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CERTIFICATION REPORT FOR AREA 6, PHASE I – PART ONE

FERNALD CLOSURE PROJECT
FERNALD, OHIO

OCTOBER 2003

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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REVISION A
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LIST OF ACRONYMS AND ABBREVIATIONS

A1PIII	Area 1, Phase III
A6PI	Area 6, Phase I
ASCOC	area-specific constituent of concern
ASL	analytical support level
AWAC	above-waste acceptance criteria
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
EPA	U.S. Environmental Protection Agency
FCP	Fernald Closure Project
FRL	final remediation level
FTF	Fire Training Facility
GC	gas chromatography
GC/MS	gas chromatography mass spectrometry
HAMDC	highest allowable minimum detectable concentration
HWMU	hazardous waste management unit
ICP/MS	inductively coupled plasma mass spectrometry
LCS	laboratory control sample
m^2	meters squared
MDC	minimum detectable concentration
µg/g	micrograms per gram
mg/kg	milligrams per kilogram
NRRP	Natural Resource Restoration Plan
OEPA	Ohio Environmental Protection Agency
ONAR	Old North Access Road
OSDF	On-Site Disposal Facility
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picoCuries per gram
ppm	parts per million
PSP	Project Specific Plan
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCQ	Sitewide CERCLA Quality Assurance Project Plan

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LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SWL	Solid Waste Landfill
TPU	total propagated uncertainty
UCL	Upper Confidence Limit
UST	underground storage tank
V/FCN	Variance/Field Change Notice
V&V	verification and validation
VOC	volatile organic compound
VSL	validation support level
WAC	waste acceptance criteria
WPRAP	Waste Pits Remedial Action Project

EXECUTIVE SUMMARY

Area 6, Phase I (A6PI) underwent the certification process during the summer of 2003. This certification effort is being presented in two separate reports. The focus of this first report is on the majority of A6PI, which includes Certification Units (CUs) 03 through 14. CUs 01 and 02 will be addressed in the follow up report, Certification Report for Area 6, Phase I – Part Two.

The results of the process indicate that CUs 03 through 14 have below-final remediation level (FRL) conditions for all constituents of concern (COCs). This Certification Report presents the information and data used by the U.S. Department of Energy (DOE) to determine that soils in these CUs of Area 6, Phase I (A6PI) meet established final remediation levels (FRLs).

The portions of the Fernald Closure Project (FCP) site included in A6PI Part One are shown on Figure 1-1, and consist of 15.7 acres that spans a large portion of the land west of Paddys Run and north of the Waste Pits Remedial Action Project and Former Production Area.

Consistent with the Sitewide Excavation Plan (SEP), this area underwent predesign, excavation, and precertification activities between May 2002 and May 2003, including the use of real-time instrumentation as well as physical sampling and analysis. As a result of these activities, it was determined that no further remediation was necessary prior to certification.

The Certification Design Letter for Area 6, Phase I (CDL, DOE 2003) was submitted in June 2003 to address the final certification approach for A6PI. Certification sampling was conducted in each CU to verify that the certification criteria set forth in the SEP were achieved.

The certification samples collected were analyzed at an off-site laboratory on the FCP Approved Laboratories List per the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ, Procedure FD-1000). All certification samples were analyzed and reported at the required analytical support level. Analytical data packages included sample results with associated quality assurance/quality control data and all applicable raw data. The data were subjected to the required verification and validation process. No sample points were rejected during the verification and validation process.

A statistical analysis was conducted where necessary to ensure certification criteria were met. As discussed in the CDL, A6PI certification criteria are that the average primary area-specific constituent of concern (ASCOC) concentrations within a CU are below-FRLs at a 95 percent upper confidence level (90 percent UCL for secondary ASCOCs). One arsenic result from CU 07 was greater than two times FRL with a result of 24.3 mg/kg. Additional samples were collected to bound the elevated sample location both laterally and vertically, and all sample results were below the FRL. The bound area was less than 10 square meters (m^2) and therefore did not require excavation as discussed in Section 3.4.6 of the SEP.

On the basis of the reported information and supporting project files, DOE has determined that no additional remedial actions are required in this portion of the site. The area will be considered certified when the U.S. Environmental Protection Agency and the Ohio Environmental Protection Agency concur that certification criteria have been met. At that time, DOE intends to proceed with final land use activities as outlined in the Natural Resource Restoration Plan (NRRP, DOE 2002).

DOE has restricted access to certified areas in order to maintain their integrity prior to final land use development. FCP procedure EP-0008 has been developed to implement a process to protect certified areas from becoming recontaminated.

1.0 INTRODUCTION

1.1 PURPOSE

This Certification Report presents the process and data used by the U.S. Department of Energy (DOE) to determine that soils in Area 6, Phase I (A6PI) meet established final remediation levels (FRLs). This report presents the final certification results for the certification units (CUs) 03 through 14, which are identified in the Area 6, Phase I Certification Design Letter (CDL, DOE 2003). A second report, Certification Report for Area 6, Phase I – Part Two, will be issued at later date to address the two remaining CUs.

1.2 BACKGROUND

In the Operable Unit (OU) 5 Record of Decision (ROD, DOE 1996a), DOE committed to excavating contaminated soil that exceeds health-based FRLs. The excavated material may be disposed of at the On-Site Disposal Facility (OSDF) or at an off-site disposal facility if it does not meet OSDF waste acceptance criteria (WAC). The OU5 Remedial Investigation Report (DOE 1995a) defined the extent of above-FRL soil contamination and, in general, indicated widespread contamination occurring in approximately 430 acres of the 1,050-acre Fernald Closure Project (FCP).

In the OU5 Remedial Action Work Plan (RAWP, DOE 1996b), DOE committed to preparing a Sitewide Excavation Plan (SEP, DOE 1998a), defining the overall approach to implementing the soil, and at- and below-grade debris cleanup obligations identified in the OU2 (DOE 1995b), OU3 (DOE 1996c), and OU5 RODs.

The Fire Training Facility (FTF) is north of the OU1 Rail Yard near the former North Construction Access Road (B Street). The FTF was constructed in 1966 and was used until 1990 as a training facility for the Fernald Site Fire Department and the surrounding community fire departments. As a result, the FTF site became contaminated with hazardous materials, low-level radioactive materials, and low levels of polychlorinated biphenyls (PCBs). The FTF was declared a hazardous waste management unit (HWMU) under Resource Conservation and Recovery Act (RCRA) in 1991.

In the SEP, the FCP was divided into distinct remedial areas and phases for soil remediation, based on the operable units' remediation schedule. After all necessary remediation is completed within each area/phase, the soil is certified as having attained all cleanup goals (i.e., FRLs). The remediation activities in Area 6

followed "Excavation Approach D – Excavation Following Decontamination and Demolition (D&D) in the Former Production Area, Sewage Treatment Plant (STP), and FTF" as described in Section 4.1 of the SEP.

Two soil remedial excavations took place in A6PI, both of these excavations were within the FTF. In the mid-1990s, Removal Action 28 was conducted to minimize impacts to human health and the environment resulting from past fire training activities in this portion of the site. For more information on this, refer to the Removal Action 28 Final Report (DOE 1995a). A second remedial excavation began in early 2003 in the FTF to remediate soil demonstrating area-specific constituents of concern (ASCOC) concentrations above the FRL. More information on this excavation is provided in the Implementation Plan for the Solid Waste Landfill (SWL) and the Fire Training Facility (DOE 2003a). Concurrent with this excavation, the Old North Access Road (ONAR) was removed.

During excavation of the FTF in early 2003, two previously unknown underground storage tanks (USTs) were discovered, located side by side, in the northwest corner of the FTF. It was determined that the tanks (hereinafter referred to as the FTF USTs) contained gasoline. Closure of the FTF USTs was consistent with section 2.2.6 of the SEP, which required that a distinct CU be established in the excavated footprint of the USTs (identified as A6P1-UST).

1.3 AREA DESCRIPTION

A6PI is located north of the Former Production Area at the FCP and spans approximately 15.7 acres. As shown on Figure 1-1, it includes the former FTF; the Waste Pits Remedial Action Project (WPRAP) Gravel Access Road; the field between the gravel road and Area 1, Phase III; and the Old North Access Road (ONAR). A6PI also includes a field west of the WPRAP exclusion fence that is non-conterminous with the above portions of A6PI. This area was defined within the larger parcel of land between WPRAP and Paddys Run, and excludes fill areas along the rail spur and Paddys Run stream.

1.4 SCOPE

The A6PI certification effort covers the following:

A6PI is an approximately 15.7-acre area that spans a large portion of the land north and west of the Waste Pits Remedial Action Project. This includes the following areas/features:

- The former FTF;
- The ONAR;
- The WPRAP Gravel Access Road;
- The field north of the WPRAP Gravel Access Road and south of Area 1, Phase III (A1PIII); and
- The field west of the WPRAP Exclusion Fence, south of the Railroad corridor and east of the Paddys Run stream corridor.

This field west of WPRAP was defined within a larger parcel of land between WPRAP and Paddys Run, and excludes fill areas along the rail spur and Paddys Run stream. The portions of the FCP site included in A6PI are shown on Figure 1-1.

Fourteen CUs were defined within A6PI to isolate and span each unique area/surface feature within A6PI. However, only CUs 03 through 14 are discussed in this report. CUs 01 and 02 will be addressed in a follow up report, Certification Report for Area 6, Phase I – Part Two. Certification sampling of adjacent portions of the rail spur, the northern drainage ditch, and Paddys Run Corridor adjacent to A6PI were not covered in this certification effort. The certification of these soils will be conducted at a later date with the appropriate remediation/certification efforts.

1.5 OBJECTIVES

The objectives of this Certification Report are:

- Provide an overview of previous predesign, excavation, and precertification and activities;
- Describe the analytical methods, data validation processes, data reduction and statistical processes used to support the certification process;
- Present certification sampling results for CUs 03 through 14;
- Present the statistical analysis showing that CUs 03 through 14 have passed the certification criteria, including FRL attainment and hot spot criteria; and
- Describe access controls implemented to prevent recontamination.

