D/E*)

Analyte	On-Property FRL	MDL
Lead	400 mg/kg	40 mg/kg

TABLE 4-2
TARGET ANALYTE LISTS
(Continued)

20810-PSP-0008-F
(VOCs - ASL D/E*)

Analyte	On-Property FRL	MDL
Benzene	850 mg/kg	85 mg/kg
Tetrachloroethene	3.6 mg/kg	0.36 mg/kg
Toluene	100,000 mg/kg	10,000 mg/kg

20810-PSP-0008-G
(VOCs - ASL D/E*)

Analyte	On-Property FRL/ Residential Generic Cleanup Number	MDL
Methyl Ethyl Ketone	23.5 mg/kg [d]	2.35 mg/kg
Xylene	920,000 mg/kg	92,000 mg/kg

20810-PSP-0008-H
(VOCs - ASL D/E*)

Analyte	On-Property FRL	MDL
1,1,1-Tricholoroethane	4.3 mg/kg [e]	0.43 mg/kg

20810-PSP-0008-I
(VOCs - ASL D/E*)

Analyte	On-Property FRL	MDL
Benzene	850 mg/kg	85 mg/kg

20810-PSP-0008-J
(VOCs - ASL D/E*)

Analyte	On-Property FRL	MDL
1,1,1-Tricholoroethane	4.3 mg/kg [d]	0.43 mg/kg
Benzene	850 mg/kg	85 mg/kg
Ethylbenzene	5,100 mg/kg	510 mg/kg
Methyl Isobutyl Ketone	8.44 mg/kg [f]	0.844 mg/kg
Toluene	100,000 mg/kg	10,000 mg/kg
Xylene	920,000 mg/kg	92,000 mg/kg

TABLE 4-2
TARGET ANALYTE LISTS
(Continued)

20810-PSP-0008-K
(Metals - ASL D/E*)

Analyte	On-Property FRL	MDL
Arsenic	12 mg/kg	1.2 mg/kg
Barium	68,000 mg/kg	6,800 mg/kg
Chromium	300 mg/kg [c]	30 mg/kg
Lead	400 mg/kg	40 mg/kg
Mercury	7.5 mg/kg	0.75 mg/kg
Selenium	5,400 mg/kg	540 mg/kg

[a] The total uranium FRL is lower in the defined high leachability zones.

[b] The MDL for technetium-99 is 10 percent of the WAC limit, which is lower than the FRL.

[c] The FRL is actually for hexavalent chromium because total chromium does not have a FRL. This value will be used for statistical comparison for certification criteria.

[d] Methyl Ethyl Ketone does not have an associated soil FRL. 23.5 mg/kg is listed on Table 1 of the June 2004 *Closure Plan Review Guidance for RCRA Facilities*.

[e] The FRL is actually for 1,1,2-trichloroethane because 1,1,1-trichloroethane does not have a FRL. This value will be used for statistical comparison for certification criteria.

[f] Methyl Isobutyl Ketone does not have an associated soil FRL. 8.44 mg/kg is listed on Table 1 of the June 2004 *Closure Plan Review Guidance for RCRA Facilities*.

* Analytical requirements will meet ASL D but the MDL may cause some analyses to be considered ASL E.

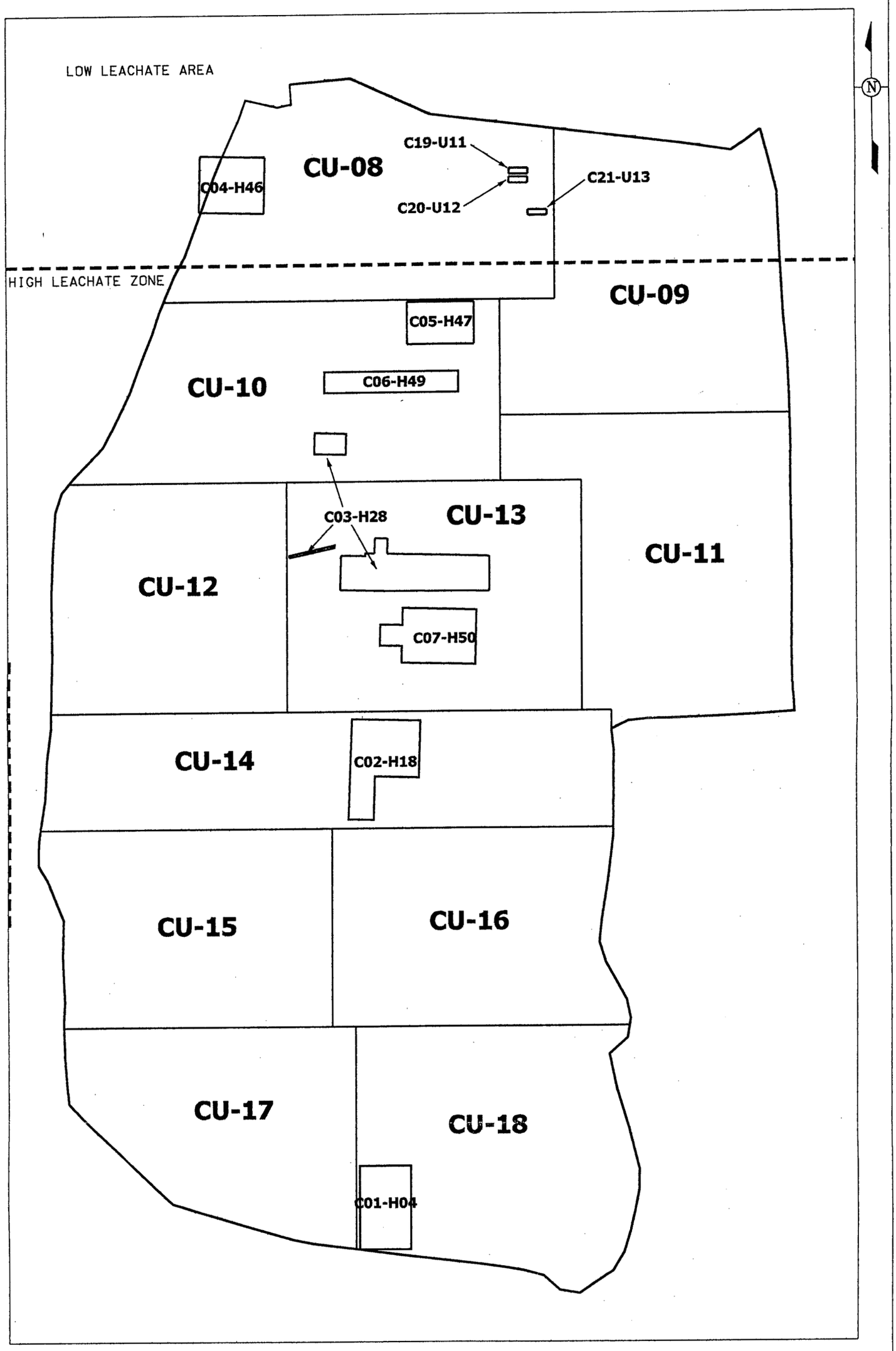


FIGURE 4-1. AREA 4B - PART ONE CERTIFICATION AREA BOUNDARIES

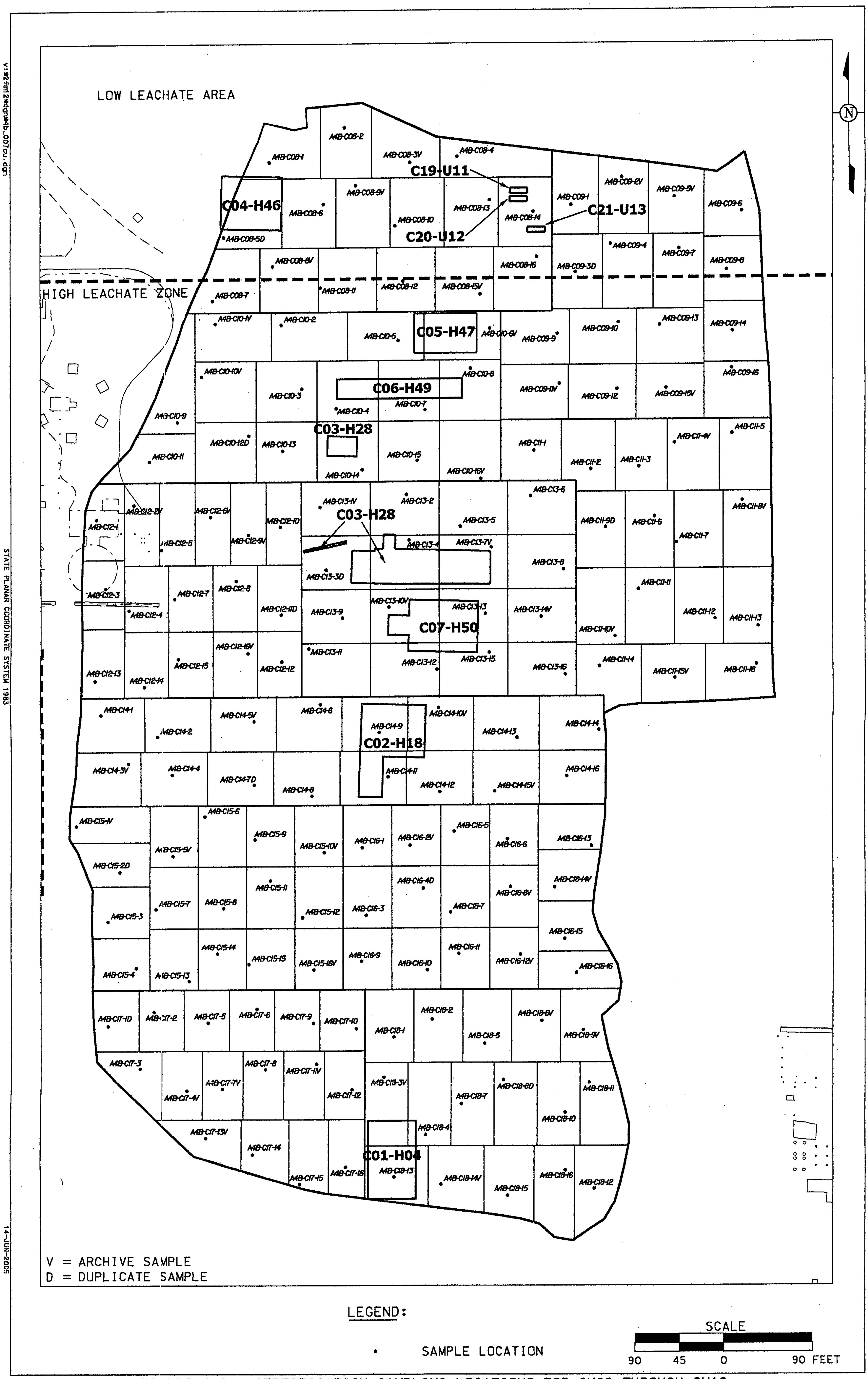


FIGURE 4-2. CERTIFICATION SAMPLING LOCATIONS FOR CU08 THROUGH CU18

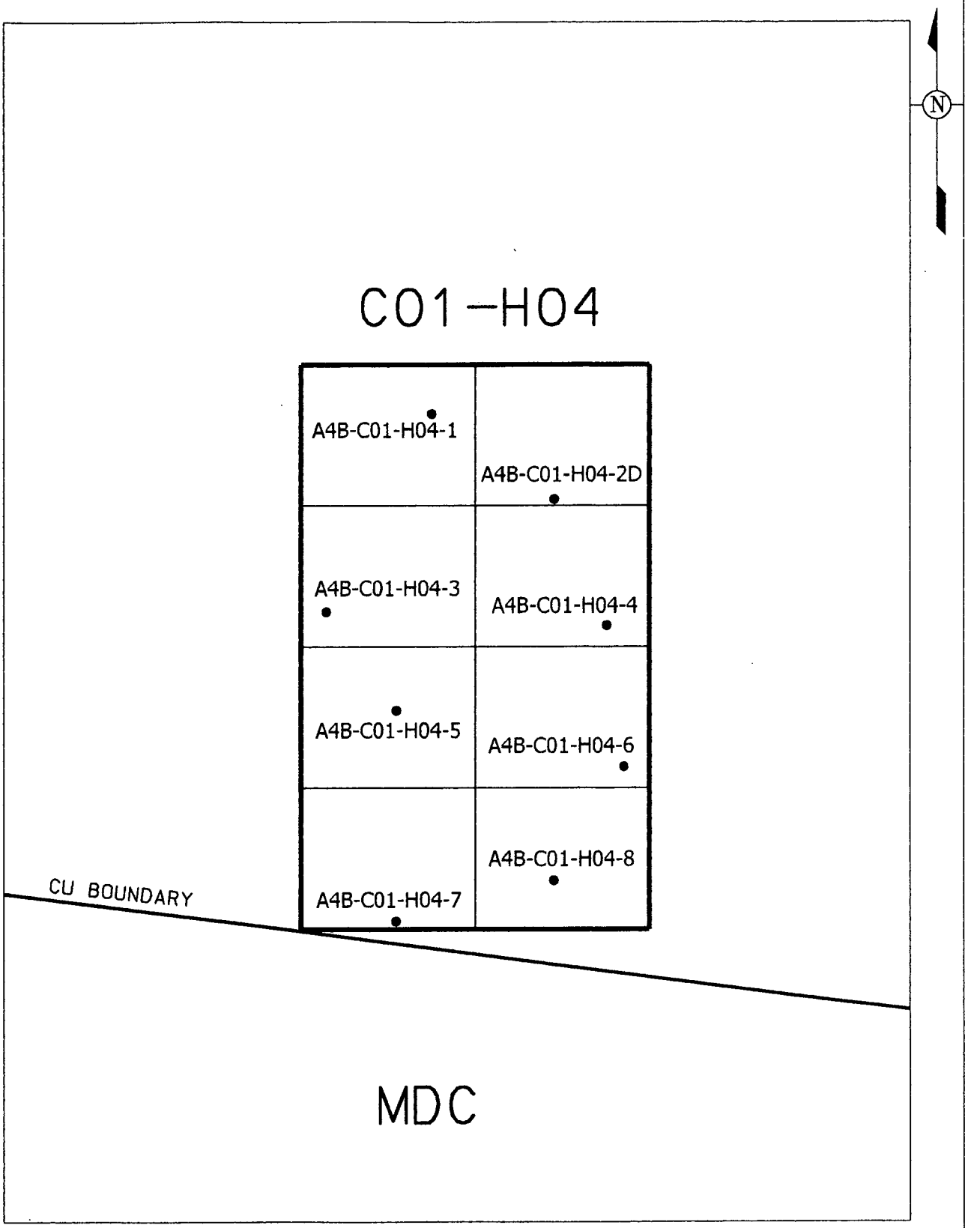


FIGURE 4-3. CERTIFICATION SAMPLING LOCATIONS FOR CU01 (HWMU-4)