1.6 REPORT FORMAT

This certification report is presented in six sections with supporting documentation and data in the appendices. These sections are as follows:

Section 1.0	Introduction: Purpose, background, area description, scope, and objectives of the report
Section 2.0	Certification Approach: The approach for certification sampling and analysis
Section 3.0	Overview of Field Activities: Historical data evaluation, excavation, area preparation, precertification, certification and changes to work scope
Section 4.0	Analytical Methodologies, Data Verification and Validation, and Data Reduction
Section 5.0	Certification Evaluation and Conclusions
Section 6.0	Protection of Certified Areas
Appendix A	Certification Samples, Analytical Results and Statistics Tables
Appendix B	Variances/Field Change Notices (V/FCNs) to the A6PI Certification Project Specific Plan (PSP)

1.7 FCP MASTER CERTIFICATION MAP

In order to track certification and characterization for reuse areas at the FCP, DOE updates a controlled map (Figure 1-2) showing the status of the soil remediation areas and phased areas with all Certification Reports. This map has been updated to include certification of A6PI Part One.

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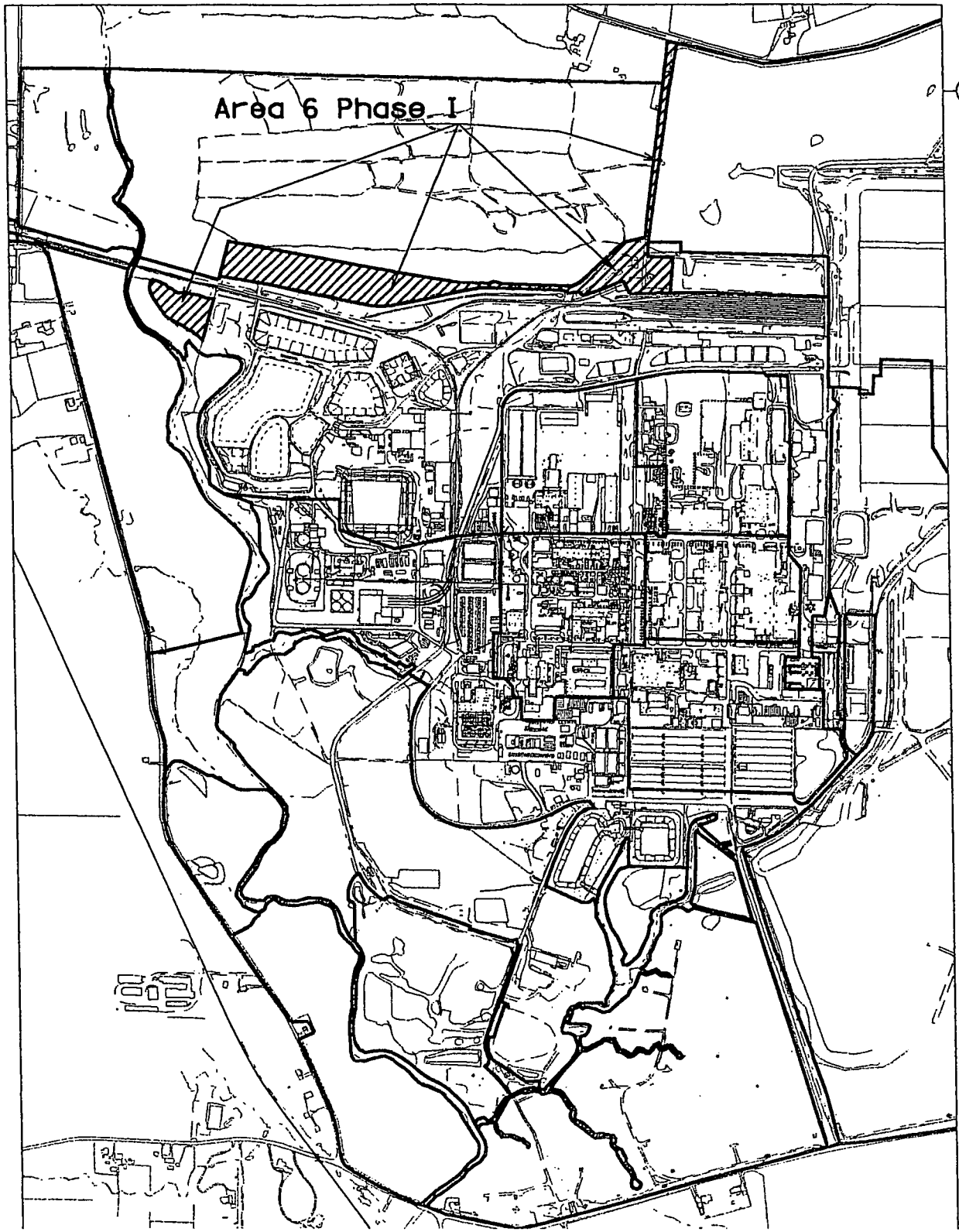
STATE PLANAR COORDINATE SYSTEM 1983

06-OCT-2003



LEGEND:

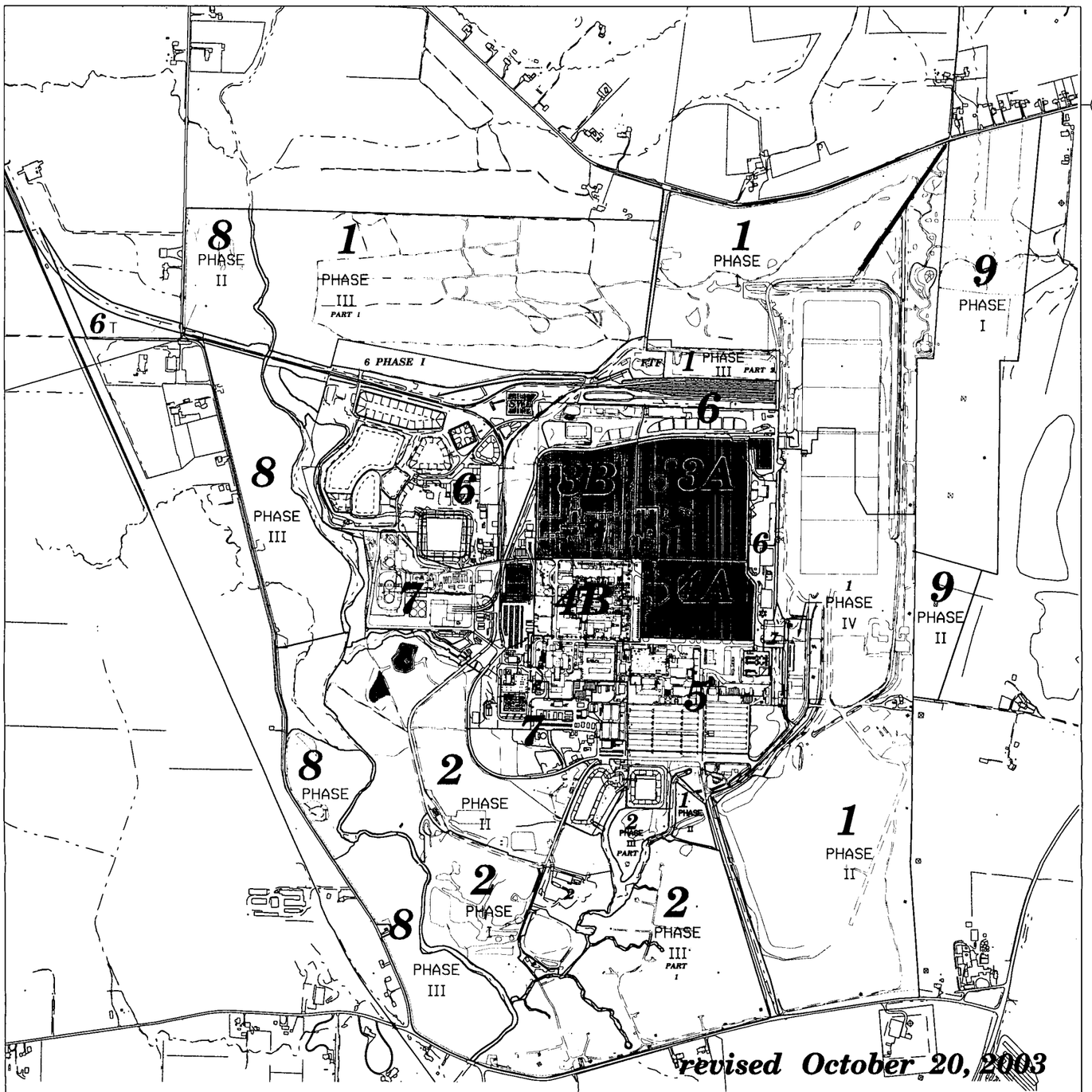
A6PI

REMEDIATION BOUNDARY LINES

SCALE

1000 500 0 1000 FEET

FIGURE 1-1. AREA 6, PHASE I LOCATION MAP



AREAS	TOTAL ACRES	APPROVED CERT. ACRES	CERT. ACRES IN PROGRESS	REMEDIATION ACRES IN PROGRESS	PREDESIGN ACRES IN PROGRESS	REMAINING ACRES
AREA 1	394.6	390.1	0	0	4.2	0.2
AREA 2	175.0	107.6	0	2.7	57.1	7.5
AREA 3A/4A	41.5	0	0	41.5	0	0
AREA 3B/4B	47.8	0	0	23.2	24.6	0
AREA 5	31.8	3.2	0	0	28.6	0
AREA 6	142.0	17.4	2.7	2.4	14.6	104.8
AREA 7	84.9	0	0	1.8	36.8	46.2
AREA 8	98.9	60.2	38.7	0	0	0
AREA 9	0.75	0	0	0	0	0.75•
PR/SSOD/PPDD	••• 32.3	0	0	0	2.1	30.2
TOTAL ON SITE	1049.5	578.6	41.4	71.6	168.0	189.8
AREA 9	84.5	71.9	0	0	0	0
TOTAL OFF SITE	84.5	71.9	0	0	0	0

• ONSITE AREA9 REMAINING ACRES INCLUDE THE DISSOLVED OXYGEN FACILITY AREA, WHICH WILL BE CERTIFIED AS PART OF THE OLD OUTFALL LINE CERTIFICATION. THE INTERIM LEACHATE LINE CORRIDOR IS INCLUDED IN AREA 6.

••• PADDYS RUN/STORMSEWER OUTFALL DITCH CORRIDOR IS IDENTIFIED AS: .

AIPI ROADS EXCLUDED FROM CERTIFICATION IDENTIFIED AS: .

AREA 10 INCLUDES PIPELINES RELATED TO GROUNDWATER REMEDIATION AND OTHER UTILITIES NOT SPECIFICALLY LISTED.

SCALE

1100 550 0 1100 FEET

FIGURE 1-2. FCP CONTROLLED CERTIFICATION MAP

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2.0 CERTIFICATION APPROACH

2.1 CERTIFICATION STRATEGY

This section summarizes the ASCOC selection process and the certification approach, including CU establishment, sampling design, and statistical analysis. The general certification strategy is described in Section 3.4 of the SEP, and the A6PI specific strategy is described in the CDL for A6PI.

2.1.1 Area-Specific Constituents of Concern

Total uranium, radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary constituents of concern (COCs) and were retained as ASCOCs for this remediation effort. Secondary ASCOCs for Area 6 are listed in the SEP; however, some COCs were not retained for this portion of A6PI based on the area investigation discussed in Section 2.1.3. Table 2-1 lists the secondary ASCOCs identified in the SEP and presents justification for retaining or not retaining them for A6PI certification. In addition to the selected ASCOCs, 1,1,1-trichloroethane and toluene were retained for sampling and analysis to support closure of HWMU #1 at the FTF. The data associated with HWMU #1 closure are not discussed in this report, but will be discussed in the follow up report, Certification Report for Area 6, Phase I – Part Two.

2.1.2 ASCOC Selection Criteria

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

- It is listed as a soil COC in the OU5 ROD and,
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment and,
- Analytical results indicate the contaminant is present above its FRL, and the above-FRL concentrations cannot be attributed to false positives or elevated contract required detection levels (CRDLs) and,
- 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-228 and thorium-232).

2.1.3 ASCOC Selection Process

Using this process and the data presented in Table 2-1, the complete list of primary and secondary COCs presented in Table 2-7 of the SEP for remediation Area 6 has been focused for the A6PI certification effort. Table 2-1 also includes a column with justification for the decision on retaining or eliminating the ASCOC. The final list of ASCOCs selected for A6PI, and the specific CUs for which they are selected, is provided in Table 2-2. Note that the Area 6 SWL/FTF Implementation Plan also identified 1,2-dichloroethene and trichloroethene as ASCOCs for FTF excavation control sampling. These COCs will not be retained as ASCOCs for certification since they have never been identified above the FRL in A6PI, nor are they linked to the FTF through process knowledge.

Table 2-7 of the SEP also identifies several additional COCs as ecological COCs based on a screening process presented in Appendix C of the SEP. For Area 6, the ecological COCs include three metals (antimony, cadmium and silver), plus polyaromatic hydrocarbons (PAHs). As discussed in Section C.4.1.4.2 of the SEP, the three metals were listed with Area 6 specifically due to their presence at the Waste Pits, and do not pertain to the FTF. However, the PAHs do pertain to the FTF and will be carried into certification sampling and analysis for the FTF CUs, as identified in Table 2-2. While this is the case, certification is not contingent on benchmark toxicity value (BTV) data.

The FTF CUs include CUs 01, 02 and 03. As previously discussed, CUs 01 and 02 will be addressed in the follow up report, Certification Report for Area 6, Phase I – Part Two.

2.2 CERTIFICATION APPROACH

2.2.1 Certification Design

The certification design and sampling strategy follow Section 3.4 of the SEP. The first criterion for A6PI CU design was to segregate areas of homogeneous historical land use. With this in mind, CU boundaries were defined with the FTF, the ONAR, the WPRAP Gravel Access Road, and the two open fields. Secondly, additional factors were evaluated, including topography, residual COC data, available real-time scan data, and proximity to other areas of the site, to determine the boundaries of each CU. Because of the remedial excavations in the FTF, and the close proximity of other portions of A6PI to the FTF or the Waste Pits, Group 1 CUs have conservatively been established throughout the entire A6PI.

CUs established in A6PI Part One are as follows:

- CU A6P1-UST — CU established within CUs 01 and 02 for closure of the FTF UST.
- CU A6P1-03: — Buffer CU for the FTF; also covers the gravel road/parking area northeast of FTF
- CU A6P1-04: — Spans the excavated portion of the ONAR south of the Security Gate
- CUs A6P1-05 through 10: — Established within the portions of the field north of WPRAP that were scanned using real-time equipment
- CU A6P1-11: — Spans the entire WPRAP Gravel Access Road
- CU A6P1-12 and 13: — Established within the field west of WPRAP

CU A6P1-14 covers the ONAR north of the Security Gate (where the road was not excavated during the ONAR excavation). The certification samples were collected from the first 6 inches of soil beneath the road and overlying material. As discussed in Section 2.1.1 of the Certification Design Letter (CDL), a biased sample was purposely placed on the historical cesium-137 FRL exceedance found at sampling location ZONE 3-543. The biased sample location is at A6P1-C-14-13 found in CU A6P1-14.

2.2.2 Sample Selection Process

Certification sampling locations were selected according to Section 3.4.2 of the SEP. A biased sample was selected in CU 14 (A6P1-C-14-13). Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were generated by randomly selecting easting and northing coordinates within each sub-CU boundary, and testing the locations against the minimum distance criterion for the CU. The minimum distance criterion is the smallest distance allowed between two sample locations within a CU, and is a function of CU size. The formula for calculating the minimum distance is provided in the SEP. If the minimum distance criterion was not met, an alternative random location was selected for that sub-CU, and all the locations were re-tested for minimum distance. The initial CU boundaries are shown in Figure 2-1, and the selected certification sampling locations are shown on Figures 2-2 through 2-6.

2.2.3 Certification Sampling

Four of the 16 locations were randomly selected (one from each quadrant) for archiving, and the other 12 locations were submitted for analysis. All samples were collected from the 0 to 6-inch (surface) soil interval at the designated and surveyed location.

2.2.4 Statistical Analysis

Statistical analysis of certification samples is described in Appendix G of the SEP. Statistical analysis of certification samples is only necessary if a sample result exceeds its associated FRL. In this instance, two criteria must be met for a CU to be certified:

1) For a normal or lognormal data distribution, the first criterion is to compare the 95 percent upper confidence limit (UCL) to the mean of each primary ASCOC, and the 90 percent UCL on the mean of each secondary ASCOC, to their respective FRLs, leading to a pass/fail decision for each individual CU. (If the data distribution is not normal or lognormal, then the appropriate non-parametric approach discussed in Appendix G of the SEP is used to evaluate the 95 percent UCL on the mean. The *a posteriori* test will be performed to determine whether the sample size is sufficient for a meaningful conclusion of this comparison.)

2) The second criterion is related to the hot spot criterion, which states that if a certification sample for a primary radiological ASCOC exceeds two times the FRL, then further action is necessary per Section 3.4.5 and Figure 3-11 of the SEP.

When the given UCL on the mean for each COC is less than its FRL, and the hot spot criterion is met, the CU will be considered certified.

TABLE 2-1

AREA 6 SECONDARY ASCOC LIST [a]

Area 6 Secondary ASCOC[b]	Retained as ASCOC?	Where?	Justification
Aroclor-1254 and 1260	Yes	All A6PI CUs	Above-FRL concentrations within the FTF; also a common contaminant in areas immediately surrounding the Former Production Area.
Arsenic	Yes	All A6PI CUs	Common contaminant in areas immediately surrounding the Former Production Area.
Benzo(a)pyrene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF, also an ecological COC.
Benzo(b)fluoranthene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF, also an ecological COC.
Beryllium	Yes	All A6PI CUs	Common contaminant in areas immediately surrounding the Former Production Area.
Bromodichloromethane	No	--	Not associated with FTF, never detected above the FRL in A6PI samples.
Cesium-137	Yes	Northern ONAR CU only	Detected concentration above the FRL only within the Northern ONAR area.
Dibenzo(a,h)anthracene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF, also an ecological COC.
1,1-dichloroethene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF and detected in the FTF at concentrations above the FRL.
Dieldrin	No	--	Not associated with FTF, never detected above the FRL in A6PI samples.
Fluoride	No	--	Not associated with FTF, never detected above the FRL in A6PI samples.
Heptachlorodibenzo-p-dioxin	No	--	Not associated with FTF, never detected above the FRL in A6PI samples.
Indeno (1,2,3-cd)pyrene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF, ecological COC.
Octachlorodibenzo-p-dioxin	No	--	Not associated with FTF, never detected above the FRL in A6PI samples.
Technetium-99	Yes	FTF CUs and FTF Buffer CU	Detected in the FTF at concentrations above the FRL.
Tetrachloroethene	Yes	FTF CUs and FTF Buffer CU	Associated with FTF and detected at concentrations above the FRL.
Thorium-230	Yes	All A6PI CUs	Associated with WPRAP.

[a] As listed in Table 2-7 of the SEP.
[b] ASCOCs identified only as ecological COCs are not included. Refer to Table 2-2.

TABLE 2-2

ASCOC LIST FOR A6PI

ASCOC[a]	FRL/*(BTV)*	Type of ASCOC	Where Retained
Total Uranium	82 mg/kg	Primary ASCOC	All A6PI CUs
Radium-226	1.7 pCi/g	Primary ASCOC	All A6PI CUs
Radium-228	1.8 pCi/g	Primary ASCOC	All A6PI CUs
Thorium-228	1.7 pCi/g	Primary ASCOC	All A6PI CUs
Thorium-232	1.5 pCi/g	Primary ASCOC	All A6PI CUs
Aroclor-1254	0.13 mg/kg	Secondary ASCOC	All A6PI CUs
Aroclor-1260	0.13 mg/kg	Secondary ASCOC	All A6PI CUs
Arsenic	12 mg/kg	Secondary ASCOC	All A6PI CUs
Beryllium	1.5 mg/kg	Secondary ASCOC	All A6PI CUs
Thorium-230	280 pCi/g	Secondary ASCOC	All A6PI CUs
Benzo(a)anthracene	*(1.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Benzo(a)pyrene	2.0 mg/kg *(1.0 mg/kg)*	Secondary ASCOC/ Ecological COC	FTF and FTF Buffer CUs Only
Benzo(b)fluoranthene	20.0 mg/kg *(1.0 mg/kg)*	Secondary ASCOC/ Ecological COC	FTF and FTF Buffer CUs Only
Benzo(g,h,i)perylene	*(1.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Benzo(k)fluoranthene	*(1.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Chrysene	*(1.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Dibenzo(a,h)anthracene	2.0 mg/kg *(0.088 mg/kg)*	Secondary ASCOC/ Ecological COC	FTF and FTF Buffer CUs Only
Fluoranthene	*(10.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
1,1-dichloroethene	0.41 mg/kg	Secondary ASCOC	FTF and FTF Buffer CUs Only
Indeno(1,2,3-cd)pyrene	20.0 mg/kg *(1.0 mg/kg)*	Secondary ASCOC/ Ecological COC	FTF and FTF Buffer CUs Only
Phenanthrene	*(5.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Pyrene	*(10.0 mg/kg)*	Ecological COC	FTF and FTF Buffer CUs Only
Technetium-99	30.0 pCi/g	Secondary ASCOC	FTF and FTF Buffer CUs Only
Tetrachloroethene	3.6 mg/kg	Secondary ASCOC	FTF and FTF Buffer CUs Only
Cesium-137	1.4 pCi/g	Secondary ASCOC	Northern ONAR CU Only
Benzene	8.5 mg/kg	UST- specific COC	FTF - A6PI-UST CU Only
Ethylbenzene	51 mg/kg	UST- specific COC	FTF - A6PI-UST CU Only
Touluene	100,000 mg/kg	UST- specific COC	FTF - A6PI-UST and HWMU CUs Only
Xylene	920 mg/kg	UST- specific COC	FTF - A6PI-UST CU Only