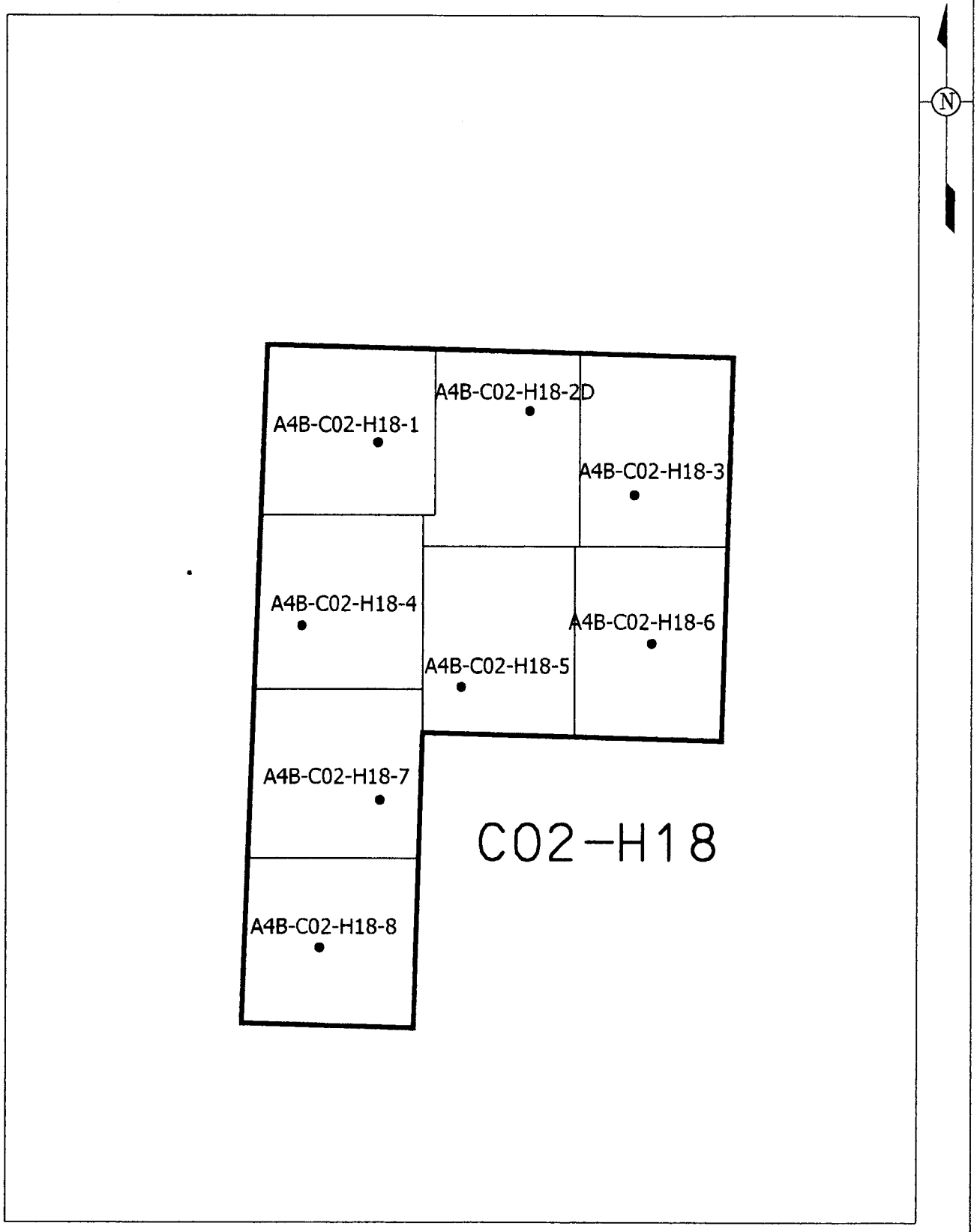
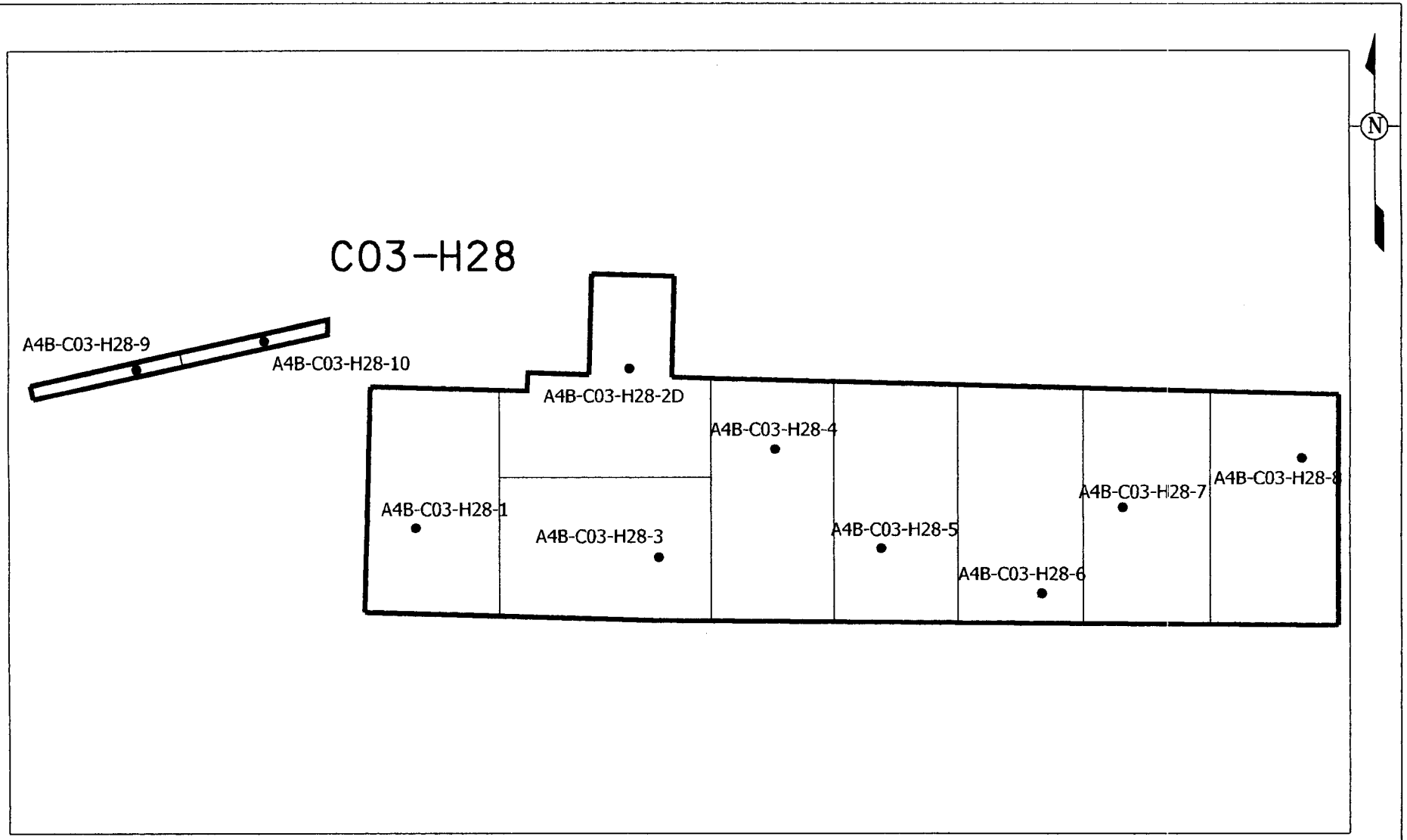


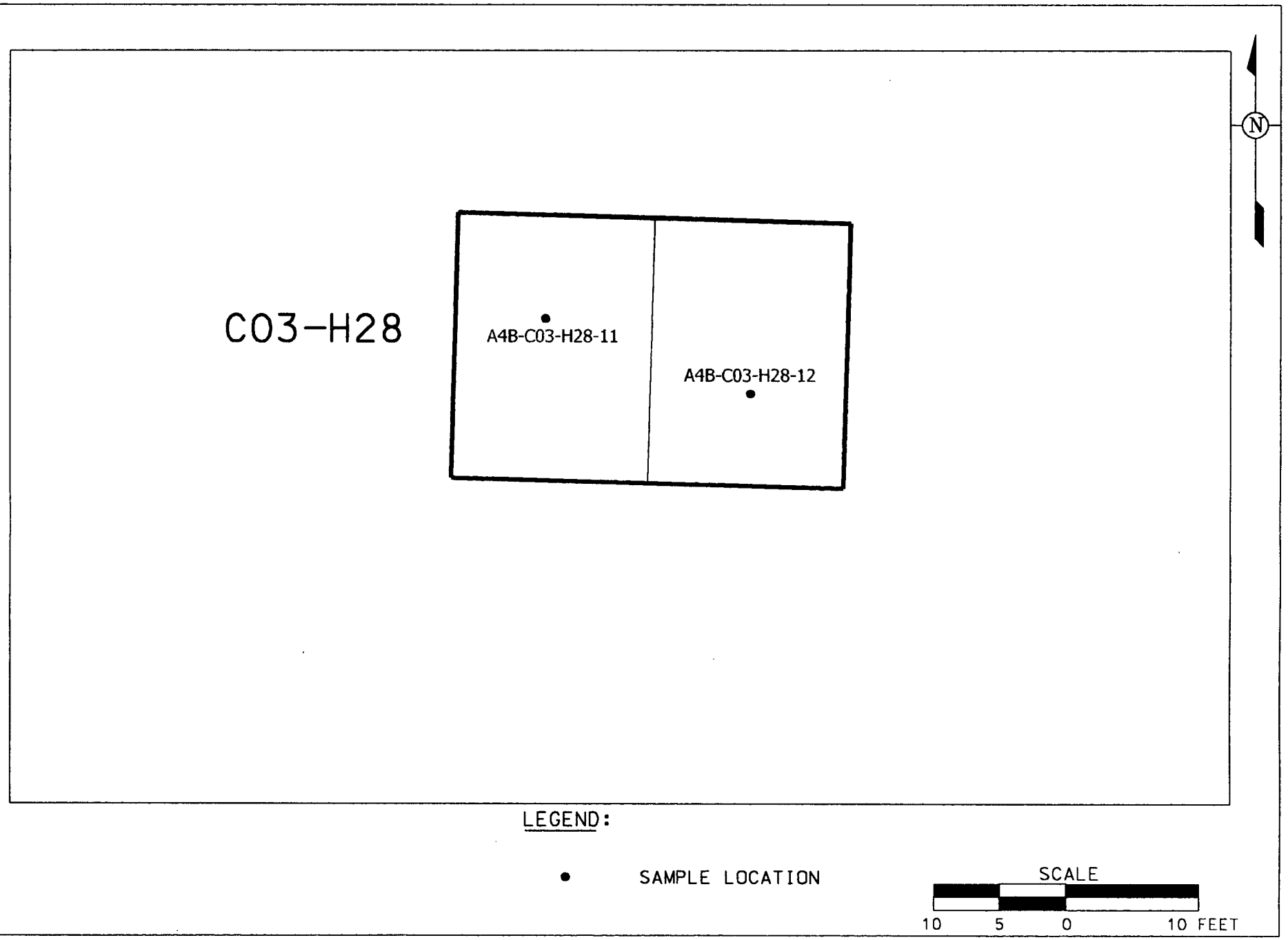
FIGURE 4-4. CERTIFICATION SAMPLING LOCATIONS CU02 (HWMU-18)



v:\2fm12\dgn\4b_hwmu_28_a.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-5A. CERTIFICATION SAMPLING LOCATIONS FOR CU03 (HWMU-28)

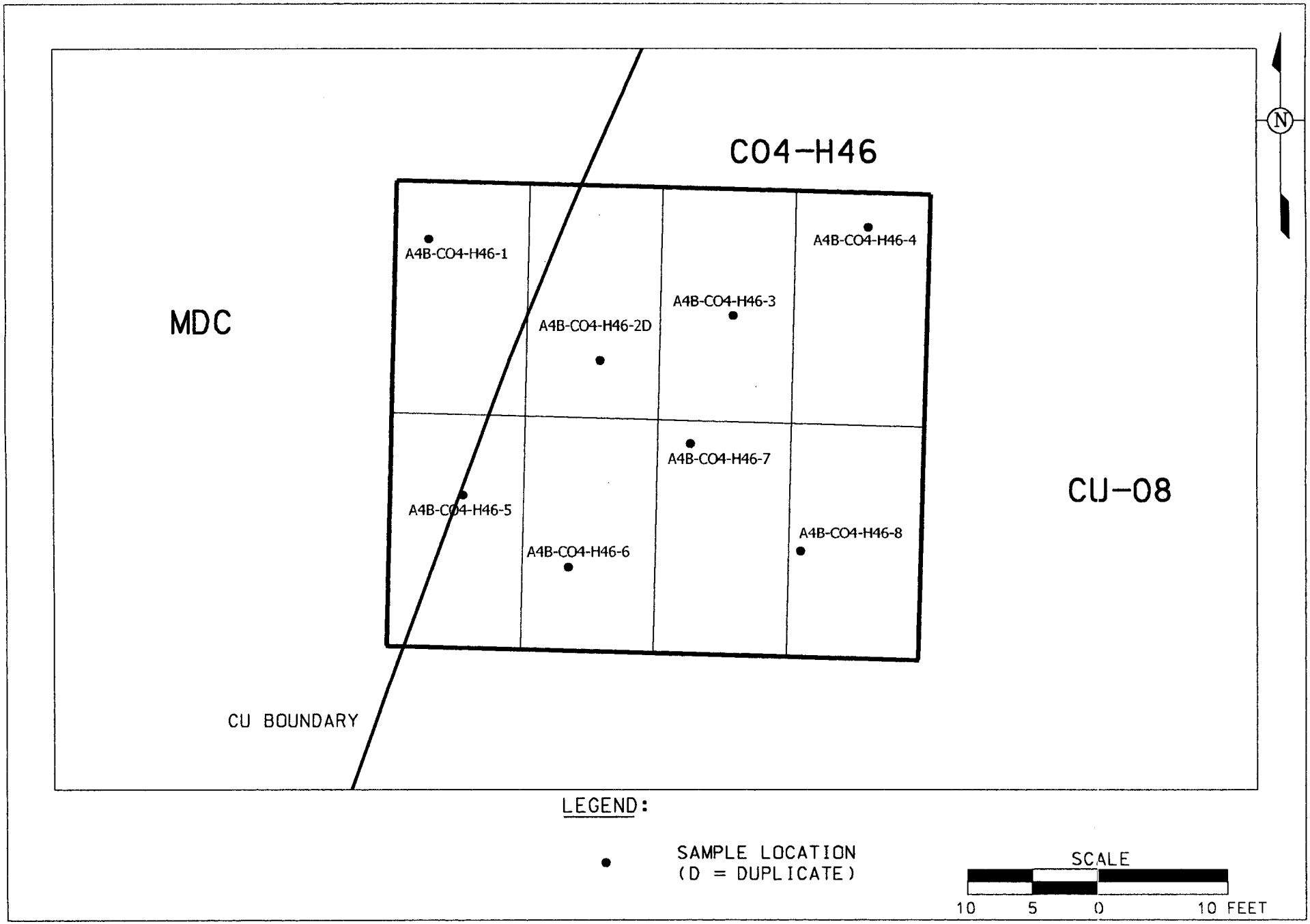
08-JUN-2005



v:\#2fm12\#dgn\#4b_hwmu_28.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-5B. CERTIFICATION SAMPLING LOCATIONS FOR CU03 (HWMU-28)

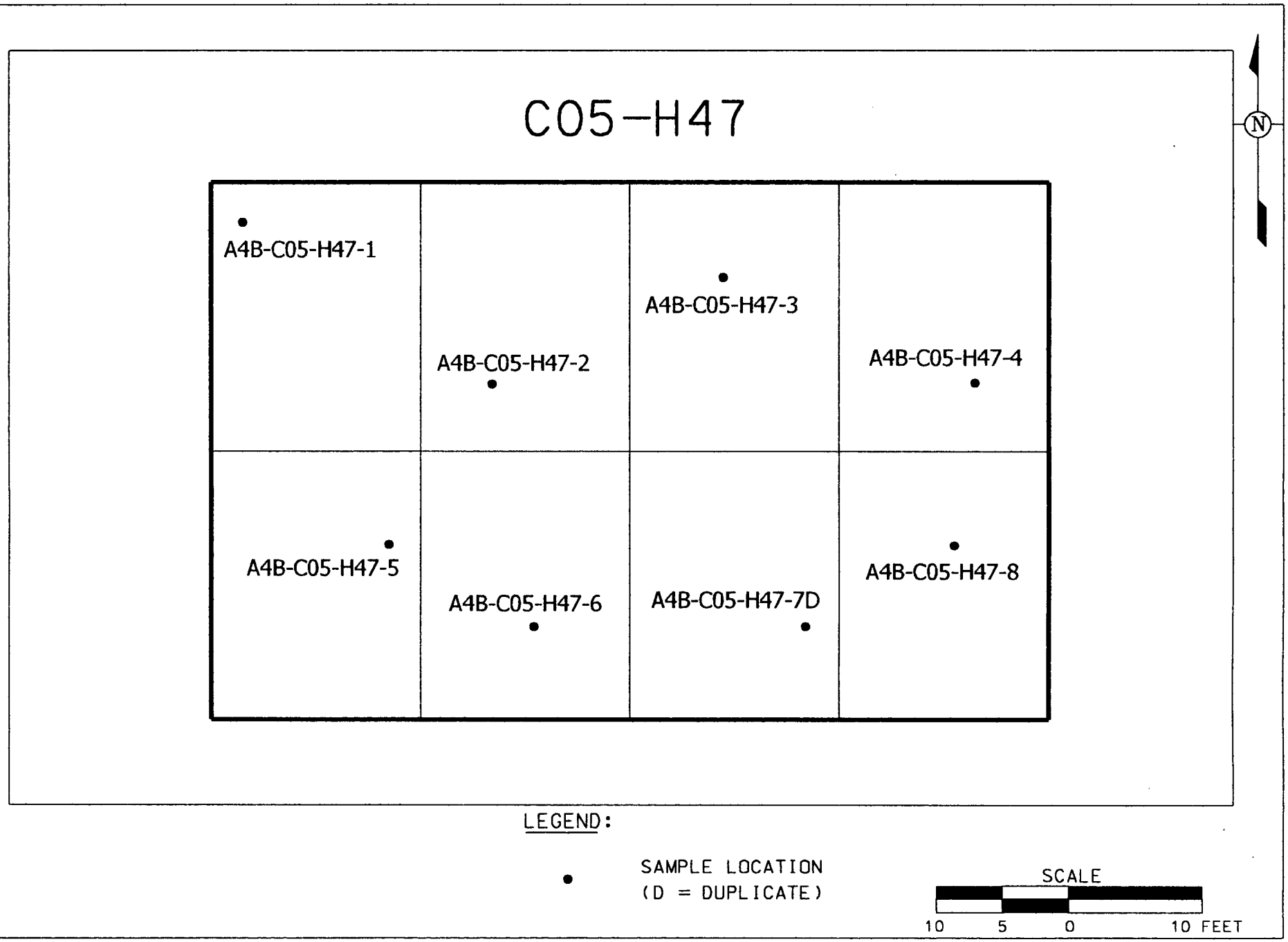
11-JUL-2005



v:\#2fm12#dgn#4b_hwmu_46.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-6. CERTIFICATION SAMPLING LOCATIONS FOR CU04 (HWMU-46)