[a] BTV applies to Ecological COCs, as applicable. A FRL is not listed for COCs that are only Ecological COCs.
mg/kg – milligrams per kilogram
pCi/g – picocuries per gram

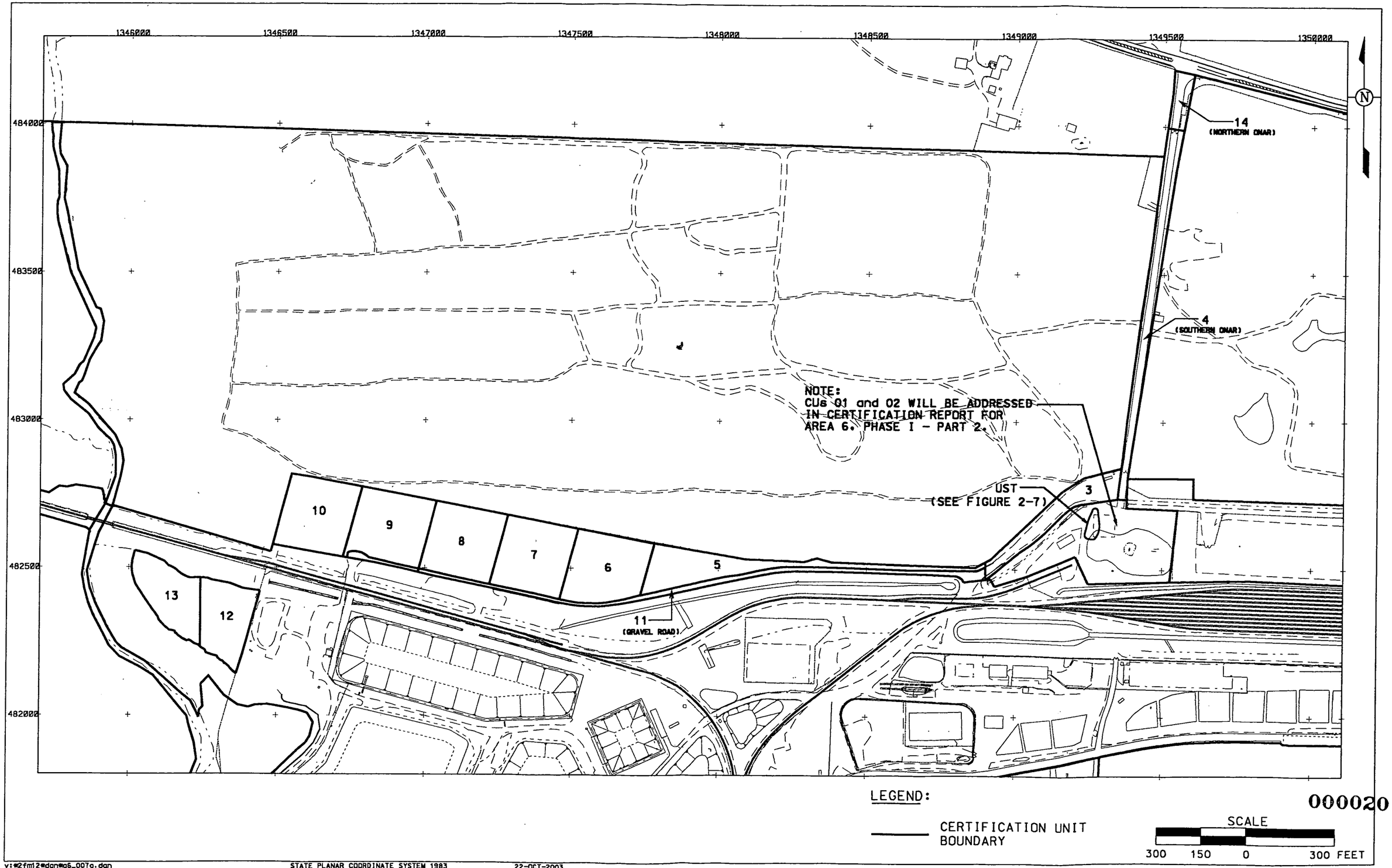

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FIGURE 2-1. A6PI CERTIFICATION UNITS

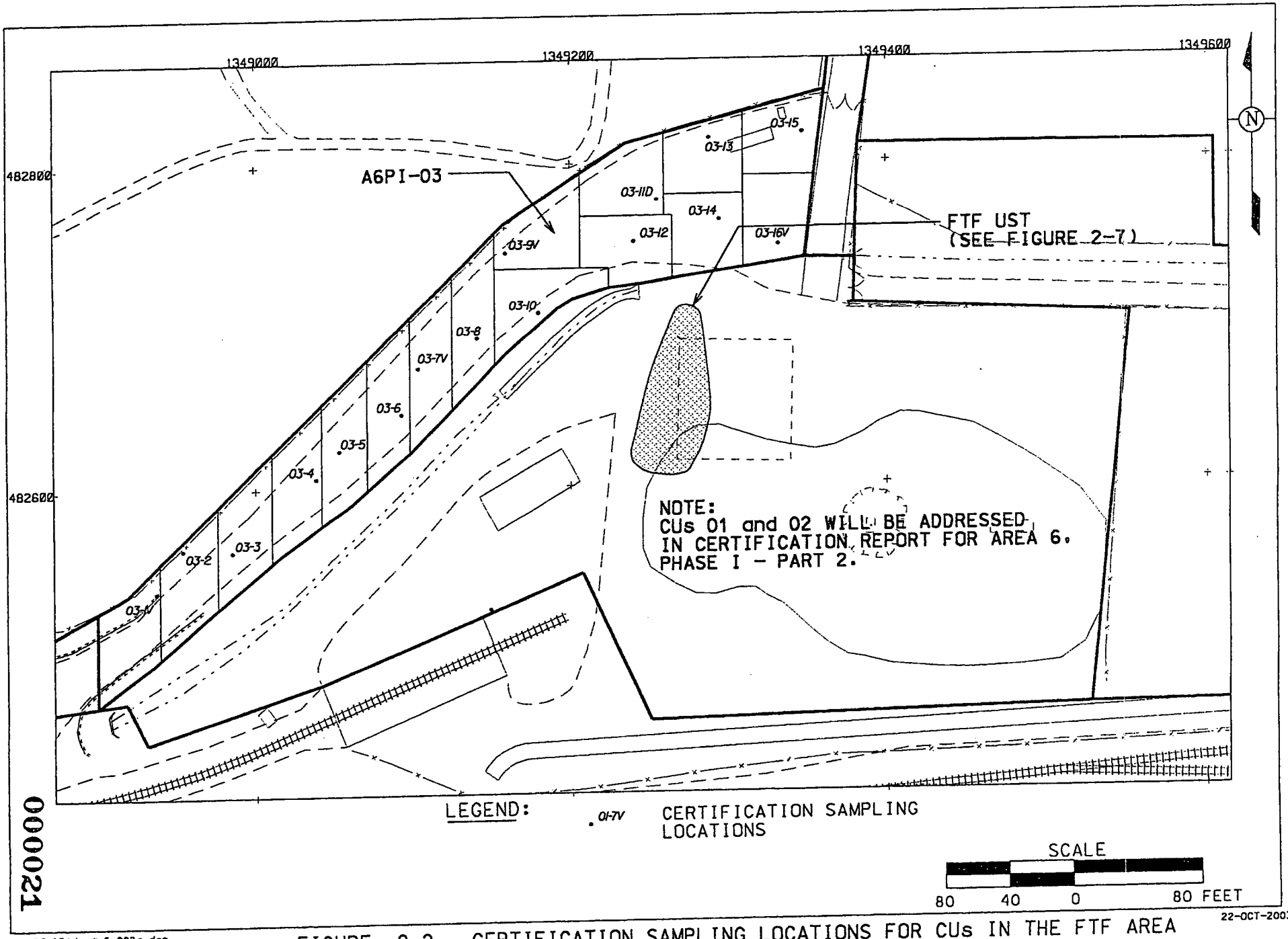

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FIGURE 2-2. CERTIFICATION SAMPLING LOCATIONS FOR CUs IN THE FTF AREA

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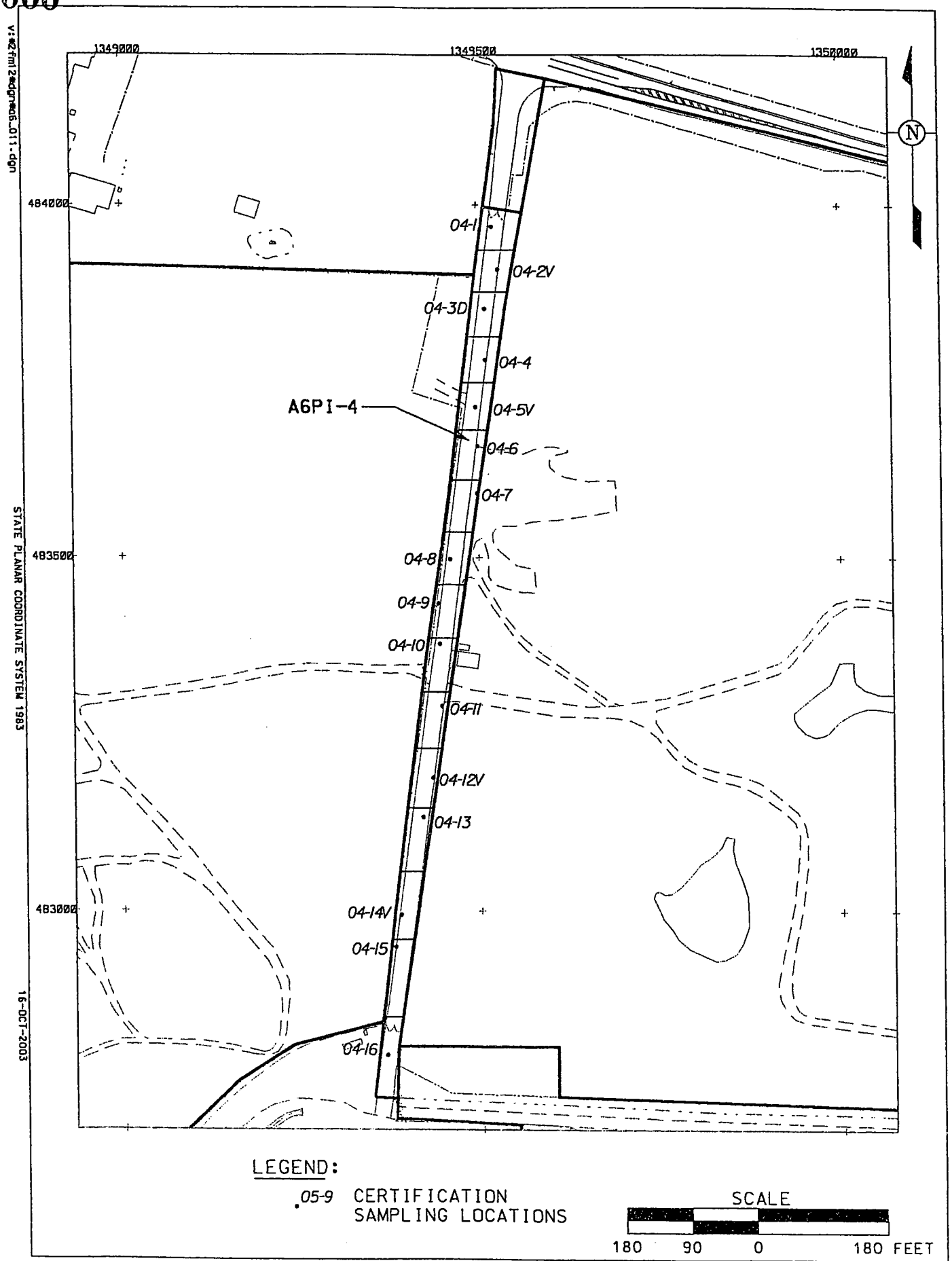

FIGURE 2-3. CERTIFICATION SAMPLING LOCATIONS FOR CUs IN THE ONAR SOUTH OF THE SECURITY GATE

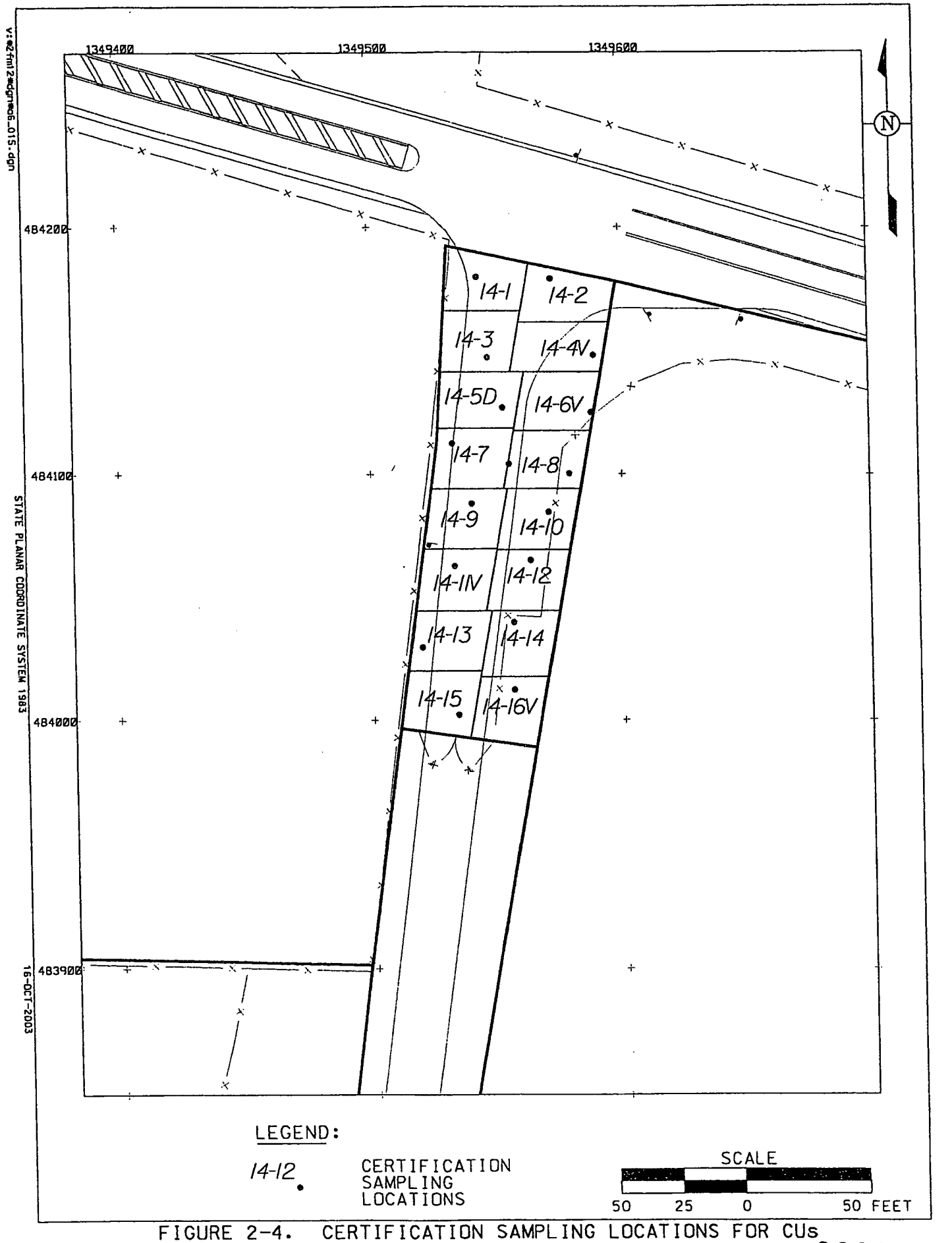

FIGURE 2-4. CERTIFICATION SAMPLING LOCATIONS FOR CUs IN THE ONAR NORTH OF THE SECURITY GATE

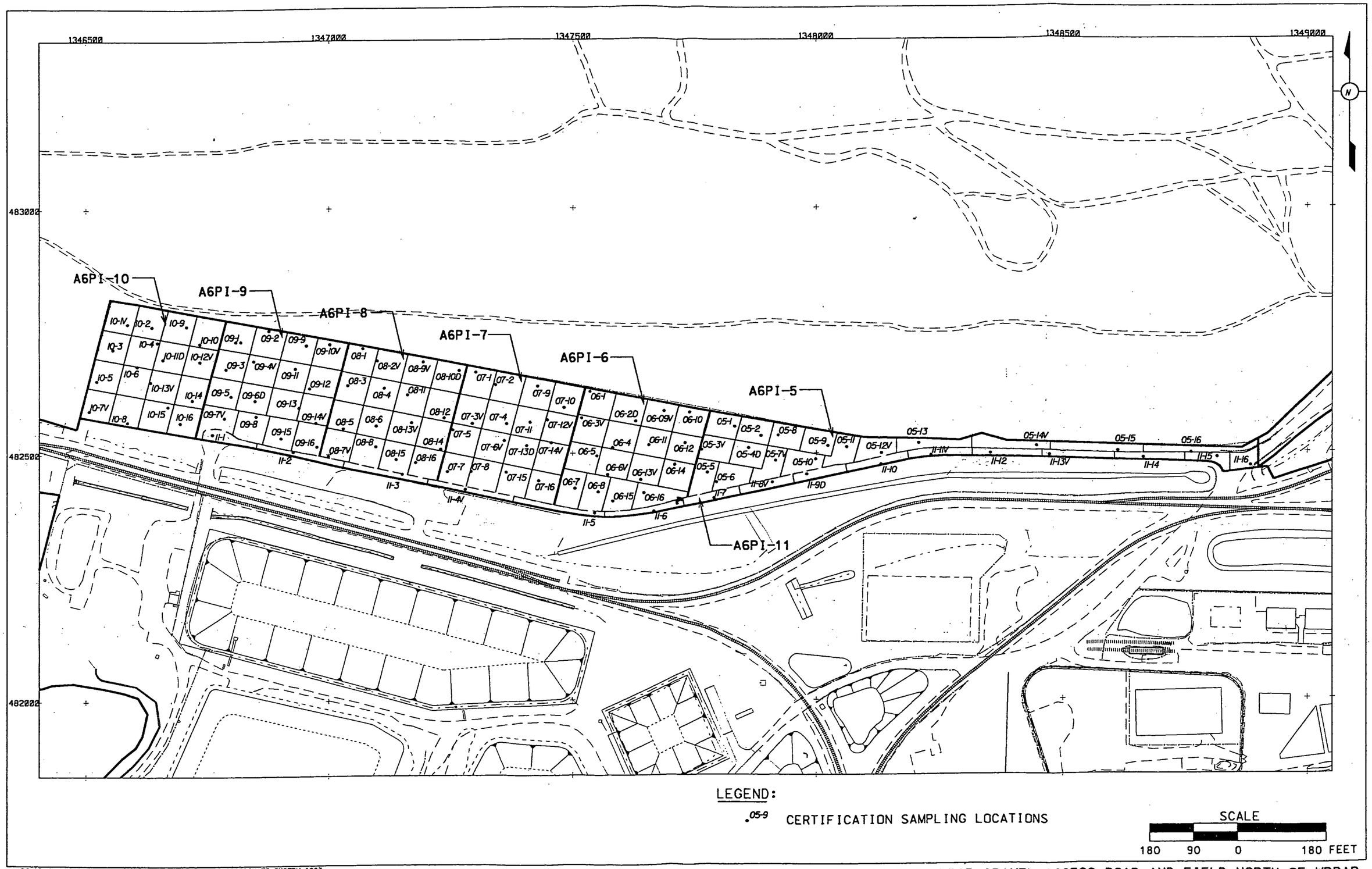

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FIGURE 2-5. CERTIFICATION SAMPLING LOCATIONS FOR CUs IN THE WPRAP GRAVEL ACCESS ROAD AND FIELD NORTH OF WPRAP