08-JUN-2005



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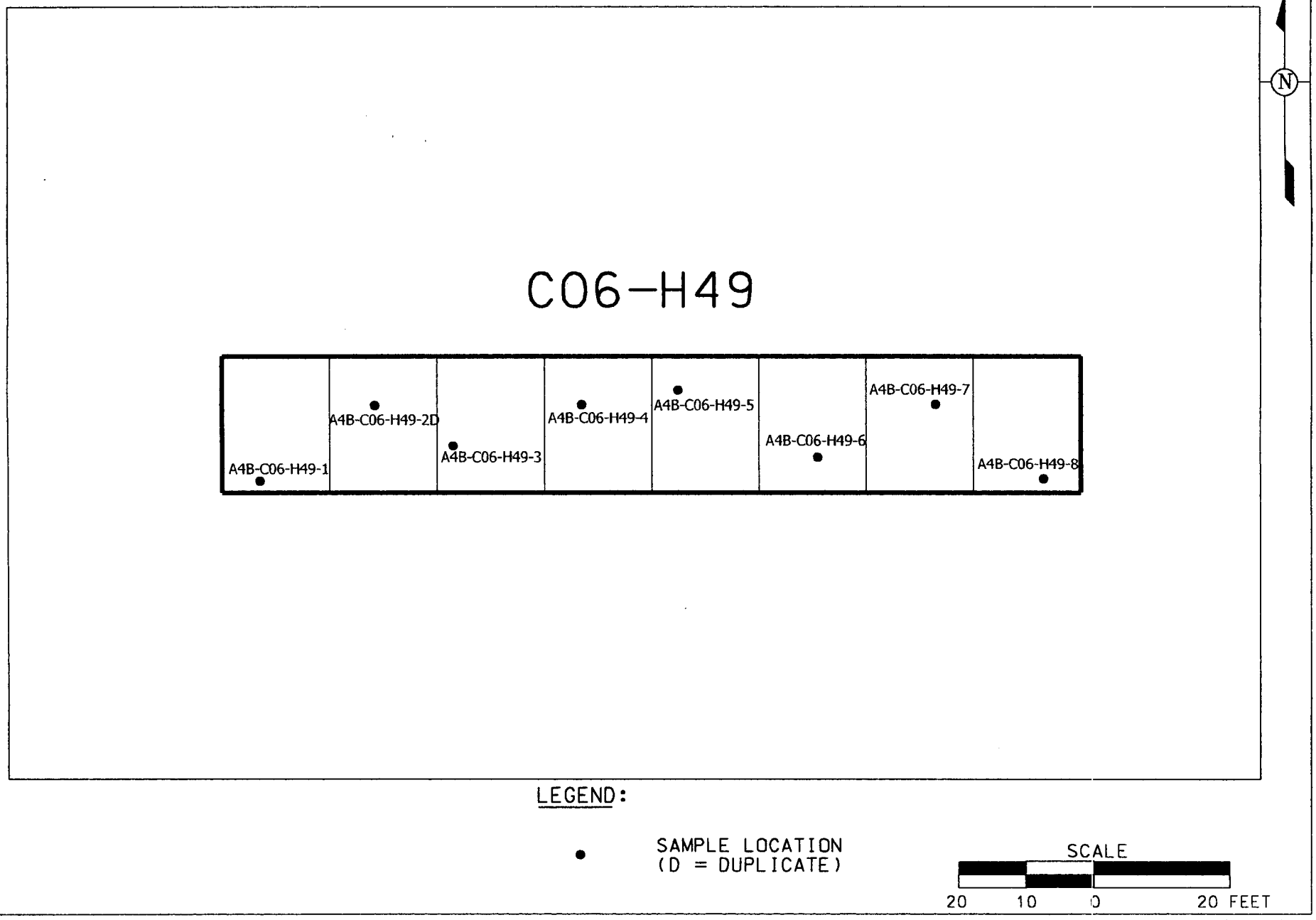
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-7. CERTIFICATION SAMPLING LOCATIONS FOR CU05 (HWMU-47)

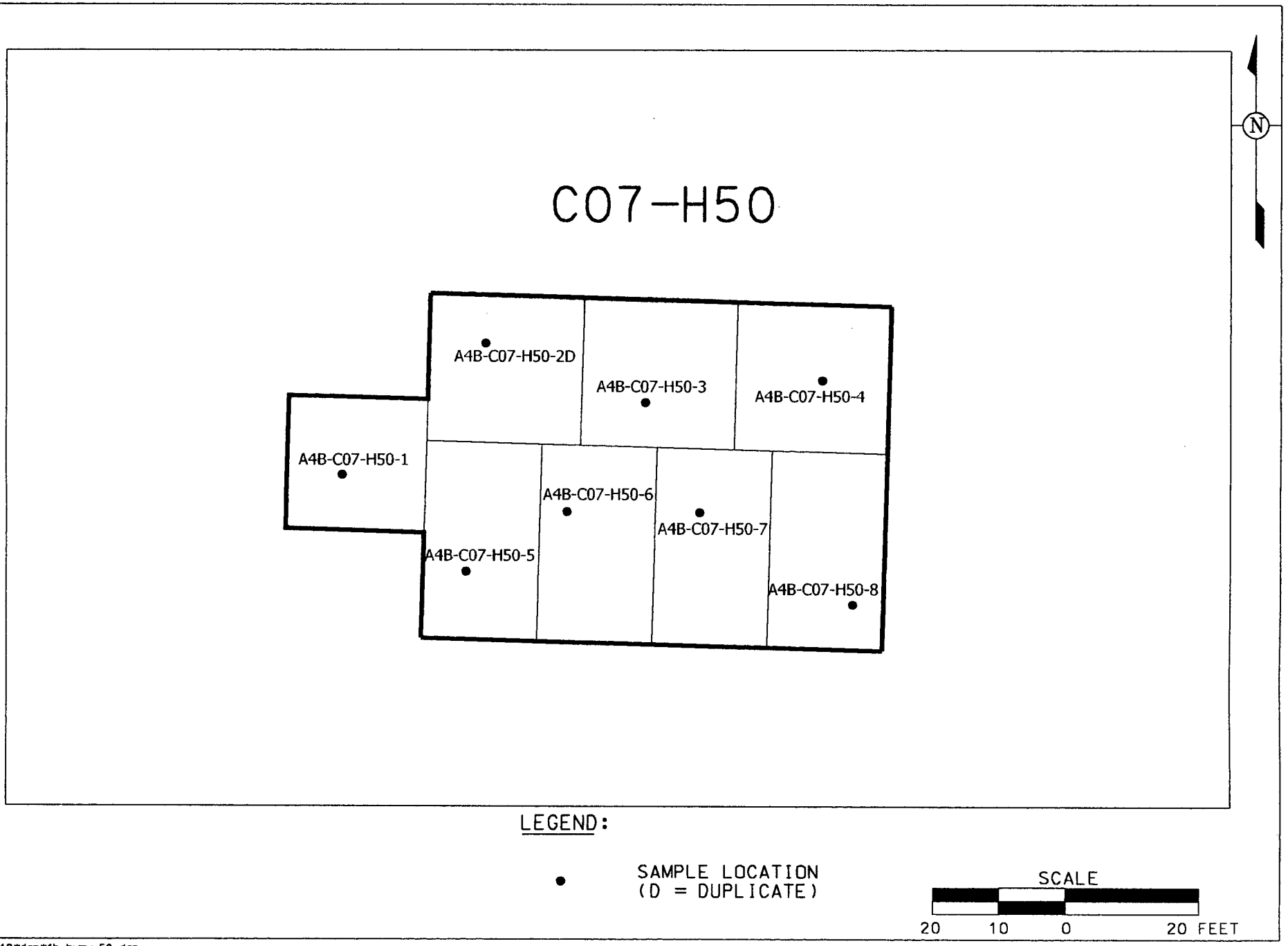
28-JUN-2005



v:*2-fm12*dgn*4B_HWMU_49.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-8. CERTIFICATION SAMPLING LOCATIONS FOR CU06 (HWMU-49)

08-JUN-2005



v:\#2fm12#dgn#4b_hwmu_50.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 4-9. CERTIFICATION SAMPLING LOCATIONS FOR CU07 (HWMU-50)

08-JUN-2005

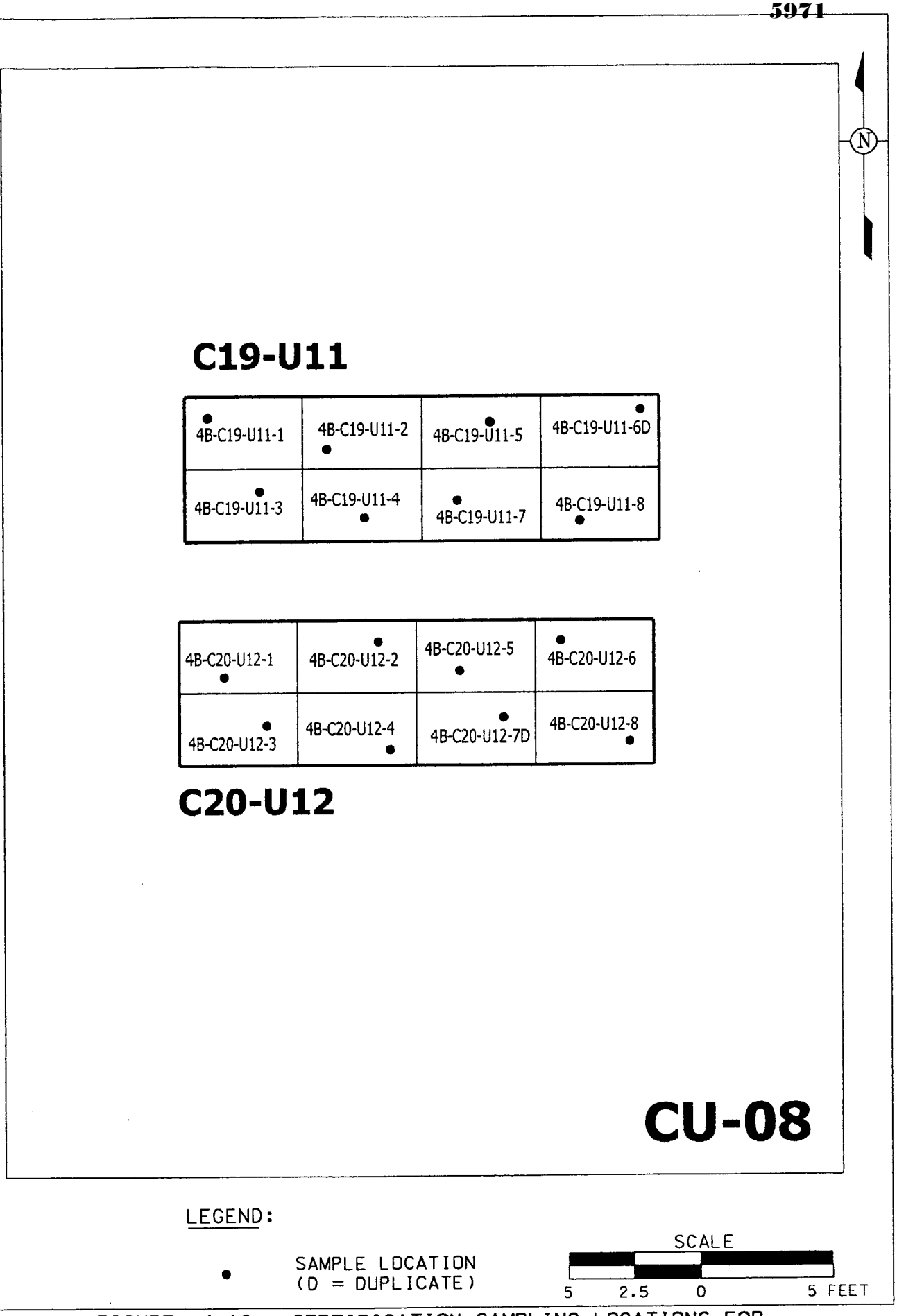


FIGURE 4-10. CERTIFICATION SAMPLING LOCATIONS FOR CU19 (UST 11) AND CU20 (UST 12)

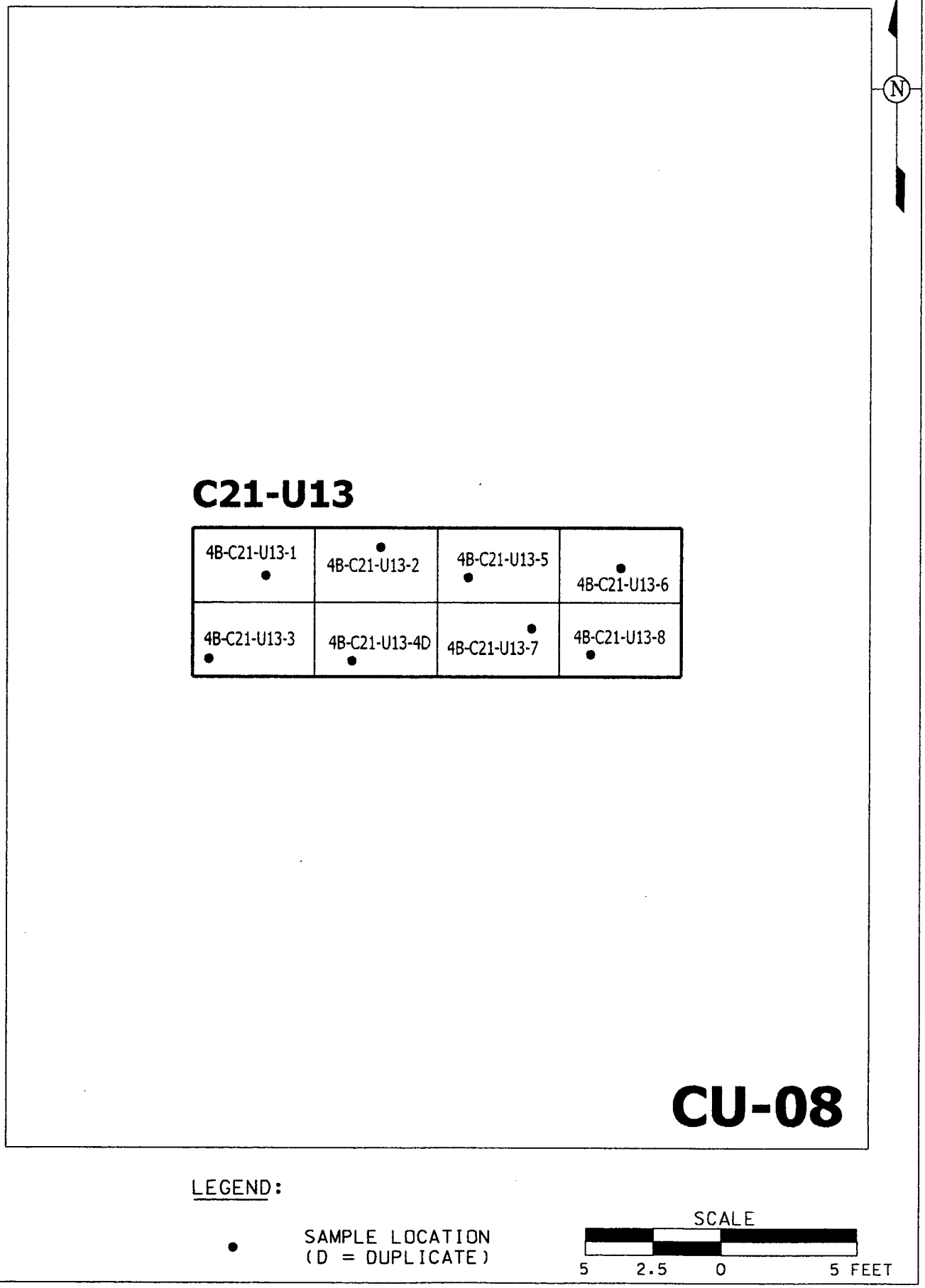


FIGURE 4-11. CERTIFICATION SAMPLING LOCATIONS FOR CU21 (UST 13)

5.0 SCHEDULE

The following draft schedule shows key activities for the completion of the work within the scope of this CDL and Certification PSP. Implementation of this schedule is pending funding availability. If necessary, an extension will be requested.

Activity	Target Date
Submittal of Certification Design Letter	July 8, 2005
Start of Certification Sampling	August 8, 2005
Complete Field Work	August 19, 2005
Complete Analytical Work	September 19, 2005
Complete Data Validation and Statistical Analysis	October 6, 2005
Submit Certification Report	October 19, 2005[a]

[a]The date for submittal of the Certification Report is a commitment to EPA and OEPA. Other dates are internal target completion dates.

6.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

6.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

Per requirements of the SEP and Data Quality Objectives SL-052, Revision 3 (Appendix B), the field quality control, analytical and data validation requirements are as follows:

- Field QC requirements include one field duplicate for the CU, as noted in Section 2.3 and identified in Appendix C. The field duplicate sample will be analyzed for the same COCs as the other samples in the CU from which the field duplicate has been collected.

  If "push tubes" are used for sample collection, one container blank will be collected before sample collection begins and one will be collected at the conclusion of sample collection for the entire Area 4B - Part One. The container blank sample will be analyzed for all of the radiological and metal COCs required for Area 4B - Part One. If an alternate sample collection method is used, one rinsate will be collected and analyzed for all of the radiological and metal COCs required for Area 4B - Part One at a minimum frequency of one per 20 pieces of equipment reused in the field.

  A trip blank is required if VOC samples are being collected. The trip blanks will be analyzed for all of the VOC COCs required for Area 4B - Part One. The frequency for a trip blank is one per day, or one per batch of 20 VOC samples collected, or one per cooler to be shipped, whichever is more frequent.

- All analyses will be performed at ASL D or E, where E meets the MDL of 10 percent of the FRL and is above the SCQ ASL D detection level, but the analyses meet all other SCQ ASL D criteria. An ASL D data package will be provided for all of the data.

- All field data will be validated. A minimum of 10 percent of the laboratory data will be validated to VSL D with the remainder validated to VSL B. The following CUs will be validated to VSL D: A4B-C01-H04, A4B-C02-H18, A4B-C03-H28, and A4B-C05-H47. If any result is rejected during validation, the sample will be re-analyzed or an archive location will be sampled and analyzed in its place. If necessary, this change will be documented in a V/FCN.

Once all data are validated as required, results will be entered into the SED and a statistical analysis will be performed to evaluate the pass/fail criteria for each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP.

If any sample collection or analytical methods are used that are not in accordance with the SCQ, the Project Manager and Characterization Manager must determine if the qualitative data from the samples will be beneficial to certification decision making. If the data will be beneficial, the Project Manager and Characterization Manager will ensure that:

- A variance will be written to document references confirming that the new method supports data needs,

- variations from the SCQ methodology are documented in a variance, or

- data validation of the affected samples is requested or qualifier codes of J (estimated) and R (rejected) be attached to detected and non-detected results, respectively.