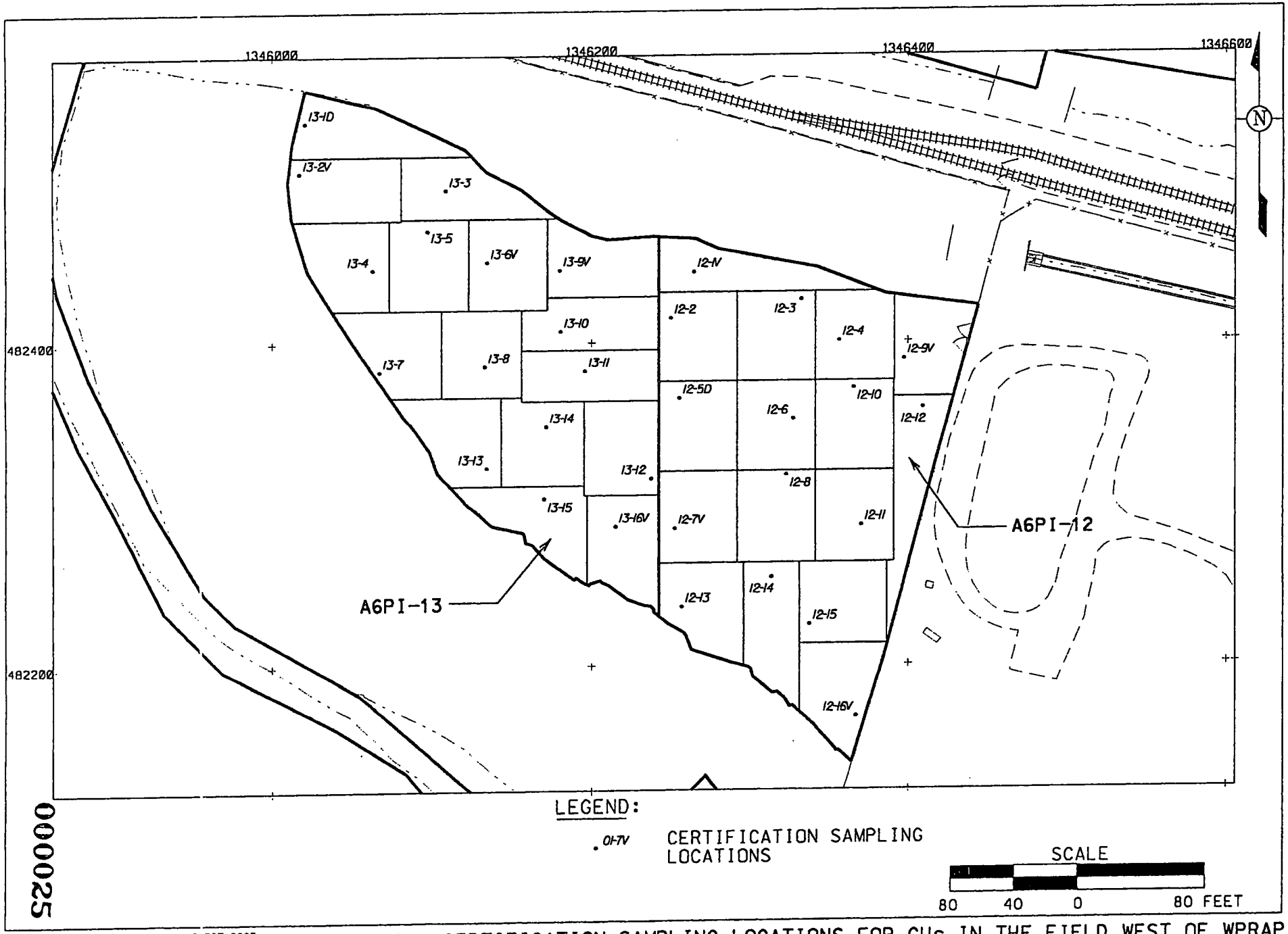

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FIGURE 2-6. CERTIFICATION SAMPLING LOCATIONS FOR CUs IN THE FIELD WEST OF WPRAP

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3.0 OVERVIEW OF FIELD ACTIVITIES

3.1 DATA EVALUATION, PRECERTIFICATION AND AREA PREPARATION

As discussed in the CDL, historical data and information were evaluated to determine the remedial design. The rationale for retaining ASCOCs for certification sampling is in Section 2.1.3.

Additional sampling and real-time data were collected before and during site preparation as well as during remediation. This section summarizes field activities that were conducted based on these sample data.

With regard to the precertification physical samples collected, the surface samples collected in the field west of WPRAP, the geological assessment of these soil cores revealed that there was no fill. The analytical data for these samples (surface and subsurface) demonstrate that no ASCOCs are present at concentrations above the FRL. These results are provided in the CDL.

During excavation of the FTF, two previously unknown USTs were discovered, located side by side, in the northwest corner of the FTF, and it was determined that the USTs contained gasoline. Closure of the FTF USTs was consistent with section 2.2.6 of the SEP, which required that a distinct CU be established in the excavated footprint of the USTs and eight physical samples be collected from the footprint and sidewalls. The FTF UST closure CU, identified as A6PI-UST, and corresponding eight sample locations are shown on Figure 3-1. The samples were analyzed for benzene, toluene, ethylbenzene, and xylene to Analytical Support Level (ASL) D in accordance with certification guidelines. Confirmation results are presented in the CDL and this report.

The approach for the removal of the FTF USTs as well as the approach for the excavation and staging of the soil, that is above-WAC for PCE at the FTF, is documented in the Proposed Approach for UST Removal and Soil Excavation at the Former FTF (DOE 2003b). Closure of the FTF USTs is discussed in Section 5.3.

All precertification real-time scanning data was collected in A6PI from August 2002 through May 2003. For several parts of A6PI, physical soil samples were collected in anticipation of the inability to scan these areas prior to the issuance of the CDL. This includes surface samples collected from five borings in the center of the field north of WPRAP, plus surface samples collected from four borings in the field west of WPRAP. These areas were subsequently scanned and included in the CDL.

For the precertification real-time data collected, all results showed total uranium, radium-226 and thorium-232 were below the target levels [three times (3x) FRL for total uranium and thorium-232; 7x FRL for radium-226].

A magnetometer survey, which was implemented as a result of the findings during the excavation of the Sewage Treatment Plant, was performed at final grade within the boundaries of CU 01 and around the perimeter of the FTF UST, which falls within both CU 01 and CU 02. The results indicated the presence of metallic objects, most of which were incidental scrap pieces of debris. Two utilities were also identified at the edge of the excavation within CUs 01 and 02, and must be removed prior to certification.

Based on the results of the above sampling events, it was determined that further excavation would be required in CUs 01 and 02 prior to the certification of A6PI.

Certification sampling in A6PI was completed during September 2003. The sampling approach is described in Project Specific Plan for Area 6, Phase I Certification Sampling (DOE 2003) and Section 2.2. Sample results as they pertain to field activities are discussed below. The sample results and data evaluation are discussed further in Section 5.0.

Certification sampling began in A6PI in July 2003 and continued through September 2003. The sampling approach is described in the PSP and Section 2.2. Sample results and data evaluation are discussed further in Section 5.0.

3.2 CHANGES TO SCOPE OF WORK

CUs 01 and 02 were originally included in this certification activity, as stated in the CDL. A magnetometer survey, which was implemented as a result of the findings during the excavation of the Sewage Treatment Plant, was performed at final grade. The results of the scan indicated the presence of metallic objects, most of which were incidental scrap pieces of debris that could be removed by hand. However, two utilities were identified at the edge of the excavation within CUs 01 and 02, which must be removed prior to certification. Therefore, these two CUs will not be addressed in this report.

There were additions and changes to the scope as documented in V/FCNs 20600-PSP-0004-01 through - 04. These four documents are included in Appendix B.

V/FCN 20600-PSP-0004-01 required all samples collected for CU1, with the exception of radiological samples, to be recollected because the samples arrived at the laboratory out of their required temperature range.

V/FCN 20600-PSP-0004-02 documents the relocation of three sample points greater than 3 feet from their original locations. Per the SEP, relocation of any sample point beyond 3 feet requires documentation in a V/FCN.

V/FCN 20600-PSP-0004-03 documents the collection of samples to bound an above-FRL (two-times FRL) concentration in boring A6P1-C-07-10. These borings and samples were collected to bound the above-FRL area laterally and vertically.

V/FCN 20600-PSP-0004-04 documents the collection of samples to confirm that activities associated with the rail yard are not adversely impacting the soil in CU2. Of the 14 CUs in A6PI, CU2 is the only CU with ongoing activities occurring in it. Within the boundaries of CU2, there is one temporary structure, Trailer 189, and three sealand containers. One of the sealand containers was move approximately 20 feet and sampling location A6P1-C-02-17 was field located and sampled under the original location of the sealand container. Another sampling location (A6P1-C-02-18) was field located and sampled under Trailer 189. All of the results associated with these two sampling locations were below-FRL.