6.2 PROJECT SPECIFIC PROCEDURES, MANUALS AND DOCUMENTS

Programs supporting this work are responsible for ensuring team members work to and are trained to applicable documents. Additionally, programs supporting this work are responsible for ensuring team members in their organizations are qualified and maintain qualification for site access requirements. The Project Manager will be responsible for ensuring any project-specific training required to perform work per this CDL and Certification PSP is conducted.

To ensure consistency and data integrity, field activities in support of the PSP will follow the requirements and responsibilities outlined in the procedures and guidance documents referenced below.

- 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan
- Sitewide Excavation Plan (SEP)
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- SH-1006, Event Investigation and Reporting
- ADM-02, Field Project Prerequisites
- EQT-06, Geoprobe® Model 5400 and Model 6600
- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- 9501, Shipping Samples to Off-site Laboratories
- Trimble Pathfinder Pro-XL GPS Operation Manual

6.3 INDEPENDENT ASSESSMENT

An independent assessment may be performed by the Fernald Closure Project (FCP) QA/QC organization by conducting a surveillance, consisting of monitoring/observing on-going project activities and work areas to verify conformance to specified requirements. The surveillance will be planned and documented in accordance with Section 12.3 of the SCQ.

6.4 IMPLEMENTATION OF CHANGES

Before the implementation of changes, the Field Sampling Lead will be informed of the proposed changes. Once the Field Sampling Lead has obtained written or verbal approval (electronic mail is acceptable) from the Characterization Manager and QA/QC for the changes to the PSP, the changes may be implemented. Changes to the PSP will be noted in the applicable FALs and on a V/FCN. QA/QC must receive the completed V/FCN, which includes the signatures of the Characterization and Sampling Managers, Project Manager, and QA/QC within seven days of implementation of the change. The EPA and OEPA will be given a 15-day review period prior to implementing the change(s) for any V/FCNs identified as "significant" per project guidelines.

7.0 HEALTH AND SAFETY

Technicians will schedule a project walkdown with Health and Safety (Radiological Control, Industrial Hygiene, and Safety) and any other groups that may be working in the same or an adjacent area before the start of the project. Any hazards identified during the project walkdown must be corrected/controlled prior to the start of work. Weekly walkdowns will be conducted throughout the course of the project in accordance with SPR 1-10, Safety Walk-Throughs. All work on this project will be performed according to applicable Environmental Monitoring procedures, the documents identified in Section 3.4, Fluor Fernald work permit, Radiological Work Permit, and other applicable permits as determined by project management. Concurrence with applicable safety permits is required by each technician in the performance of their assigned duties.

A job/safety briefing will be conducted before field activities begin each day. The project lead or designee will document the briefing on form FS-F-2955, Training Attendance Roster. Personnel will also be briefed on any health and safety documents (such as Travelers) that may apply to the project work scope. During the course of this project, no operating heavy-duty equipment within a 50-foot buffer zone will be permitted. Additional safety information can be found in 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan. All personnel have stop-work authority for imminent safety hazards or other hazards resulting from noncompliance with the applicable safety and health practices.

Technicians will be provided with cellular phones for all sampling activities, and **all emergencies will be reported by dialing 911 and 648-6511**. Announcements for severe weather will be provided to select company issued cell phones and alpha-numeric page. Pagers and cellular phones are provided to the Technicians by FCP, as needed. As soon as possible, field personnel are to contact their supervisor and Health and Safety Representative after any unplanned event or injury.

8.0 DISPOSITION OF WASTE

During sampling activities, field personnel may generate small amounts of soil, water, and contact waste. Excess soil generated during sample collection will be replaced in the borehole. Contact waste generation will be minimized by limiting contact with sample media, and by only using disposable materials that are necessary. Contact waste will be bagged and brought back to site for disposal in an uncontrolled area dumpster. Generation of decontamination waters will be minimized in the field. Decontamination water that is generated will be contained in a plastic bucket with a lid and returned to site for disposal. A wastewater discharge form must be completed for disposal. On-site decontamination of equipment will take place at a facility that discharges to the Advanced Wastewater Treatment Facility, either directly or indirectly, through the storm water collection system.

Following analysis, any remaining soil and/or sample residuals will remain at the off-site laboratories for a specified period of time as defined in their contracts with Fluor Fernald. Prior authorization must be obtained from the Characterization Manager, or designee, to disposition samples collected under this CDL and Certification PSP.

9.0 DATA MANAGEMENT

A data management process will be implemented so information collected during the investigation will be properly managed to satisfy data end use requirements after completion of field activities. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on a FAL, which should be sufficiently detailed for accurate reconstruction of the events without reliance on memory. Sample Collection Logs will be completed according to protocols specified in Appendix B of the SCQ and in applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered following the sampling event.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the FAL, the Chain of Custody/Request for Analysis form, the Lithologic Log, and Borehole Abandonment Record. The PSP number will be on all documentation associated with these sampling activities.

Samples will be assigned a unique sample number as explained in Section 2.3 and listed in Appendix C. This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for Analysis form and will be used to identify the samples during analysis, data entry, and data management.

Technicians will review all field data for completeness and accuracy then forward the field data package to the Field Data Validation Contact for final QA/QC review. Analytical data will be entered into the SED by Sample Data Management personnel. Analytical data that is designated for data validation will be forwarded to the Data Validation Group. The PSP requirements for analytical data validation are outlined in Section 4.1. Analytical data will be reviewed by the Data Management Lead upon receipt from the off-site laboratories.

Following field and analytical data validation, the Sample Data Management organization will perform data entry into the SED. The original field data packages, original analytical data packages, and original documents generated during the validation process will be maintained as project records by the Sample Data Management organization.

To ensure that correct coordinates and survey information are tied to the final sample locations in the database, the following process will take place. Upon surveying all locations identified in the PSP, the Surveying Manager will provide the Data Management Lead (i.e., Characterization) with an electronic file of all surveyed coordinates and surface elevations. The Sampling Manager will provide the Data Management Lead with a list of any locations that must be moved during penetration permitting or sample collection, and the Data Management Lead will update the electronic file with this information.

After sample collection is complete, the Data Management Lead will provide this electronic file to the Database Contact for uploading to SED.

REFERENCES

Ohio Environmental Protection Agency, 2004, Closure Plan Review Guidance for RCRA Facilities," OEPA Division of Hazardous Waste Management, Columbus, Ohio.

U.S. Department of Energy, 1995a, "Remedial Investigation Report for Operable Unit 3," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1995b, "Remedial Investigation Report for Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1995c, "Feasibility Study Report for Operable Unit 3," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1995d, "Feasibility Study Report for Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1996, "Record of Decision for Remedial Action at Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1998, "Sitewide Excavation Plan," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2001, "Project Specific Plan for Area 4B Potentially Characteristic Area and West of the Pilot Plant Predesign Investigation," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2002, "Project Specific Plan for Delineating Known Exceedances of the On-Site Disposal Facility Waste Acceptance Criteria in Areas 3B/4B/5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2004a, "Implementation Plan for Area 3A/4B/5," Final, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2004b, "Project Specific Plan for the Excavation Control of Areas 3B, 4B, and 5 (Supplement to 20300-PSP-0011)," Revision 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2004c, Letter DOE-0005-05, "Final Remediation Level Development and Resource Conservation and Recovery Act Hazardous Waste Management Unit Closure," Dated October 1, 2004, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2005, "Project Specific Plan Guidelines for General Characterization for Sitewide Soil Remediation," Revision 2, PCN 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

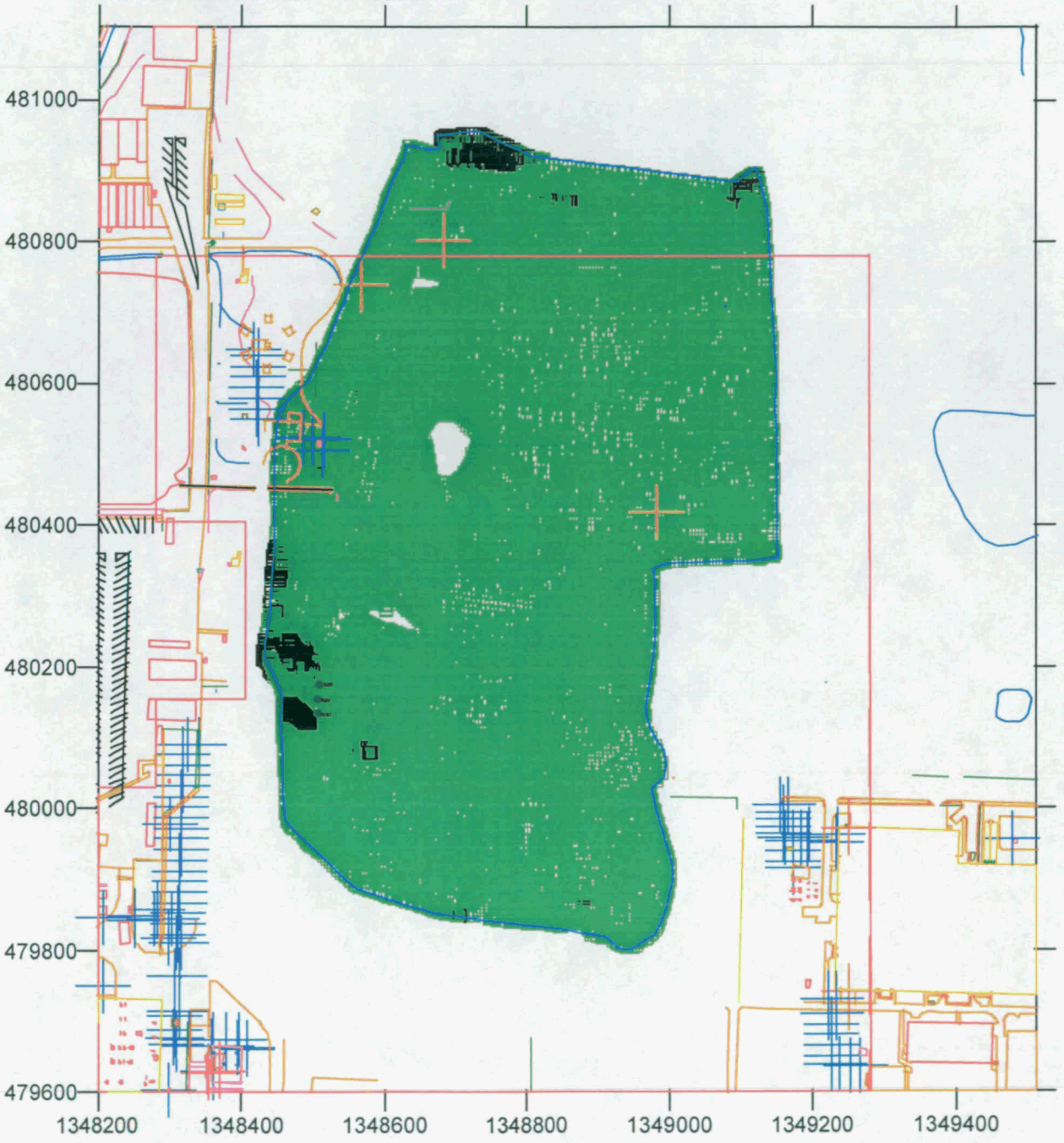
APPENDIX A

PRECERTIFICATION REAL-TIME SCAN DATA FOR AREA 4B

Figure A-1 Area 4B Phase 1 Total Gross Counts per Second

Data groups: GATOR-0499_05-11-2005, RSS1_1808_05-13-2005, GATOR_0502_05-13-2005,GATOR_0505_05-17-2005, RSS2_0926_05-17-2005, GATOR_0508_05-18-2005,RSS2_0929_05-18-2005,GATOR_0515_05-24-2005, RSS2_0935_05-24-2005, RSS3_0833_05-24-2005, GATOR_0530_06-07-2005,GATOR_0533_06-08-2005 RSS1_1904_06-07-2005,RSS1_1914_06-08-2005,RSS3_0863_06-07-2005,RSS3_0867_06-08-2005, GATOR_0540_06-17-2005,RSS2_0998_06-17-2005,RSS2_1003_06-20-2005,RSS2_1004-06-20-2005, RSS2_1012-06-22-2005,RSS2_1015-06-23-2005,RSS2_1016-06-23-2005 40743_06-23-2005

Measurement Period: 05-11-2005 thru 06-23-2005



Certification Area Boundary

Hi Leachate Boundary

NAI Total Counts per second

-9999 to 3000

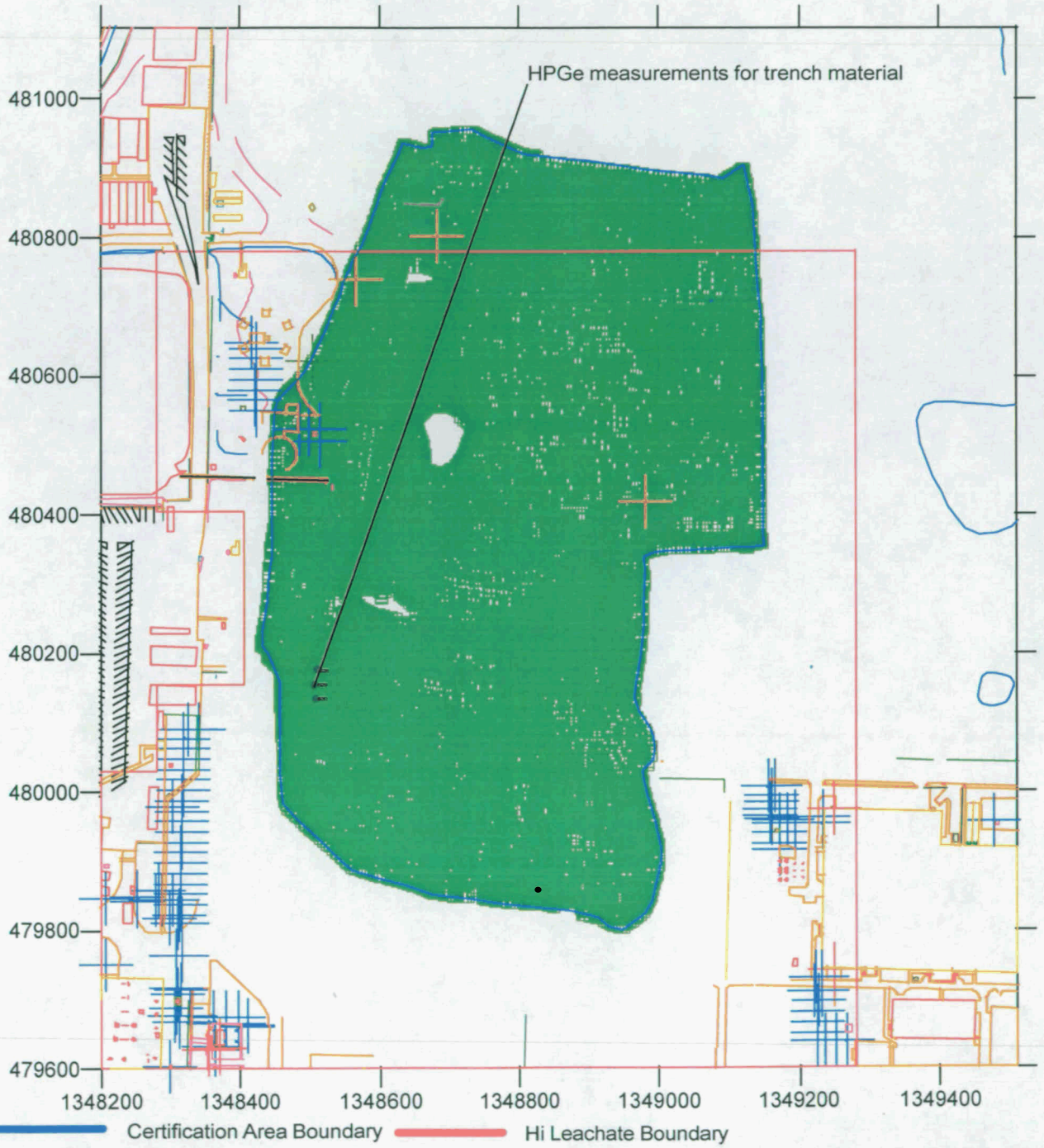
3000 to 9999

RTIMP DWG ID: A4B_P1_NAI_TC.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P1_LL_NAI.xls, A4B_P1_HL_NAI.xls, A4B_P1_HL_HPGe_15cm.xls

Figure A-2 Area 4B Phase 1 Moisture Corrected Radium-226

Data groups: GATOR-0499_05-11-2005, RSS1_1808_05-13-2005, GATOR_0502_05-13-2005,GATOR_0505_05-17-2005, RSS2_0926_05-17-2005, GATOR_0508_05-18-2005,RSS2_0929_05-18-2005,GATOR_0515_05-24-2005, RSS2_0935_05-24-2005, RSS3_0833_05-24-2005, GATOR_0530_06-07-2005,GATOR_0533_06-08-2005 RSS1_1904_06-07-2005,RSS1_1914_06-08-2005,RSS3_0863_06-07-2005,RSS3_0867_06-08-2005, GATOR_0540_06-17-2005,RSS2_0998_06-17-2005,RSS2_1003_06-20-2005,RSS2_1004-06-20-2005, RSS2_1012-06-22-2005,RSS2_1015-06-23-2005,RSS2_1016-06-23-2005 40743_06-23-2005