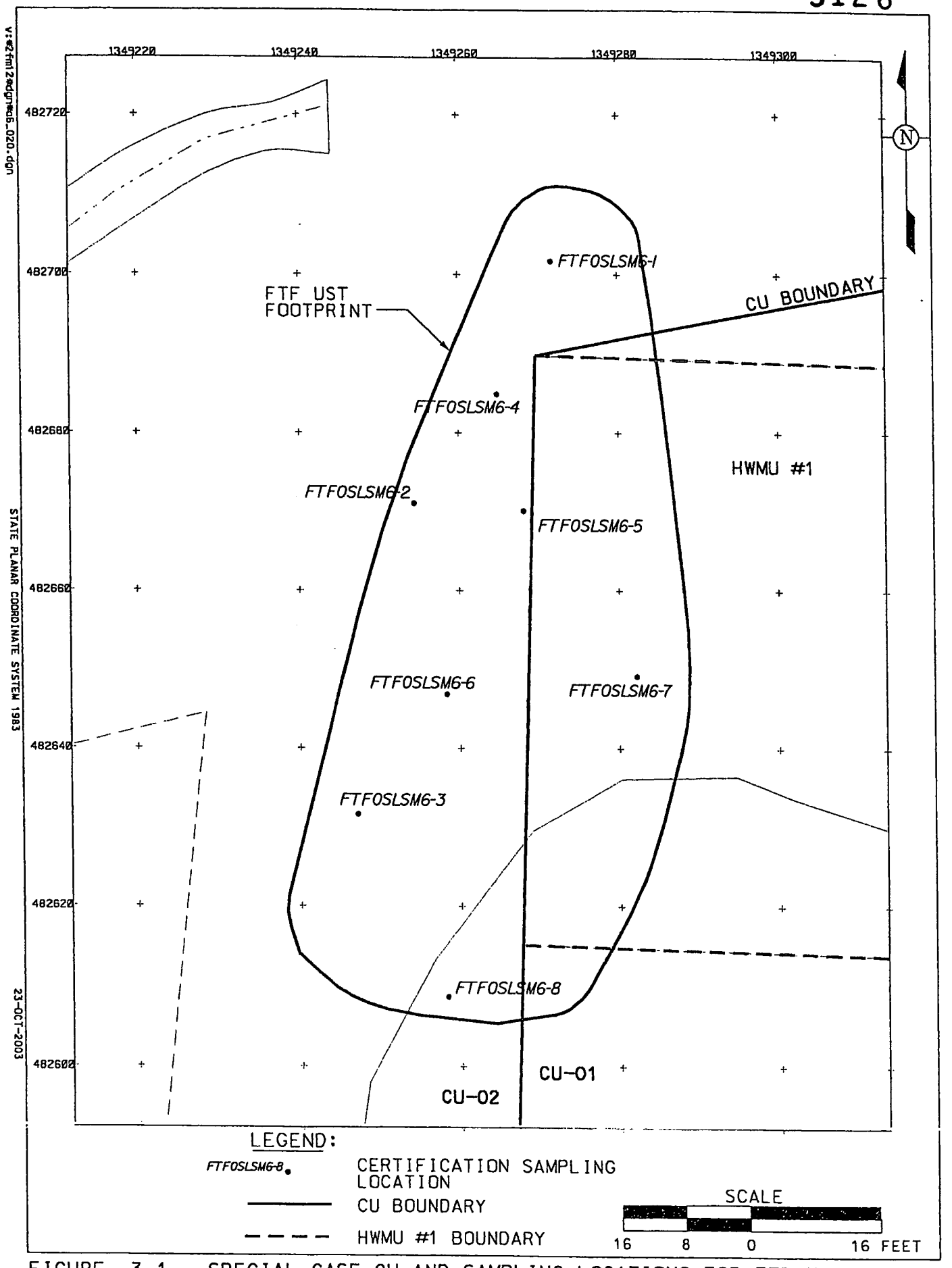

FIGURE 3-1. SPECIAL CASE CU AND SAMPLING LOCATIONS FOR FTF UST CLOSURE

4.0 ANALYTICAL METHODOLOGIES, DATA VALIDATION PROCESSES, AND DATA REDUCTION

4.1 ANALYTICAL METHODOLOGIES

Radiological, metals, and organic samples were sent to an off-site laboratory for analysis. The laboratory complied with Sitewide CERCLA Quality Assurance Project Plan (SCQ) requirements. The SCQ is the source for analytical methodologies (Appendix G), data verification and validation, and analytical and field quality assurance/quality control requirements.

Laboratory analysis of certification samples was conducted using approved analytical methods, as discussed in Appendix H of the SEP. Analyses were conducted to ASL D or E, where the minimum detection level of 10 percent of the FRL is above the SCQ ASL detection level, but the analyses meet all other SCQ ASL D criteria. An ASL D data package was provided for a minimum of 10 percent of the data, with an ASL B package for the remaining 90 percent. All data were validated. No samples were rejected during this validation. Once data were validated as required, results were entered into the FCP Sitewide Environmental Database (SED).

4.1.1 Chemical Methods

Metals

Samples were analyzed for arsenic and beryllium by inductively coupled plasma mass spectrometry (ICP-MS).

Polyaromatic Hydrocarbons (PAHs)

Samples were analyzed for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene using gas chromatography/mass spectrometry (GC/MS).

Polychlorinated Biphenyls (PCBs)

Samples were analyzed for aroclor-1254 and aroclor-1260 by gas chromatography (GC).

Volatile Organic Compounds (VOCs)

Samples were analyzed for 1,1-dichloroethene, benzene, ethylbenzene, tetrachloroethene, toluene, and xylenes by GC/MS.

4.1.2 Radiochemical Methods

The radiochemical analytical methods depended on the specific nuclides of interest. Performance-based specification criteria included the highest allowable minimum detectable concentration (HAMDC), percent overall tracer/chemical recovery, percent matrix spike recovery, method blank concentration, percent recovery of laboratory control sample (LCS), and relative error ratio for duplicate samples for each analyte. The off-site laboratory was required to meet these specifications using the methodologies described below.

Total Uranium

Samples were analyzed for uranium-238 using gamma spectrometry, and the results were used to calculate the total uranium value. The calculation used was as follows:

Total uranium (mg/kg) = (2.998544) x uranium-238 gamma spectrometry result (pCi/g)

Radium-226

Samples were analyzed by gamma spectrometry, and radium-226 was quantified by measuring gamma rays emitted by members of its decay chain. This method does not require chemical separation, but the samples must be allowed a 20-day progeny in-growth period before counting.

Radium-228

Following gamma spectrometry analysis, radium-228 was also quantified by measuring gamma rays emitted by members of its decay chain.

Isotopic Thorium

Isotopic thorium (thorium-228, thorium-230, and thorium-232) was also quantified by measuring gamma rays emitted by members of its decay chain by gamma spectrometry.

Cesium-137

Cesium-137 was also quantified by measuring gamma rays emitted by members of its decay chain by gamma spectrometry.

Technetium-99

Technetium-99 was quantified by liquid scintillation.

4.2 DATA VERIFICATION AND VALIDATION

This section discusses the data verification and validation (V&V) process used to examine the quality of field and laboratory results. Data were qualified to indicate the level of data usability, or level of confidence in the reported analytical results. The U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Data Review (Inorganic Data) (EPA 1994), as adapted and approved by EPA Region V, was used for this process.

Specific parameters associated with the data were evaluated during V&V to determine whether or not the data quality objectives were met. Five principal QA parameters (i.e., precision, accuracy, completeness, comparability, and representativeness) were addressed during V&V. Field sampling and handling, laboratory analysis and reporting, and non-conformances and discrepancies in the data were examined to ensure compliance with appropriate and applicable procedures.

The V&V process evaluated the following parameters:

- Specific field forms for sample collection and handling
- Chain of Custody forms
- Completeness of laboratory data deliverable.

The data validation process examined the analytical data to determine the validation qualifier of the results. General areas examined that apply to all the chemical data include the following:

- Holding Times
- Instrument calibrations
- Calculation of results
- Matrix spike/matrix spike duplicate recoveries
- Laboratory/field duplicate precision
- Field/Laboratory Blank contamination
- Dry weight correction for solid samples
- Correct detection limits reported
- LCS recoveries and compliance with established limits.

Parameters unique to the evaluation of radiochemical analyses include:

- Calibration data for specific energies
- Background checks
- Relative Error ratios
- Detector efficiencies
- Background count correction.

For this project, all the radiological data were reviewed and validated for all criteria noted above. Per project requirements, a minimum of 10 percent of the certification data were validated to validation support level (VSL) D. This validation included the same review process as for VSL B, but included a systematic review of the raw data and recalculations. The data from two CUs, A6PI-C-01 and A6PI-C-02, were validated to VSL D, while all remaining data were validated to VSL B.

Following V&V, qualifier codes were applied to specific data points, reflecting the level of confidence assigned to the particular datum. These codes included:

- No qualification; the positive result or detection limit is confident as reported

J Positive result is estimated or imprecise; data point is usable for decision-making purposes. Positive results less than the contract required reporting limit are also qualified in this manner

R Positive result or detection limit is considered unreliable; data point should not be used for decision-making purposes

U Undetected result at the stated limit of detection

UJ Undetected result; detection limit is considered estimated or imprecise; the data point is usable for decision-making purposes

N Positive result is tentatively identified - that is, there is some question regarding the actual identification and quantification of the result. Compound reported is best professional judgement of the interpretation of the supporting data, such as mass spectra. Caution must be exercised with the use of these data

NV Not Validated. The results for this sample were not validated

Z This result, or detection limit in this analysis is not the best one to use; another analysis (e.g., the dilution or re-analysis) contains a more confident and usable result.

The V&V of this data set did not identify any problems. All the results were either not qualified, qualified as estimated (J) and/or undetected (U). No results were qualified as rejected (R).

4.3 DATA REDUCTION

Each sample used to support the A6PI area certification decision was entered in the FCP Sitewide Environmental Database (SED) with the following information:

Field Information

- Sample Identification Number - A unique number assigned to each discrete sample point. An example sample identification for an A6PI certification sample is as follows:

  A6P1-C-07-5^RMP

  where:

  A6P1 = Area 6, Phase I
  C = Certification Sample
  07 = CU number
  5 = Sample location within the CU
  RMP = "R" for radiological; "M" for metals; "P" for PCBs

- Coordinate Information - Northing and Easting locations.

Laboratory Information

For each sample result the following information is entered:

- Laboratory Result - The reported analytical value from the laboratory

- Laboratory Qualifier - The qualifier reported from the lab. For radiological parameters non-detect values are assigned a U qualifier

- Total Propagated Uncertainty (TPU) – Applicable to radiological parameters only. The TPU is an estimate of the overall uncertainty associated with a measured or calculated result that has been derived from an evaluation of all factors that can influence a result, including both systematic and random sources of uncertainty. For both *in situ* and laboratory-based radioactivity measurements, factors such as the random nature of the radioactive decay process (i.e., counting uncertainty), the mass or volume of the "sample" being analyzed, the variation in radiation detection efficiency with the energy of the emitted radiation and the density and chemical composition of the sample, uncertainty in nuclear decay parameters used to convert counts to activity, and attenuation of the radiation must be considered to properly assess the overall uncertainty of the measured result.

- Units - The units in which the Laboratory Result is reported.

Validation Information

- Validation Result - The result based on the validation process. During the validation process, sample results may be adjusted. If the laboratory result is less than the associated MDC, the validation result becomes the MDC value

- Validation TPU - The TPU based on the validation process (applicable to radiological parameters only). During the data validation process, the reported TPU is evaluated, as described in Section 11.2 and Appendix D of the SCQ, to assess the impact on the data quality and the will be qualified as estimated if the uncertainty is excessive.

- Validation Qualifier - The qualifier assigned as a result of the data validation process

- Validation Units - The units in which the Validation Result is reported.

Using the information as summarized above, the following actions were taken for data reduction of each CU data set.