Measurement Period: 05-11-2005 thru 06-23-2005



Certification Area Boundary

Hi Leachate Boundary

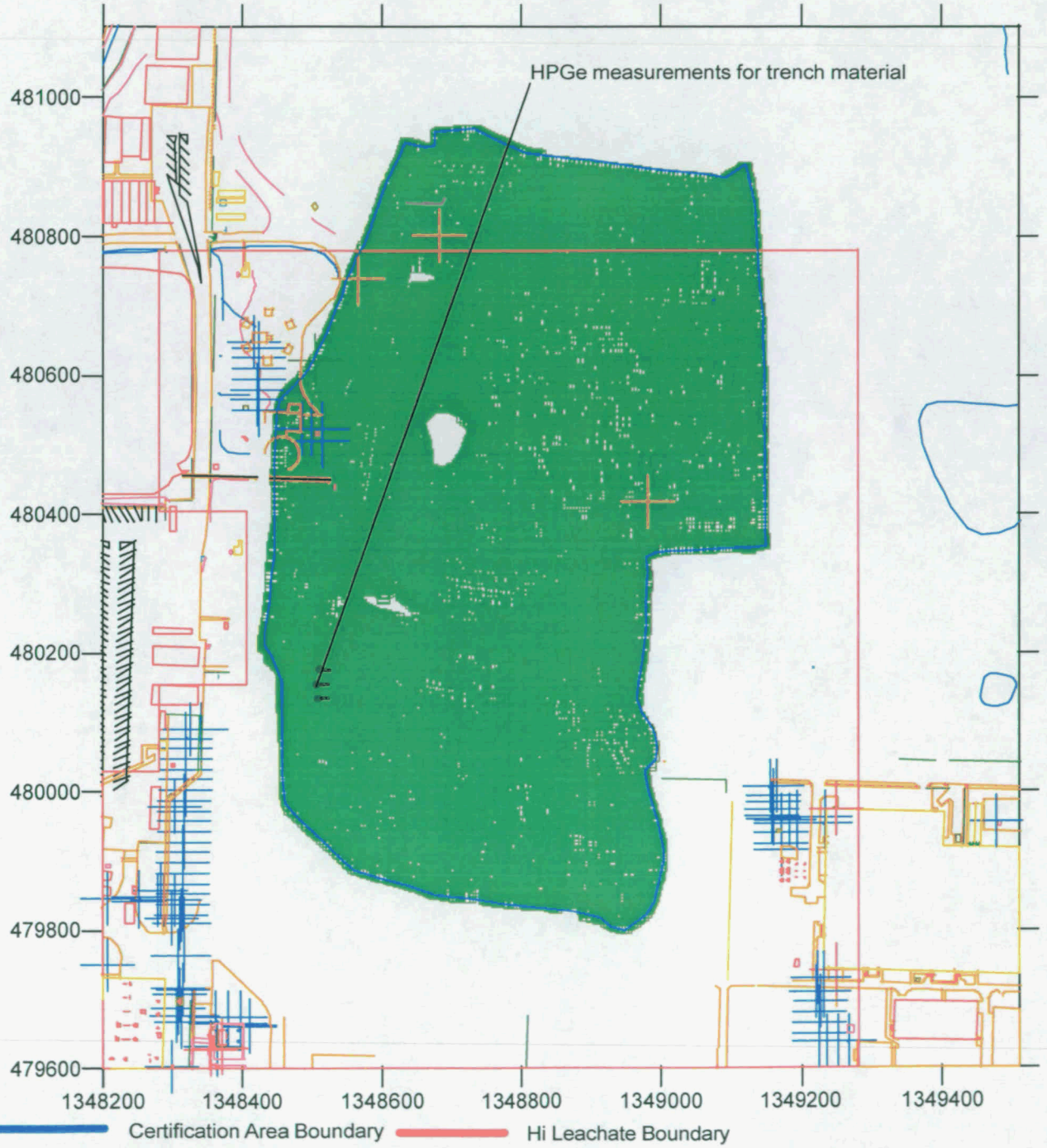
NAI Ra-226 in pCi/g	15 cm HPGe Ra-226 in pCi/g
-9999 to 5.1	-9999 to 5.1
5.1 to 9999	5.1 to 9999

RTIMP DWG ID: A4B_P1_NAI_RA.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P1_LL_NAI.xls, A4B_P1_HL_NAI.xls, A4B_P1_HL_HPGe_15cm.xls

Figure A-3 Area 4B Phase 1 Moisture Corrected Thorium-232

Data groups: GATOR-0499_05-11-2005, RSS1_1808_05-13-2005, GATOR_0502_05-13-2005,GATOR_0505_05-17-2005, RSS2_0926_05-17-2005, GATOR_0508_05-18-2005,RSS2_0929_05-18-2005,GATOR_0515_05-24-2005, RSS2_0935_05-24-2005, RSS3_0833_05-24-2005, GATOR_0530_06-07-2005,GATOR_0533_06-08-2005 RSS1_1904_06-07-2005,RSS1_1914_06-08-2005,RSS3_0863_06-07-2005,RSS3_0867_06-08-2005, GATOR_0540_06-17-2005,RSS2_0998_06-17-2005,RSS2_1003_06-20-2005,RSS2_1004-06-20-2005, RSS2_1012-06-22-2005,RSS2_1015-06-23-2005,RSS2_1016-06-23-2005 40743_06-23-2005

Measurement Period: 05-11-2005 thru 06-23-2005



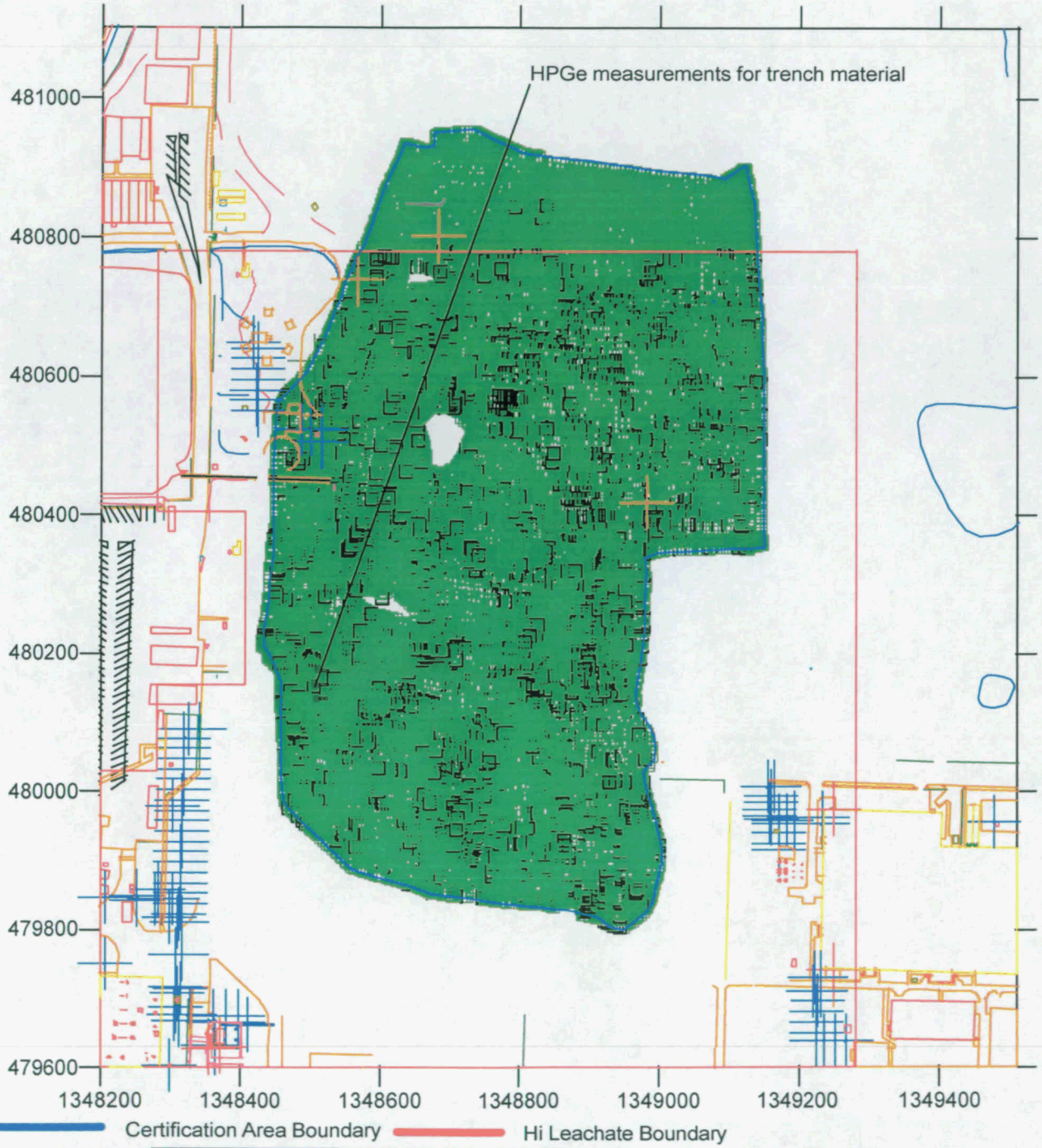
NAI Th-232 in pCi/g		15 cm HPGe Th-232 in pCi/g	
-9999 to 4.5		-9999 to 4.5	
4.5 to 9999		4.5 to 9999	

RTIMP DWG ID: A4B_P1_NAI_TH.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P1_LL_NAI.xls, A4B_P1_HL_NAI.xls, A4B_P1_HL_HPGe_15cm.xls

Figure A-4 Area 4B Phase 1 Moisture Corrected Total Uranium

Data groups: GATOR-0499_05-11-2005, RSS1_1808_05-13-2005, GATOR_0502_05-13-2005,GATOR_0505_05-17-2005, RSS2_0926_05-17-2005, GATOR_0508_05-18-2005,RSS2_0929_05-18-2005,GATOR_0515_05-24-2005, RSS2_0935_05-24-2005, RSS3_0833_05-24-2005, GATOR_0530_06-07-2005,GATOR_0533_06-08-2005 RSS1_1904_06-07-2005,RSS1_1914_06-08-2005,RSS3_0863_06-07-2005,RSS3_0867_06-08-2005, GATOR_0540_06-17-2005,RSS2_0998_06-17-2005,RSS2_1003_06-20-2005,RSS2_1004-06-20-2005, RSS2_1012-06-22-2005,RSS2_1015-06-23-2005,RSS2_1016-06-23-2005 40743_06-23-2005

Measurement Period: 05-11-2005 thru 06-23-2005



Certification Area Boundary

Hi Leachate Boundary

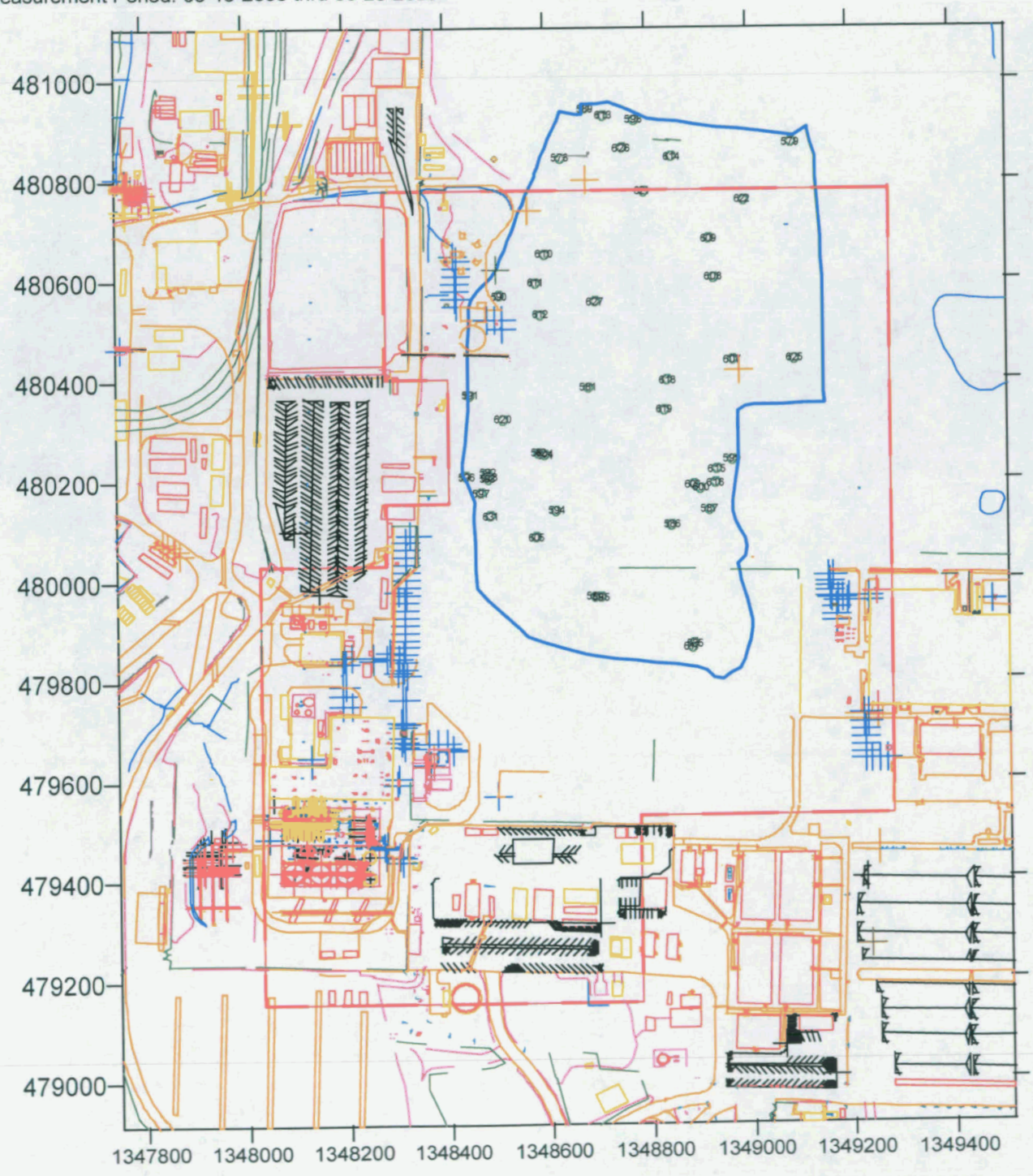
NAI Total U in ppm for non high leachate	NAI Total U in ppm for high leachate	15 cm HPGe Total U in ppm high leach
-9999 to 246	-9999 to 60	-9999 to 60
246 to 9999	60 to 9999	60 to 9999

RTIMP DWG ID: A4B_P1_NAI_TU.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P1_LL_NAI.xls, A4B_P1_HL_NAI.xls, A4B_P1_HL_HPGe_15cm.xls

Figure A-5 Area 4B Phase 2 Moisture Corrected Radium-226

Data groups: 40743_05-16-2005, 40293_05-17-2005, 40293_05-18-2005, 40227_05-23-2005, 40227_05-25-2005
40293_06-16-2005,40293_06-17-2005,40743_06-17-2005,40227_06-21-2005,30687_06-22-2005
40743_06-23-2005

Measurement Period: 05-16-2005 thru 06-23-2005



Certification boundary

High leachate boundary

HPGe Ra-226
in pCi/g

-9999 to 5.1

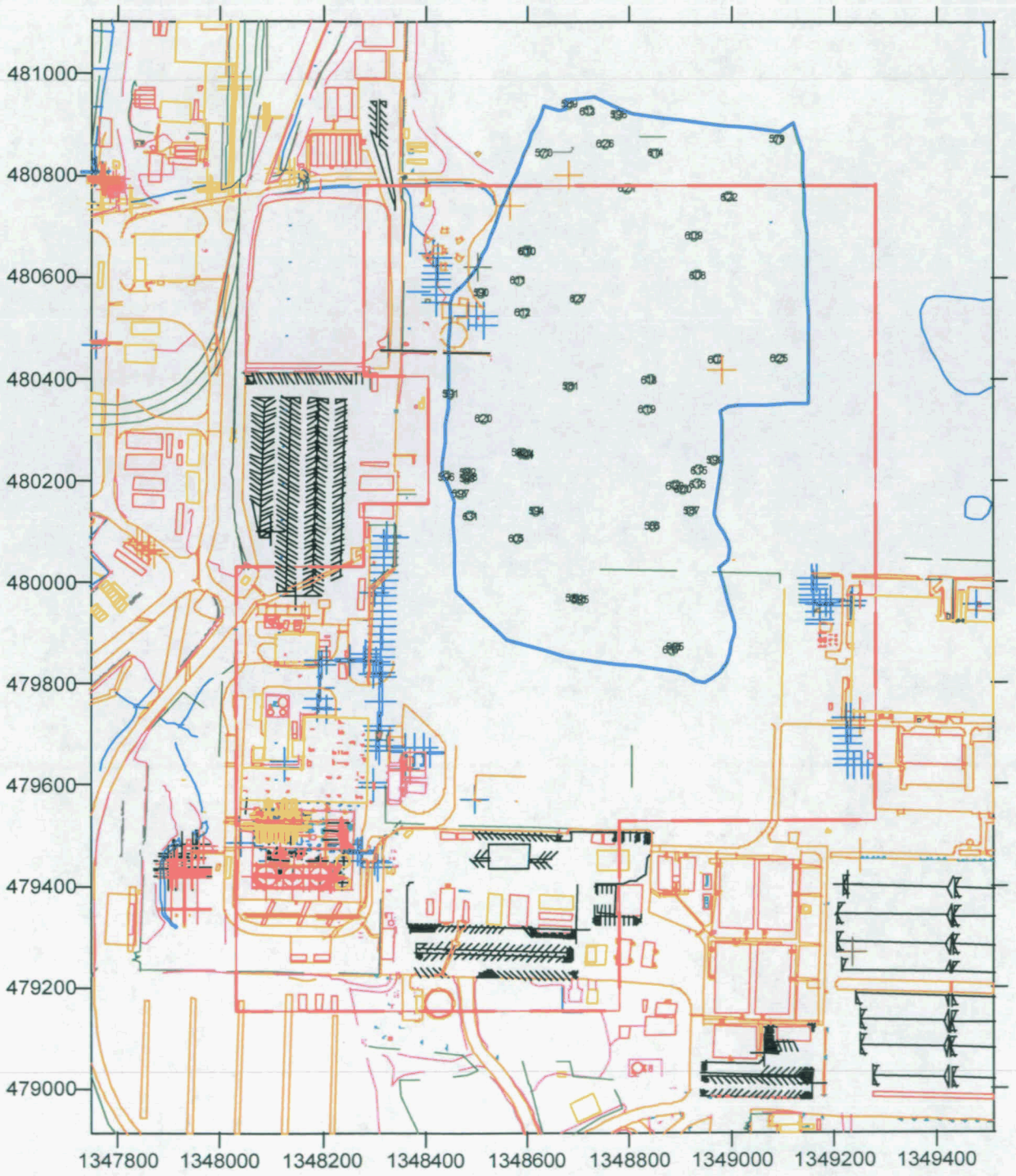
5.1 to 9999

RTIMP DWG ID: A4B_P2_RA.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P2_HL_HPGE_31cm.xls,
A4B_P2_LL_HPGE_31cm.xls

Figure A-6 Area 4B Phase 2 Moisture Corrected Thorium-232

Data groups: 40743_05-16-2005, 40293_05-17-2005, 40293_05-18-2005, 40227_05-23-2005, 40227_05-25-2005
40293_06-16-2005,40293_06-17-2005,40743_06-17-2005,40227_06-21-2005,30687_06-22-2005
40743_06-23-2005

Measurement Period: 05-16-2005 thru 06-23-2005

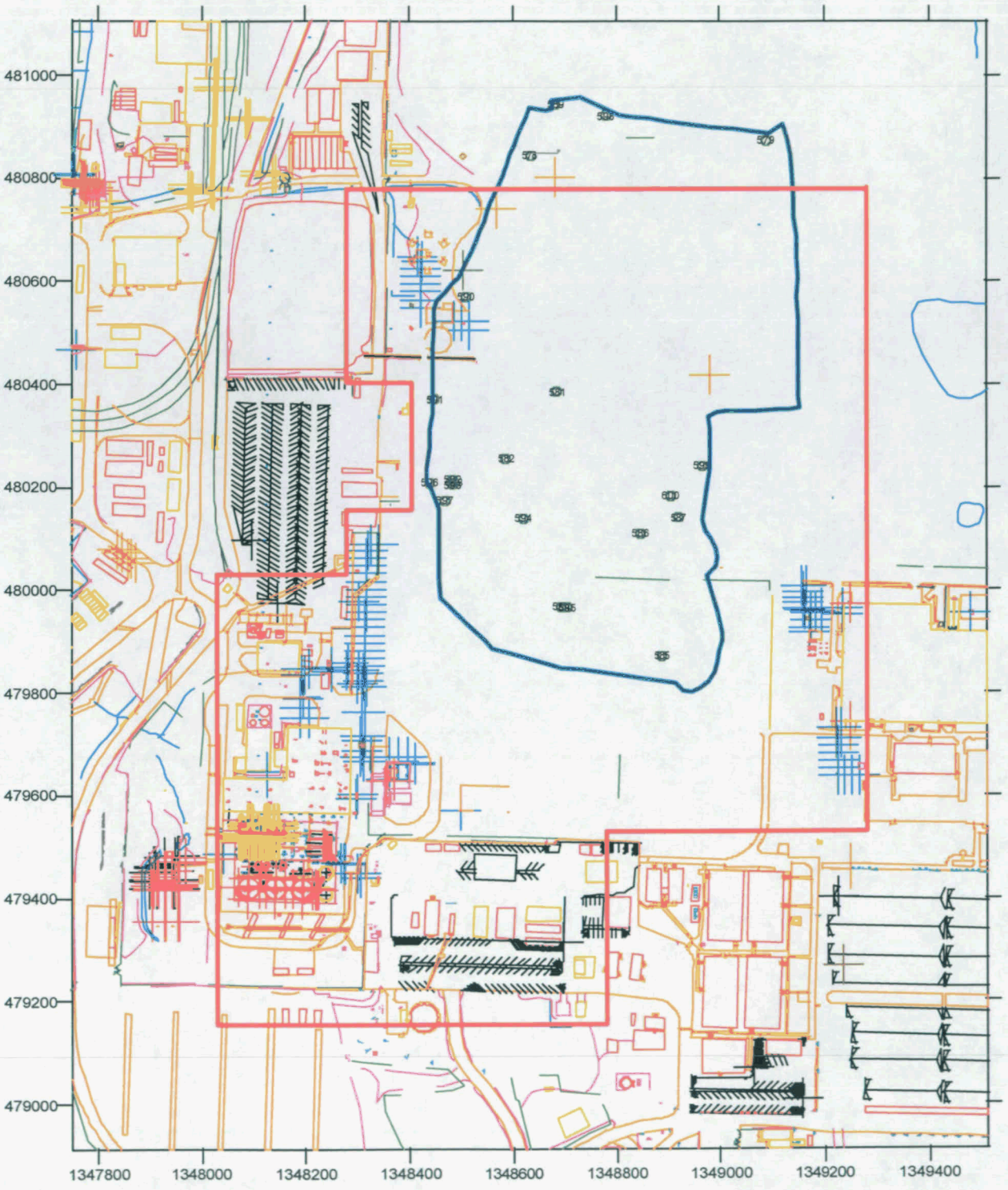


HPGe Th-232
in pCi/g
-9999 to 4.5
4.5 to 9999

RTIMP DWG ID: A4B_P2_TH.srf
Project ID: Gen Char for Site Soil Remed 20300-PSP-0011
Prepared: D.Seiller 06-25-2005
Supporting Data: A4B_P2_HL_HPGE_31cm.xls,
A4B_P2_LL_HPGE_31cm.xls

Figure A-7 Area 4B Phase 2 Moisture Corrected Total Uranium

Data groups: 40743_05-16-2005, 40293_05-17-2005, 40293_05-18-2005, 40227_05-23-2005, 40227_05-25-2005



NAI Total U
in ppm
- -9999 to 60
- 60 to 9999

RTIMP DWG ID: A4B_P2_TU.srf
Project Name: Gen Char for Site Soil Remed
Project Number: 20300-PSP-0011
Date Prepared: 05/31/05
Prepared By:D.Seiller
Supporting Data: A4B_P2.xls

APPENDIX B

DATA QUALITY OBJECTIVES SL-052, REV. 3

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Sitewide Certification Sampling and Analysis

Number: SL-052

Revision: 3

Effective Date: March 13, 2000

Contact Name: Mike Rolfes

Approval: _____ Date: 3/13/00
James Chambers
DQO Coordinator

Approval: _____ Date: 3/13/00
J.D. Chiou
SCEP Project Director

Rev. #	0	1	2	3			
Effective Date:	4/28/99	6/10/99	2/3/00	3/13/00			

DATA QUALITY OBJECTIVES
Sitewide Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team

The members of the scoping team included individuals with expertise in QA, analytical methods, field sampling, statistics, laboratory analytical methods and data management.

Conceptual Model of the Site

Soil sampling was conducted at the Fernald Environmental Management Project (FEMP) during the Operable Unit 5 (OU5) Remedial Investigation/Feasibility Study (RI/FS). Final Remediation Levels (FRLs) for constituents of concern (COCs), along with the extent of soil contaminated above the FRLs, were identified in the OU5 Record of Decision (ROD). Actual soil remediation activities now fall under the guidance of the final Sitewide Excavation Plan (SEP).

As outlined in the SEP, the FEMP has been divided into individual Remediation Areas (or phased areas within a Remediation Area) to sequentially carry out soil remedial activities. Under the strategy identified in the SEP, pre-design investigations are first conducted to better define the limits of soil excavation requirements. Following any necessary excavation, pre-certification real-time scanning activities are conducted to evaluate residual patterns of soil contamination. Pre-certification scan data should provide a level of assurance that the FRLs will be achieved. When pre-certification data indicate that remediation goals are likely to be met, they are used to define certification units (CUs) within the Remediation Area of interest. Table 2-9 of the final SEP identifies a list of area-specific COCs (ASCOCs) for each Remediation Area at the FEMP. Based on existing data and production knowledge, a subset of these ASCOCs are conservatively identified within each CU as potentially present in the CU. This suite of CU-specific COCs is the subset of the ASCOCs to be evaluated against the FRLs within that CU. At a minimum, the five primary radiological COCs (total uranium, radium-226, radium-228, thorium-228, thorium-232) will be retained as CU-specific COCs for certification of each CU.

Delineation and justification for the final CU boundaries, along with each corresponding suite of CU-specific ASCOCs is documented in a Certification Design Letter. Upon approval of the Certification Design Letter by the EPA, certification activities can begin. Section 3.4 of the final SEP presents the general certification strategy.

1.0 Statement of Problem

FEMP soil and potentially impacted adjacent off-property soil must be certified on a CU by CU basis for compliance with the FRLs of all CU-specific ASCOCs. The appropriate sampling, analytical and information management criteria must be developed to provide the required qualified data necessary to demonstrate attainment of certification statistical criteria. For every area undergoing certification, a sampling plan must be in place that will direct soil samples to be collected which are representative of the CU-specific COC concentrations within the framework of the certification approach identified in the final SEP. The appropriate analytical methodologies must be selected to provide the required data.

Exposure to Soil

The cleanup standards, or FRLs, were developed for a final site land use as an undeveloped park. Under this exposure scenario, receptors could be directly exposed to contaminated soil through dermal contact, external radiation, incidental ingestion, and/or inhalation of fugitive dust while visiting the park. Exposure to contaminated soil by the modeled receptor is expected to occur at random locations within the boundaries of the FEMP and would not be limited to any single area. Some soil FRLs were developed based on the modeled cross-media impact potential of soil contamination to the underlying aquifer. In these instances, potential exposure to contaminants would be indirect through the groundwater pathway, and not directly linked to soil exposure. Off-site soil FRLs were established at more conservative levels than the on-property soil FRLs, based on an agricultural receptor. Benchmark Toxicity Values (BTVs) are also being considered in the cleanup process by assessing habitat impact of individual BTVs under post-remedial conditions.

Available Resources

Time: Certification sampling will be accomplished by the field sampling team prior to interim or final regrading or release of soil for construction activities. The certification sampling schedule must allow sufficient time, in the event additional remediation is required, to demonstrate certification of FRLs prior to permanent construction or regrading. Certification sampling will have to be completed and analytical results validated and statistical analysis completed prior to submission of a Certification Report to the regulatory agencies.

Project Constraints: Certification sampling and analytical testing must be performed with existing manpower, materials and equipment to support the certification effort. Remediation areas are prioritized for certification sampling and analysis according to the date required for initiation of sequential construction activities in those areas. Fluor Daniel Fernald (FDF) and DOE must demonstrate post-remedial compliance with the CU-specific COC FRLs to release the designated Remediation Area for

planned interim grading, eventual restoration under the Natural Resources Restoration Plan (NRRP), and other final land use activities.

2.0 Identify the Decision

Decision

Demonstrate within each CU if all CU-specific COCs pass the certification criteria. These criteria are as follows: 1) The average concentration of each CU-specific COC is below the FRL and within the agreed upon confidence limits (95% for primary ASCOCs and 90% for secondary ASCOCs); and 2) the hot-spot criteria, that no result for any CU-specific COC is more than two times the associated soil FRL. The certification criteria are discussed in greater detail in Section 3.4.4 of the final SEP.

Possible Results

1. The average concentration of each CU-specific COC is demonstrated to be below the FRLs within the confidence level, with no single result for any CU-specific COC greater than two times the associated FRL. The CU can then be certified as attaining remediation goals.

2. The average concentration of at least one CU-specific COC is demonstrated to be above the FRL at the given confidence level. The CU will fail certification and require additional remedial action, per Section 3.4.5 of the final SEP.

3. If a result(s) of one or more CU-specific COC is demonstrated to be at or above two times the FRL, the CU will fail certification. The CU will fail certification and require additional remedial action per Section 3.4.5 of the final SEP. A combination of results 2 and 3 also constitutes certification failure.

3.0 Inputs That Affect the Decision

Required Information

Certification data will be obtained through physical soil sampling. Based on the certification analytical results, the average concentrations of each CU-specific COC with specified confidence levels will be calculated using the statistical methods identified in Appendix G of the final SEP.

Source of Information

Per the SEP, analysis of certification samples for each CU-specific COC will be conducted at analytical support level (ASL) D in accordance with methods and QA/QC standards in the FEMP Sitewide CERCLA Quality Assurance Project Plan [SCQ].

Contaminant-Specific Action Levels
The cleanup levels are the soil FRLs published in the OU5 and OU2 RODs. BTVs being considered in the remediation process are discussed for consideration during certification in Appendix C of the NRRP.

Methods of Sampling and Analysis
Physical soil samples will be collected in accordance with the applicable site sampling procedures. Per the SEP, laboratory analysis will be conducted at ASL D using QA/QC protocols specified in the SCQ. Full raw data deliverables will be required from the laboratory to allow for appropriate data validation. For FEMP-approved on- and off-site laboratories, the analytical method used will meet the required precision, accuracy and detection capabilities necessary to achieve FRL analyte ranges.

4.0 The Boundaries of the Situation

Spatial Boundaries
Domain of the Decision: The boundaries of this certification DQO extend to all surface, stockpile and fill soil in areas that are undergoing certification as part of FEMP remediation.

Population of Soil: Soil includes all excavated surfaces, undisturbed relatively unimpacted native soil, and sub-surface intervals (stockpile or fill areas only) in areas undergoing certification sampling and analysis.

Scale of Decision Making
Based on considerations of the final certification units and the COC evaluation process, the CU-specific COCs are determined. The area undergoing certification will be evaluated on a CU basis, based on physical sample results, as to whether it has passed or failed the criteria for attainment of certification (final SEP Section 3.4.4).

Temporal Boundaries
Time frame: Certification sampling must be performed in time to sequentially release certified areas for scheduled interim grading, restoration, and other final land use activities. Certification sampling data received from the laboratory will be validated and statistically evaluated. Certification results and findings will be documented in Certification Reports, which must be submitted to and approved by the regulatory agencies prior to release of the areas for scheduled interim grading, restoration, and other final land use activities.

Practical Considerations: Some areas undergoing remediation will not be accessible for certification sampling until decontamination/demolition and remedial excavation activities are complete. Other areas, such as wood lots, that are relatively uncontaminated and not planned for excavation, may require preparation, such as cutting of grass or removal of undergrowth prior to certification sampling, thus requiring coordination with FEMP Maintenance personnel.

5.0 Decision Rule

Successful certification of soil within the boundaries of a certification unit (CU) demonstrates that the certified soil (surface or subsurface) has concentrations of CU-specific COC(s) that meet the established criteria for attainment of Certification.

Parameters of Interest
The parameters of interest are the individual and average surface soil concentrations of CU-specific COCs and confidence limits on the calculated average within a CU. OU2 and OU5 ROD identify all applicable soil FRLs. The SEP identifies the ASCOCs, a subset of which will be used to establish CU-specific COCs within each Remediation Area undergoing certification sampling and analysis.

Action Levels
The applicable action levels are the on- and off-property soil FRLs published in the OU5 or OU2 ROD for each ASCOC.

Decision Rules
If the average concentration for each CU-specific COC is demonstrated to be below the FRLs within the agreed upon confidence level (95% for primary COCs; 90% for secondary COCs), and no analytical result exceeds two times the soil FRL, then the CU can be certified as complying with the cleanup criteria. If a CU does not meet the FRLs within the agreed upon confidence level for one or more CU-specific COCs, or one or more analytical results for one or more CU-specific COCs is greater than two times the associated soil FRL, then the CU fails certification and requires further assessment as per the SEP.

6.0 Limits on Decision Errors

Types of Decision Errors and Consequences

Definition

Decision Error 1: This decision error occurs when the decision maker decides that a CU has met the certification criteria, when in reality, the certification criteria have not been met. This situation could result in an increased risk to human health and the environment. In addition, this type of error could result in regulatory fees and penalties.

Decision Error 2: This decision error occurs when the decision maker decides a CU does not met the certification criteria, when actually, the certification criteria have been met. This error would result in unnecessary added costs due to the excavation of soil containing COC concentrations below their FRLs, and an increased volume of soil assigned to the OSDF. In addition, unnecessary delays in the remediation schedule may result.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the certification criteria are not met (average CU-specific COC concentrations not below the FRL within the specified confidence limits; or a single sample result above two times the FRL). The true state of nature for Decision Error 2 is that certification criteria are met (average CU-specific COC concentrations are below the FRL within the specified confidence limits, and no result is above two times the FRL). Decision Error 1 is the more severe error due to the potential threat this poses to human health and the environment.

Null Hypothesis

H_0: The average concentration of at least one CU-specific COC within a CU is equal to or greater than the associated FRL.

H_1: The average concentration of all CU-specific COCs within a CU is less than the action levels.

False Positive and False Negative Errors

A false positive is Decision Error 1: less than or equal to five percent ($p = .05$) is considered the acceptable decision error in determination of compliance with FRLs for primary ASCOCs, while ten percent ($p = .10$) is acceptable for secondary ASCOCs.

A false negative is Decision Error 2: less than or equal to 20 percent is considered the acceptable decision error. This decision error is controlled through the determination of sample sizes (see Section G.1.4.1 of the final SEP).

7.0 Design for Obtaining Quality Data

Section 3.4.2 of the final SEP presents the specifics of the certification sampling design. The following text describes the general certification sampling design.

Soil Sample Locations

In order to select certification sampling locations, each CU is divided into 16 approximately equal sub-CUs. Certification sample locations are then generated by randomly selecting an easting and northing coordinate within the boundaries of each cell. Additional alternative sample locations are also generated in case the original random sample location fails the minimum distance criterion. The minimum distance criterion is defined as the minimum distance allowed between random sample locations in order to eliminate the chance of random sample points clustering within a small area. This clustering would tend to over emphasize a small area and, conversely, under represent a large area in certification determination. By not allowing sample locations to be too closely arranged, the sample locations are spread out and provide a more uniform coverage, thus reducing the possibility of large unsampled areas. The equation for determining minimum distance criterion is presented in Section 3.4.2.1 of the SEP.

In the event that the original random sample location failed the minimum distance criterion, the first alternate location was selected and all the locations were retested. This process continued until all 16 random locations passed the minimum distance criteria.

Each CU is also divided into four quadrants, each of which contains 4 sub-CUs and 4 sample locations. Three of the four locations per quadrant (12 per CU) are then selected for sample collection and analysis. The other one per quadrant (4 per CU) are designated as "archives", and samples will not be collected and analyzed unless need arises due to analytical or validation problems warrant. Per Section 3.4.2 of the SEP, as few as 8 samples may be collected from Group 2 CUs for analysis of secondary COCs.

Physical Samples

Physical soil certification samples will be collected from the surface according to SMPL-01 at locations identified in the PSP (generally 12 of the 16 locations per CU).

If stockpiled soil is to be certified, two CUs will be established, on for the stockpile and one for the underlying soil (i.e., the "footprint"). To certify the stockpile, samples will be collected from predetermined random intervals from within the stockpiled soil at each certification sampling location identified in the PSP. To certify the footprint, the first 6-inches of native soil present at each sampling location will also be collected for certification. If fill soil is to be certified, the strategy (surface or sampling at depth) will be based on results from the precertification scan of the fill area(s), as discussed in the Certification Design Letter and the certification PSP.

Laboratory Analysis

As defined in the PSP, a minimum of 8 to 12 samples per CU will be submitted to the on-site laboratory or a FDF approved off-site laboratory for analysis. All certification analyses will meet ASL D requirements per the SCQ except for the HAMDC. Samples will be analyzed for all CU-specific ASCOCs, with minimum detection levels set according to the SCQ and applicable project guidelines.

Validation

All field data will be validated. Also, a minimum of 10 percent of the analytical data from each laboratory will be subject to analytical validation to ASL D requirements in the SCQ, and will require an ASL D package. The remaining analytical data will be validated to a minimum of ASL B, and will require an ASL B package.

8.0 Use of Data to Test Null Hypothesis

Appendix G of the final SEP discusses in detail, the statistical evaluations of certification data used to determine attainment of certification criteria.

Data Quality Objectives
Sitewide Certification Sampling and Analysis

1A. Task Description:

1B. Project Phase: (Put an X in the appropriate selection.)

RI☐ FS☐ RD☐ RA☒ RvA☐ Other (specify) _____

1C. DQO No.: SL-052, Rev. 2 DQO Reference No.: _____

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2. Media Characterization: (Put an X in the appropriate selection.)

Air☐ Biological☐ Groundwater☐ Sediment☒ Soil☒
Waste☐ Wastewater☐ Surface Water☐ Other (specify) _____

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3. Data Use with Ananlytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable data use)

Site Characterization	Risk Assessment
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☐ E☐
Evaluation of Alternatives	Engineering Design
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☐ E☐
Monitoring During Remediation	Other
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☒ E☐

4A. Drivers: Remediation Area Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 2 and Operable Unit 5 Records of Decision (ROD), Sitewide Excavation Plan (SEP).

4B. Objective: Confirmation that remediation areas at the FEMP, or adjacent off-property areas, have met certification criteria on a CU by CU basis.

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5. Site Information (Description):

The OU2 and OU5 RODs have identified areas at the FEMP that require soil remediation activities. The RODs specify that the soil in these areas will be demonstrated to be below the FRLs. Certification is necessary for all FEMP soil and some adjacent off-property soil to demonstrate that the residual soil does not contain COC contamination exceeding the FRL at a specified confidence level.

6A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	☐	2. Uranium	☒*	3. BTX	☐
Temperature	☐	Full Radiological	☒*	TPH	☐
Specific Conductance	☐	Metals	☒*	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☒*	Silica	☐		
4. Cations	☐	5. VOA	☒*	6. Other (specify)	
Anions	☐	BNA	☐		
TOC	☐	PEST	☒*		
TCLP	☐	PCB	☒*		
CEC	☐	COD	☐		

* As identified in the area certification PSP

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A _____	SCQ Section _____
ASL B _____	SCQ Section _____
ASL C _____	SCQ Section _____
ASL D Per SCQ and PSP	SCQ Section Appendix G, Tbls. 1&3
ASL E Per PSP	SCQ Section Appendix H (final)

7A. Sampling Methods: (Put an X in the appropriate selection.)

Biased☐ Composite☐ Grab☒ Environmental☐ Grid☐
Intrusive☒ Non-Intrusive☐ Phased☐ Source☐ Random☒*
*Systematic random samples, selected one per cell and meeting the minimum distance criterion

7B. Sample Work Plan Reference: Project Specific Plan for the associated Remediation area Remedial Action Work Plan

Background samples: OU5 RI

7C. Sample Collection Reference: Associated PSP(s), SMPL-01

8. Quality Control Samples: (Put an X in the appropriate selection.)

8A. Field Quality Control Samples:

Trip Blanks	☒[1]	Container Blanks	☒
Field Blanks	☒[2]	Duplicate Samples	☒
Equipment Rinsate Blanks	☒	Split Samples	☒[3]
Preservative Blanks	☐	Performance Evaluation Samples	☐

Other (specify) _____

1) Collected for volatile organic sampling
2) As noted in the PSP
3) Split samples will be taken where required by the EPA

8B. Laboratory Quality Control Samples:

Method Blank	☒	Matrix Duplicate/Replicate	☒
Matrix Spike	☒	Surrogate Spikes	☒
Tracer Spike	☒	Other (specify) _____	

9. Other: Please identify any other germane information that may impact the data quality or gathering of this particular objective, task, or data use.

Sample density will be dependent upon the CU size (Group 1 [250'x250'] or Group 2 [500'x500']), as determined by historical and pre-certification scan data.

APPENDIX C

AREA 4B SAMPLE LOCATION AND IDENTIFIERS

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
1-H04	1-H04-1	0"-6"	A4B-C01-H04-1^RMP	ABC	479915.2	1348756.71
			A4B-C01-H04-1^L	F		
	1-H04-2D	0"-6"	A4B-C01-H04-2^RMP	ABC	479903.25	1348773.76
			A4B-C01-H04-2^RMP-D			
			A4B-C01-H04-2^L	F		
			A4B-C01-H04-2^L-D			
	1-H04-3	0"-6"	A4B-C01-H04-3^RMP	ABC	479887.42	1348741.96
			A4B-C01-H04-3^L	F		
	1-H04-4	0"-6"	A4B-C01-H04-4^RMP	ABC	479885.5	1348781.1
			A4B-C01-H04-4^L	F		
	1-H04-5	0"-6"	A4B-C01-H04-5^RMP	ABC	479873.57	1348751.84
			A4B-C01-H04-5^L	F		
	1-H04-6	0"-6"	A4B-C01-H04-6^RMP	ABC	479865.7	1348783.5
			A4B-C01-H04-6^L	F		
	1-H04-7	0"-6"	A4B-C01-H04-7^RMP	ABC	479844.01	1348751.75
			A4B-C01-H04-7^L	F		
	1-H04-8	0"-6"	A4B-C01-H04-8^RMP	ABC	479849.77	1348773.71
			A4B-C01-H04-8^L	F		
2-H18	2-H18-1	0"-6"	A4B-C02-H18-1^RMP	ABCE	480334.53	1348747.53
			A4B-C02-H18-1^L	G		
	2-H18-2D	0"-6"	A4B-C02-H18-2^RMP	ABCE	480338.92	1348768.66
			A4B-C02-H18-2^L	G		
			A4B-C02-H18-2^RMP-D	ABCE		
			A4B-C02-H18-2^L-D	G		
	2-H18-3	0"-6"	A4B-C02-H18-3^RMP	ABCE	480327.16	1348783.38
			A4B-C02-H18-3^L	G		
	2-H18-4	0"-6"	A4B-C02-H18-4^RMP	ABCE	480308.88	1348736.97
			A4B-C02-H18-4^L	G		
	2-H18-5	0"-6"	A4B-C02-H18-5^RMP	ABCE	480300.33	1348759.17
			A4B-C02-H18-5^L	G		
	2-H18-6	0"-6"	A4B-C02-H18-6^RMP	ABCE	480306.38	1348785.88
			A4B-C02-H18-6^L	G		
	2-H18-7	0"-6"	A4B-C02-H18-7^RMP	ABCE	480284.48	1348747.89
			A4B-C02-H18-7^L	G		
	2-H18-8	0"-6"	A4B-C02-H18-8^RMP	ABCE	480263.82	1348739.58
			A4B-C02-H18-8^L	G		

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
3-H28	3-H28-1	0"-6"	A4B-C03-H28-1^RMP	ABCE	480483.14	1348728.88
			A4B-C03-H28-1^L	H		
	3-H28-2D	0"-6"	A4B-C03-H28-2^RMP	ABCE	480506.36	1348760.02
			A4B-C03-H28-2^RMP-D			
			A4B-C03-H28-2^L	H		
			A4B-C03-H28-2^L-D			
	3-H28-3	0"-6"	A4B-C03-H28-3^RMP	ABCE	480478.89	1348764.26
			A4B-C03-H28-3^L	H		
	3-H28-4	0"-6"	A4B-C03-H28-4^RMP	ABCE	480494.57	1348781.21
			A4B-C03-H28-4^L	H		
	3-H28-5	0"-6"	A4B-C03-H28-5^RMP	ABCE	480480.19	1348796.69
			A4B-C03-H28-5^L	H		
	3-H28-6	0"-6"	A4B-C03-H28-6^RMP	ABCE	480473.73	1348820.09
			A4B-C03-H28-6^L	H		
	3-H28-7	0"-6"	A4B-C03-H28-7^RMP	ABCE	480486.09	1348831.89
			A4B-C03-H28-7^L	H		
	3-H28-8	0"-6"	A4B-C03-H28-8^RMP	ABCE	480493.28	1348857.87
			A4B-C03-H28-8^L	H		
	3-H28-9	0"-6"	A4B-C03-H28-9^RMP	ABCE	480506.23	1348688.19
			A4B-C03-H28-9^L	H		
	3-H28-1	0"-6"	A4B-C03-H28-10^RMP	ABCE	480510.31	1348706.86
			A4B-C03-H28-10^L	H		
	3-H28-11	0"-6"	A4B-C03-H28-11^RMP	ABCE	480612	1348704.43
			A4B-C03-H28-11^L	H		
	3-H28-12	0"-6"	A4B-C03-H28-12^RMP	ABCE	480606.29	1348720.04
			A4B-C03-H28-12^L	H		
4-H46	4-H46-1	0"-6"	A4B-C04-H46-1^RMP	ABCD	480877.32	1348593.35
	4-H46-2D	0"-6"	A4B-C04-H46-2^RMP	ABCD	480863.4	1348613.1
			A4B-C04-H46-2^RMP-D			
	4-H46-3	0"-6"	A4B-C04-H46-3^RMP	ABCD	480868.51	1348628.5
	4-H46-4	0"-6"	A4B-C04-H46-4^RMP	ABCD	480878.67	1348644.14
	4-H46-5	0"-6"	A4B-C04-H46-5^RMP	ABCD	480847.91	1348597.21
	4-H46-6	0"-6"	A4B-C04-H46-6^RMP	ABCD	480836.85	1348609.27
	4-H46-7	0"-6"	A4B-C04-H46-7^RMP	ABCD	480853.86	1348623.55
	4-H46-8	0"-6"	A4B-C04-H46-8^RMP	ABCD	480841.4	1348636.23

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
5-H47	5-H47-1	0"-6"	A4B-C05-H47-1^RMP	ABCD	480741.28	1348788.18
	5-H47-2	0"-6"	A4B-C05-H47-2^RMP	ABCD	480729.18	1348807.11
	5-H47-3	0"-6"	A4B-C05-H47-3^RMP	ABCD	480737.19	1348824.62
	5-H47-4	0"-6"	A4B-C05-H47-4^RMP	ABCD	480729.26	1348843.72
	5-H47-5	0"-6"	A4B-C05-H47-5^RMP	ABCD	480717	1348799.27
	5-H47-6	0"-6"	A4B-C05-H47-6^RMP	ABCD	480710.82	1348810.28
	5-H47-7D	0"-6"	A4B-C05-H47-7^RMP	ABCD	480710.82	1348830.88
			A4B-C05-H47-7^RMP-D			
	5-H47-8	0"-6"	A4B-C05-H47-8^RMP	ABCD	480716.92	1348842.13
6-H49	6-H49-1	0"-6"	A4B-C06-H49-1^RMP	ABCD	480659.73	1348712.64
	[illegible]	0"-6"	[illegible]-H49-2^RMP	ABCD	480670.82	1348729.59
			A4B-C06-H49-2^RMP-D			
	6-H49-3	0"-6"	A4B-C06-H49-3^RMP	ABCD	480664.94	1348741.15
	6-H49-4	0"-6"	A4B-C06-H49-4^RMP	ABCD	480670.93	1348760.16
	6-H49-5	0"-6"	A4B-C06-H49-5^RMP	ABCD	480673.09	1348774.45
	6-H49-6	0"-6"	A4B-C06-H49-6^RMP	ABCD	480663.24	1348795.16
	6-H49-7	0"-6"	A4B-C06-H49-7^RMP	ABCD	480671.02	1348812.61
	6-H49-8	0"-6"	A4B-C06-H49-8^RMP	ABCD	480660.11	1348828.52
7-H50	7-H50-1	0"-6"	A4B-C07-H50-1^RMP	ABCD	480426.17	1348767.47
	7-H50-2D	0"-6"	A4B-C07-H50-2^RMP	ABCD	480446.03	1348789.15
			A4B-C07-H50-2^RMP-D			
	7-H50-3	0"-6"	A4B-C07-H50-3^RMP	ABCD	480437.02	1348813.44
	7-H50-4	0"-6"	A4B-C07-H50-4^RMP	ABCD	480440.38	1348840.32
	7-H50-5	0"-6"	A4B-C07-H50-5^RMP	ABCD	480411.66	1348786.25
	7-H50-6	0"-6"	A4B-C07-H50-6^RMP	ABCD	480420.67	1348801.53
	7-H50-7	0"-6"	A4B-C07-H50-7^RMP	ABCD	480420.52	1348821.68
	7-H50-8	0"-6"	A4B-C07-H50-8^RMP	ABCD	480406.62	1348844.9

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
8	8-1	0"-6"	A4B-C08-1^RMP	ABC	480897.14	1348637.89
	8-2	0"-6"	A4B-C08-2^RMP	ABC	480931.71	1348714.66
	8-3V	0"-6"	A4B-C08-3^V	Archive	480896.56	1348781.14
	8-4	0"-6"	A4B-C08-4^RMP	ABC	480902.1	1348829.04
	8-5D	0"-6"	A4B-C08-5^RMP	ABC	480821.87	1348591.33
			A4B-C08-5^RMP-D			
	8-6	0"-6"	A4B-C08-6^RMP	ABC	480854.76	1348693.04
	8-7	0"-6"	A4B-C08-7^RMP	ABC	480758.05	1348580.08
	8-8V	0"-6"	A4B-C08-8^V	Archive	480792.38	1348641.39
	8-9V	0"-6"	A4B-C08-9^V	Archive	480873.43	1348726.01
	8-10	0"-6"	A4B-C08-10^RMP	ABC	480832.62	1348766.07
	8-11	0"-6"	A4B-C08-11^RMP	ABC	480770.72	1348690.01
	8-12	0"-6"	A4B-C08-12^RMP	ABC	480776.93	1348774.26
	8-13	0"-6"	A4B-C08-13^RMP	ABC	480858.52	1348862.17
	8-14	0"-6"	A4B-C08-14^RMP	ABC	480846.48	1348906.86
	8-15V	0"-6"	A4B-C08-15^V	Archive	480763.4	1348852.7
	8-16	0"-6"	A4B-C08-16^RMP	ABC	480800.73	1348910.54
9	9-1	0"-6"	A4B-C09-1^RMP	ABC	480853	1348945.46
	9-2V	0"-6"	A4B-C09-2^V	Archive	480881.04	1348997.13
	9-3D	0"-6"	A4B-C09-3^RMP	ABC	480785.09	1348950.02
			A4B-C09-3^RMP-D			
	9-4	0"-6"	A4B-C09-4^RMP	ABC	480813.51	1348985.76
	9-5V	0"-6"	A4B-C09-5^V	Archive	480860.84	1349050.34
	9-6	0"-6"	A4B-C09-6^RMP	ABC	480846.28	1349118.96
	9-7	0"-6"	A4B-C09-7^RMP	ABC	480808.22	1349055.31
	9-8	0"-6"	A4B-C09-8^RMP	ABC	480786.92	1349103.65
	9-9	0"-6"	A4B-C09-9^RMP	ABC	480722.95	1348931.59
	9-10	0"-6"	A4B-C09-10^RMP	ABC	480734.4	1348993.65
	9-11V	0"-6"	A4B-C09-11^V	Archive	480672.38	1348933.59
	9-12	0"-6"	A4B-C09-12^RMP	ABC	480666.73	1348992.29
	9-13	0"-6"	A4B-C09-13^RMP	ABC	480731.52	1349035.62
	9-14	0"-6"	A4B-C09-14^RMP	ABC	480725.03	1349109.64
	9-15V	0"-6"	A4B-C09-15^V	Archive	480667.46	1349042.01
	9-16	0"-6"	A4B-C09-16^RMP	ABC	480687.46	1349108.67

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
10	10-1V	0"-6"	A4B-C10-1^V	Archive	480734.58	1348582.79
	10-2	0"-6"	A4B-C10-2^RMP	ABC	480733.02	1348650.05
	10-3	0"-6"	A4B-C10-3^RMP	ABC	480668	1348671.17
	10-4	0"-6"	A4B-C10-4^RMP	ABC	480648.14	1348706.28
	10-5	0"-6"	A4B-C10-5^RMP	ABC	480716.67	1348769.34
	10-6V	0"-6"	A4B-C10-6^V	Archive	480728.72	1348862.53
	10-7	0"-6"	A4B-C10-7^RMP	ABC	480646.23	1348796.64
	10-8	0"-6"	A4B-C10-8^RMP	ABC	480688.38	1348842.83
	10-9	0"-6"	A4B-C10-9^RMP	ABC	480634.75	1348544.03
	10-10V	0"-6"	A4B-C10-10^V	Archive	480680.99	1348568.66
	10-11	0"-6"	A4B-C10-11^RMP	ABC	480594.41	1348515.49
	10-12D	0"-6"	A4B-C10-12^RMP	ABC	480620.43	1348616.96
			A4B-C10-12^RMP-D			
	10-13	0"-6"	A4B-C10-13^RMP	ABC	480604.81	1348651.5
	10-14	0"-6"	A4B-C10-14^RMP	ABC	480585.29	1348732.54
	10-15	0"-6"	A4B-C10-15^RMP	ABC	480594.45	1348788.52
	10-16V	0"-6"	A4B-C10-16^V	Archive	480575.8	1348853.4
11	11-1	0"-6"	A4B-C11-1^RMP	ABC	480604.24	1348907.65
	11-2	0"-6"	A4B-C11-2^RMP	ABC	480585.26	1348965.72
	11-3	0"-6"	A4B-C11-3^RMP	ABC	480587.63	1349014.55
	11-4V	0"-6"	A4B-C11-4^V	Archive	480611.47	1349050.54
	11-5	0"-6"	A4B-C11-5^RMP	ABC	480620.87	1349109.08
	11-6	0"-6"	A4B-C11-6^RMP	ABC	480537.42	1349030.16
	11-7	0"-6"	A4B-C11-7^RMP	ABC	480510.69	1349052.65
	11-8V	0"-6"	A4B-C11-8^V	Archive	480553.09	1349119.37
	11-9D	0"-6"	A4B-C11-9^RMP	ABC	480526.82	1348980.63
			A4B-C11-9^RMP-D			
	11-10V	0"-6"	A4B-C11-10^V	Archive	480415.8	1348990.13
	11-11	0"-6"	A4B-C11-11^RMP	ABC	480463.73	1349013.97
	11-12	0"-6"	A4B-C11-12^RMP	ABC	480433.28	1349091.76
	11-13	0"-6"	A4B-C11-13^RMP	ABC	480425.58	1349135.37
	11-14	0"-6"	A4B-C11-14^RMP	ABC	480385.46	1348974.51
	11-15V	0"-6"	A4B-C11-15^V	Archive	480373.19	1349051.01
	11-16	0"-6"	A4B-C11-16^RMP	ABC	480386.68	1349133.65

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
12	12-1	0"-6"	A4B-C12-1^RMP	ABC	480536.48	1348461.23
	12-2V	0"-6"	A4B-C12-2^V	Archive	480550.7	1348499.59
	12-3	0"-6"	A4B-C12-3^RMP	ABC	480466.17	1348470.4
	12-4	0"-6"	A4B-C12-4^RMP	ABC	480443.9	1348494.22
	12-5	0"-6"	A4B-C12-5^RMP	ABC	480505.07	1348527.73
	12-6V	0"-6"	A4B-C12-6^V	Archive	480538.55	1348577.81
	12-7	0"-6"	A4B-C12-7^RMP	ABC	480455.34	1348541.09
	12-8	0"-6"	A4B-C12-8^RMP	ABC	480473.17	1348603.68
	12-9V	0"-6"	A4B-C12-9^V	Archive	480520.01	1348616.47
	12-10	0"-6"	A4B-C12-10^RMP	ABC	480528.14	1348649.12
	12-11D	0"-6"	A4B-C12-11^RMP	ABC	480438.74	1348649.87
			A4B-C12-11^RMP-D			
	12-12	0"-6"	A4B-C12-12^RMP	ABC	480390.94	1348650.15
	12-13	0"-6"	A4B-C12-13^RMP	ABC	480372.13	1348459.92
	12-14	0"-6"	A4B-C12-14^RMP	ABC	480365.87	1348510.29
	12-15	0"-6"	A4B-C12-15^RMP	ABC	480393.93	1348544.55
	12-16V	0"-6"	A4B-C12-16^V	Archive	480399.61	1348615.84
13	13-1V	0"-6"	A4B-C13-1^V	Archive	480547.9	1348689.62
	13-2	0"-6"	A4B-C13-2^RMP	ABC	480560.26	1348777.55
	13-3D	0"-6"	A4B-C13-3^RMP	ABC	480483.96	1348695.51
			A4B-C13-3^RMP-D			
	13-4	0"-6"	A4B-C13-4^RMP	ABC	480514.14	1348780.3
	13-5	0"-6"	A4B-C13-5^RMP	ABC	480527.87	1348832.41
	13-6	0"-6"	A4B-C13-6^RMP	ABC	480558.35	1348904.09
	13-7V	0"-6"	A4B-C13-7^V	Archive	480506.69	1348863.91
	13-8	0"-6"	A4B-C13-8^RMP	ABC	480483.94	1348937.75
	13-9	0"-6"	A4B-C13-9^RMP	ABC	480435.31	1348712.16
	13-10V	0"-6"	A4B-C13-10^V	Archive	480446.2	1348759.71
	13-11	0"-6"	A4B-C13-11^RMP	ABC	480404.07	1348677.88
	13-12	0"-6"	A4B-C13-12^RMP	ABC	480382.42	1348808.38
	13-13	0"-6"	A4B-C13-13^RMP	ABC	480439.17	1348858.07
	13-14V	0"-6"	A4B-C13-14^V	Archive	480435.9	1348914.9
	13-15	0"-6"	A4B-C13-15^RMP	ABC	480399.64	1348861.88
	13-16	0"-6"	A4B-C13-16^RMP	ABC	480377.26	1348939.44

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
14	14-1	0"-6"	A4B-C14-1^RMP	ABC	480337.45	1348465.65
	14-2	0"-6"	A4B-C14-2^RMP	ABC	480315.06	1348523.38
	14-3V	0"-6"	A4B-C14-3^V	Archive	480287.49	1348493.44
	14-4	0"-6"	A4B-C14-4^RMP	ABC	480275.81	1348538.15
	14-5V	0"-6"	A4B-C14-5^V	Archive	480330.73	1348621.77
	14-6	0"-6"	A4B-C14-6^RMP	ABC	480347.36	1348689.47
	14-7D	0"-6"	A4B-C14-7^RMP	ABC	480265.59	1348621.96
			A4B-C14-7^RMP-D			
	14-8	0"-6"	A4B-C14-8^RMP	ABC	480253.68	1348681.08
	14-9	0"-6"	A4B-C14-9^RMP	ABC	480318.83	1348749.55
	14-10V	0"-6"	A4B-C14-10^V	Archive	480343.65	1348809.89
	14-11	0"-6"	A4B-C14-11^RMP	ABC	480273.38	1348758.69
	14-12	0"-6"	A4B-C14-12^RMP	ABC	480257.57	1348811.33
	14-13	0"-6"	A4B-C14-13^RMP	ABC	480313.08	1348889.95
	14-14	0"-6"	A4B-C14-14^RMP	ABC	480320.92	1348973.65
	14-15V	0"-6"	A4B-C14-15^V	Archive	480258.05	1348867.28
	14-16	0"-6"	A4B-C14-16^RMP	ABC	480273.42	1348940.88
15	15-1V	0"-6"	A4B-C15-1^V	Archive	480223.66	1348440.16
	15-2D	0"-6"	A4B-C15-2^RMP	ABC	480176.23	1348484.95
			A4B-C15-2^RMP-D			
	15-3	0"-6"	A4B-C15-3^RMP	ABC	480125.89	1348472.72
	15-4	0"-6"	A4B-C15-4^RMP	ABC	480078.46	1348501.44
	15-5V	0"-6"	A4B-C15-5^V	Archive	480192.49	1348538.82
	15-6	0"-6"	A4B-C15-6^RMP	ABC	480233.07	1348571.52
	15-7	0"-6"	A4B-C15-7^RMP	ABC	480138.42	1348521.77
	15-8	0"-6"	A4B-C15-8^RMP	ABC	480139.4	1348590.78
	15-9	0"-6"	A4B-C15-9^RMP	ABC	480209.12	1348622.61
	15-10V	0"-6"	A4B-C15-10^V	Archive	480195.77	1348693.42
	15-11	0"-6"	A4B-C15-11^RMP	ABC	480167.1	1348638.46
	15-12	0"-6"	A4B-C15-12^RMP	ABC	480129.66	1348671.33
	15-13	0"-6"	A4B-C15-13^RMP	ABC	480065.22	1348555.53
	15-14	0"-6"	A4B-C15-14^RMP	ABC	480093.16	1348584.59
	15-15	0"-6"	A4B-C15-15^RMP	ABC	480082.09	1348616.64
	15-16V	0"-6"	A4B-C15-16^V	Archive	480076.32	1348682.97

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
16	16-1	0"-6"	A4B-C16-1^RMP	ABC	480200.59	1348732.25
	16-2V	0"-6"	A4B-C16-2^V	Archive	480202.88	1348780.93
	16-3	0"-6"	A4B-C16-3^RMP	ABC	480131.96	1348736.29
	16-4D	0"-6"	A4B-C16-4^RMP	ABC	480159.18	1348794.31
			A4B-C16-4^RMP-D			
	16-5	0"-6"	A4B-C16-5^RMP	ABC	480217.22	1348825.88
	16-6	0"-6"	A4B-C16-6^RMP	ABC	480209.04	1348880.26
	16-7	0"-6"	A4B-C16-7^RMP	ABC	480134.56	1348822.02
	16-8V	0"-6"	A4B-C16-8^V	Archive	480160.4	1348883.24
	16-9	0"-6"	A4B-C16-9^RMP	ABC	480085.12	1348731.55
	16-10	0"-6"	A4B-C16-10^RMP	ABC	480075.98	1348798.5
	16-11	0"-6"	A4B-C16-11^RMP	ABC	480092.54	1348830.52
	16-12V	0"-6"	A4B-C16-12^V	Archive	480091.65	1348893.53
	16-13	0"-6"	A4B-C16-13^RMP	ABC	480201.95	1348966.12
	16-14V	0"-6"	A4B-C16-14^V	Archive	480160.04	1348928.4
	16-15	0"-6"	A4B-C16-15^RMP	ABC	480107.59	1348938.89
	16-16	0"-6"	A4B-C16-16^RMP	ABC	480072.9	1348950.65
17	17-1D	0"-6"	A4B-C17-1^RMP	ABC	480019.09	1348472.75
			A4B-C17-1^RMP-D			
	17-2	0"-6"	A4B-C17-2^RMP	ABC	480033.55	1348519.73
	17-3	0"-6"	A4B-C17-3^RMP	ABC	479975.39	1348505.41
	17-4V	0"-6"	A4B-C17-4^V	Archive	479952.52	1348553.31
	17-5	0"-6"	A4B-C17-5^RMP	ABC	480022.6	1348574.92
	17-6	0"-6"	A4B-C17-6^RMP	ABC	480036.4	1348624.79
	17-7V	0"-6"	A4B-C17-7^V	Archive	479954.45	1348589.75
	17-8	0"-6"	A4B-C17-8^RMP	ABC	479974.45	1348633.43
	17-9	0"-6"	A4B-C17-9^RMP	ABC	480021.9	1348682.45
	17-10	0"-6"	A4B-C17-10^RMP	ABC	480016.24	1348726.17
	17-11V	0"-6"	A4B-C17-11^V	Archive	479979.87	1348685.9
	17-12	0"-6"	A4B-C17-12^RMP	ABC	479953.75	1348722.09
	17-13V	0"-6"	A4B-C17-13^V	Archive	479904.57	1348572.98
	17-14	0"-6"	A4B-C17-14^RMP	ABC	479887.87	1348620.47
	17-15	0"-6"	A4B-C17-15^RMP	ABC	479857.29	1348668.77
	17-16	0"-6"	A4B-C17-16^RMP	ABC	479874.98	1348715.63

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
18	18-1	0"-6"	A4B-C18-1^RMP	ABC	480007.46	1348764.54
	18-2	0"-6"	A4B-C18-2^RMP	ABC	480025.65	1348803.75
	18-3V	0"-6"	A4B-C18-3^V	Archive	479966.24	1348754.42
	18-4	0"-6"	A4B-C18-4^RMP	ABC	479907.65	1348797.02
	18-5	0"-6"	A4B-C18-5^RMP	ABC	480000.83	1348857.06
	18-6V	0"-6"	A4B-C18-6^V	Archive	480023.86	1348915.37
	18-7	0"-6"	A4B-C18-7^RMP	ABC	479938.96	1348833.38
	18-8D	0"-6"	A4B-C18-8^RMP	ABC	479963.29	1348876.24
			A4B-C18-8^RMP-D			
	18-9V	0"-6"	A4B-C18-9^V	Archive	480014.23	1348957.79
	18-10	0"-6"	A4B-C18-10^RMP	ABC	479929.94	1348939.39
	18-11	0"-6"	A4B-C18-11^RMP	ABC	479960.53	1348963.93
	18-12	0"-6"	A4B-C18-12^RMP	ABC	479852.65	1348969.22
	18-13	0"-6"	A4B-C18-13^RMP	ABC	479864.75	1348765.01
	18-14V	0"-6"	A4B-C18-14^V	Archive	479857.08	1348812.73
	18-15	0"-6"	A4B-C18-15^RMP	ABC	479845.93	1348880.62
	18-16	0"-6"	A4B-C18-16^RMP	ABC	479871.43	1348939.49
19-U11	19-U11-1	0"-6"	A4B-C19-U11-1^RM	ABCK	480869.59	1348884.05
			A4B-C19-U11-1^L	J		
	19-U11-2	0"-6"	A4B-C19-U11-2^RM	ABCK	480868.41	1348888.61
			A4B-C19-U11-2^L	J		
	19-U11-3	0"-6"	A4B-C19-U11-3^RM	ABCK	480866.81	1348886.04
			A4B-C19-U11-3^L	J		
	19-U11-4	0"-6"	A4B-C19-U11-4^RM	ABCK	480865.81	1348890.03
			A4B-C19-U11-4^L	J		
	19-U11-5	0"-6"	A4B-C19-U11-5^RM	ABCK	480869.45	1348894.73
			A4B-C19-U11-5^L	J		
	19-U11-6D	0"-6"	A4B-C19-U11-6^RM	ABCK	480869.88	1348900.47
			A4B-C19-U11-6^RM-D			
			A4B-C19-U11-6^L	J		
			A4B-C19-U11-6^L-D			
	19-U11-7	0"-6"	A4B-C19-U11-7^RM	ABCK	480866.46	1348893.52
			A4B-C19-U11-7^L	J		
	19-U11-8	0"-6"	A4B-C19-U11-8^RM	ABCK	480865.68	1348898.15
			A4B-C19-U11-8^L	J		

APPENDIX C
AREA 4B CERTIFICATION SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
20-U12	20-U12-1	0"-6"	A4B-C20-U12-1^RM	ABCE	480859.77	1348884.67
			A4B-C20-U12-1^L	I		
	20-U12-2	0"-6"	A4B-C20-U12-2^RM	ABCE	480861.1	1348890.53
			A4B-C20-U12-2^L	I		
	20-U12-3	0"-6"	A4B-C20-U12-3^RM	ABCE	480857.93	1348886.29
			A4B-C20-U12-3^L	I		
	20-U12-4	0"-6"	A4B-C20-U12-4^RM	ABCE	480857.01	1348890.97
			A4B-C20-U12-4^L	I		
	20-U12-5	0"-6"	A4B-C20-U12-5^RM	ABCE	480860	1348893.59
			A4B-C20-U12-5^L	I		
	20-U12-6	0"-6"	A4B-C20-U12-6^RM	ABCE	480861.14	1348897.42
			A4B-C20-U12-6^L	I		
	20-U12-7D	0"-6"	A4B-C20-U12-7^RM	ABCE	480858.23	1348895.25
			A4B-C20-U12-7^RM-D			
			A4B-C20-U12-7^L	I		
			A4B-C20-U12-7^L-D			
	20-U12-8	0"-6"	A4B-C20-U12-8^RM	ABCE	480857.31	1348900.04
			A4B-C20-U12-8^L	I		
21-U13	21-U13-1	0"-6"	A4B-C21-U13-1^RM	ABCK	480829.14	1348903.81
			A4B-C21-U13-1^L	J		
	21-U13-2	0"-6"	A4B-C21-U13-2^RM	ABCK	480830.17	1348908.06
			A4B-C21-U13-2^L	J		
	21-U13-3	0"-6"	A4B-C21-U13-3^RM	ABCK	480826.08	1348901.74
			A4B-C21-U13-3^L	J		
	21-U13-4D	0"-6"	A4B-C21-U13-4^RM	ABCK	480825.98	1348907.02
			A4B-C21-U13-4^RM-D			
			A4B-C21-U13-4^L	J		
			A4B-C21-U13-4^L-D			
	21-U13-5	0"-6"	A4B-C21-U13-5^RM	ABCK	480829.06	1348911.27
			A4B-C21-U13-5^L	J		
	21-U13-6	0"-6"	A4B-C21-U13-6^RM	ABCK	480829.43	1348916.93
			A4B-C21-U13-6^L	J		
	21-U13-7	0"-6"	A4B-C21-U13-7^RM	ABCK	480827.18	1348913.63
			A4B-C21-U13-7^L	J		
	21-U13-8	0"-6"	A4B-C21-U13-8^RM	ABCK	480826.22	1348915.82
			A4B-C21-U13-8^L	J		