1. All the data for each CU were queried from the SED. All the data were used even if the CU had more than the minimum required data points.

2. The data from the validation fields were used for statistical calculations.

3. Data with a qualifier of R or Z was not used in the statistical calculations.

4. The highest of the two duplicate results was used in the statistical calculations.

5. One half of the non-detect (U or UJ) values were used in the statistical calculations.

5.0 CERTIFICATION EVALUATION AND CONCLUSIONS

Certification success or failure was based on sample data from each CU against criteria discussed in Section 2.2.4. Subsequent to any evaluation of preliminary data, full statistical analysis and evaluation was performed on all validated data. Final certification data are presented in Appendix A.

5.1 CERTIFICATION RESULTS AND EVALUATION

After remediation of impacted material, all A6PI CUs met the certification criteria. All but nine results were below the FRLs; all CUs passed on the first round of certification. In those cases where constituents had both a BTV and FRL (i.e. CU 03), the lower of the two limits was chosen when performing statistics.

There were no FRL exceedances in CUs 04, 05, 06, 11, 12, and 13; therefore, no additional field activity was necessary.

CU 3

In A6PI-C-03-2, there was an above-FRL result for arsenic; however, this result was less than two times the FRL. A statistical analysis conducted on the arsenic result indicated that the CU met all certification criteria discussed in Section 2.2.4. No additional field activity was necessary.

CU 7

In A6PI-C-07-10 and A6PI-C-07-13, there were above-FRL results for arsenic. The arsenic result from A6PI-C-07-13 was less than two times the FRL; however, the arsenic result from A6PI-C-07-10 was greater than two times the FRL. Bounding samples were collected to bound sampling location A6PI-C-07-10 both laterally and vertically. All bounding sample results were below the FRL and the area that was bound was less than 10 m^2. Since the area surrounding the hotspot is less than 10 m^2 and the hotspot is less than three-times FRL, then the hotspot does not require excavation as discussed in Section 3.4.6 of the SEP. A statistical analysis conducted on the arsenic results indicated that the CU met all certification criteria discussed in Section 2.2.4.

CUs 8 through 10

In A6PI-C-08-3, A6PI-C-09-15, and A6PI-C-10-8 there were above-FRL results for arsenic; however, these readings were less than two times the FRL. A statistical analysis conducted on these arsenic results indicated that the CUs 08, 09, and 10 met all certification criteria discussed in Section 2.2.4. No additional field activity was necessary.

CU 14

In A6PI-C-14-5, there was an above-FRL result for arsenic and for thorium-232. There was also an above-FRL result for thorium-232 in A6PI-C-14-8. The readings for both arsenic and thorium-232 were less than two times the FRL. A statistical analysis conducted on the arsenic and thorium-232 results indicated that the CU met all certification criteria discussed in Section 2.2.4. No additional field activity was necessary.

As discussed in Section 2.2.1 a biased sample location (A6P1-14-13) was placed within this CU. The analytical results from this biased location are well below the FRL.

5.2 FIRE TRAINING FACILITY UNDERGROUND STORAGE TANKS CLOSURE

As discussed in Section 2.1.1 of the CDL, there were two USTs discovered during excavation of the FTF. The approach for the removal of the FTF USTs is documented in the Proposed Approach for UST Removal and Soil Excavation at the Former FTF (DOE 2003b). Within the documented approach, several key steps that have been completed include:

- Absorbent pads used to soak up all organic solvents have been disposed of per the Waste Acceptance Organization.
- All water from the excavated area and within the tanks was pumped to Advance Waste Water Treatment Facility Phase II treatment.
- The FTF USTs were removed, sheared, and placed in the OSDF.
- All solvent/fuel saturated soils surrounding the FTF USTs were excavated and placed in AR3-007 Area (burrito). The remaining soils were placed in the OSDF.
- The excavated footprint which contained the FTF USTs was defined as a distinct CU and was identified as A6PI-UST. Closure sampling was performed in April 2003, and the samples were analyzed for benzene, toluene, ethylbenzene, and xylene to ASL D in accordance with certification guidelines. A statistical analysis conducted on these results indicated that the CU met all certification criteria discussed in Section 2.2.4.

5.3 A6PI CERTIFICATION CONCLUSIONS

Based on the analytical results, precertification data, and statistical analysis, DOE has determined that the remedial objectives in the OU5 ROD have been achieved for A6PI, CUs 03 through 14, and no further remedial actions are required. This portion of the FCP will be released for final land use upon EPA and OEPA concurrence. Once excavation of the utilities in CUs 01 and 02 is complete, certification of these two CUs will resume and the results will be reported in the Certification Report for Area 6, Phase I - Part Two.

6.0 PROTECTION OF CERTIFIED AREAS

DOE has restricted access to certified areas in order to maintain their integrity prior to transfer for final land use. FCP Procedure EP-0008 has been developed to implement a process to protect certified areas from becoming re-contaminated.

The procedure is summarized as follows:

- At the beginning of certification sampling activities for a remediation area, the perimeter of the "certified" area will be clearly delineated
- Signs will be posted upon the temporary perimeter limiting access to authorized individuals or projects
- To gain access to conduct work in a "certified" area, the person or project desiring access will submit a written request to the Compliance section of Soil and Disposal Facility Project (SDFP)
- Any equipment to be used within the "certified" area must have been cleaned in accordance with FCP certified area access
- Employees/operators should be briefed on the entry and exit requirements for a "certified" area
- Additional restrictions apply to certified areas that have been restored. The SDFP Natural Resources Group will approve request for access in writing prior to entry.

After DOE, EPA and OEPA agree that an area is certified, the area will be released for final land use. At that time, best management practices and administrative controls will be used to protect the area from contamination, and other controls will be implemented as needed.

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APPENDIX A

CERTIFICATION SAMPLES, ANALYTICAL RESULTS AND STATISTICS TABLES

	Secondary COCs (con't)									
Sample ID	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Tetrachloroethene
A6P1-C-03-2	41 U	41 U	41 U	41 U	41 U	29 J	41 U	41 U	23 J	1.2 U
A6P1-C-03-3	37 U	37 U	37 U	37 U	37 U	37 U	37 U	37 U	37 U	1.1 U
A6P1-C-03-4	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	1.1 U
A6P1-C-03-5	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	1.2 U
A6P1-C-03-6	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	1.2 U
A6P1-C-03-8	39 U	39 U	39 U	39 U	39 U	39 U	39 U	39 U	39 U	1.2 U
A6P1-C-03-10	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	1.2 U
A6P1-C-03-11	92 -	39 U	34 J	56 -	39 U	75 -	56 -	28 J	74 -	1.2 U
A6P1-C-03-11-D	120 -	39 U	39 U	83 -	39 U	140 -	61 -	59 -	130 -	1.2 U
A6P1-C-03-12	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	1.2 U
A6P1-C-03-13	180 -	140 -	41 U	140 -	41 U	210 -	100 -	74 -	190 -	1.2 U
A6P1-C-03-14	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	1.2 U
A6P1-C-03-15	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	1.1 U
Limit	1000 (BTV)	1000 (BTV)	1000 (BTV)	1000 (BTV)	88 (BTV)	10000 (BTV)	1000 (BTV)	5000 (BTV)	10000 (BTV)	3600
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	180	140	34	140	41 U	210	100	74	190	1.2 U
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	10	11	12	10	12	10	10	10	10	12
% Nondetects	83%	92%	100%	83%	100%	83%	83%	83%	83%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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	Primary COCs					Secondary COCs								
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Thorium-230	Arsenic	Beryllium	1,1-Dichloroethene	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene
A6P1-C-03-2	0.984 -	0.909 -	0.921 -	0.909 -	6.64 -	1.69 U	6.15 U	12.4 J	0.794 -	1.2 U	4.1 U	4.1 U	41 U	41 U
A6P1-C-03-3	0.862 -	0.747 -	0.741 -	0.747 -	4.27 -	1.65 U	12.1 U	8.80 J	0.683 -	1.1 U	3.7 U	3.7 U	37 U	37 U
A6P1-C-03-4	0.677 -	0.572 -	0.581 -	0.572 -	5.08 -	1.61 U	3.89 U	7.44 J	0.451 -	1.1 U	3.6 U	3.6 U	36 U	36 U
A6P1-C-03-5	1.16 -	1.12 -	1.21 -	1.12 -	7.33 -	1.65 U	5.73 U	4.35 J	0.762 -	1.2 U	4.1 U	4.1 U	41 U	41 U
A6P1-C-03-6	0.851 -	1.12 -	1.05 -	1.12 -	9.47 -	1.71 U	11.7 U	4.2 J	0.763 -	1.2 U	4.0 U	4.0 U	40 U	40 U
A6P1-C-03-8	0.995 -	1.02 -	1.04 -	1.02 -	7.51 -	1.73 U	4.53 U	9.47 J	0.685 -	1.2 U	3.9 U	3.9 U	39 U	39 U
A6P1-C-03-10	0.936 -	1.16 -	1.16 -	1.16 -	7.69 -	1.76 U	10.9 U	5.28 J	0.709 -	1.2 U	4.1 U	4.1 U	41 U	41 U
A6P1-C-03-11	0.910 -	0.975 -	0.960 -	0.975 -	11.8 -	1.61 U	12.0 U	7.53 J	0.671 -	1.2 U	13.6 -	3.4 J	39 U	68 -
A6P1-C-03-11-D	0.996 -	0.951 -	0.948 -	0.951 -	12.2 -	1.76 U	11.5 U	5.33 J	0.596 -	1.2 U	40.8 -	9.5 -	39 U	87 -
A6P1-C-03-12	1.01 -	1.15 -	1.22 -	1.15 -	7.89 -	1.72 U	5.43 U	5.18 J	0.772 -	1.2 U	4.0 U	4.0 U	40 U	40 U
A6P1-C-03-13	1.03 -	1.04 -	1.05 -	1.04 -	10.9 -	1.78 U	3.27 U	6.31 J	0.763 -	1.2 U	4.1 U	4.1 U	41 U	150 -
A6P1-C-03-14	1.05 -	1.07 -	1.06 -	1.07 -	4.43 -	1.78 U	10.4 U	7.05 J	0.800 -	1.2 U	4.1 U	4.1 U	41 U	41 U
A6P1-C-03-15	0.943 -	0.970 -	0.960 -	0.970 -	7.29 -	1.83 U	10.0 U	6.10 J	0.746 -	1.1 U	4.0 U	4.0 U	40 U	40 U
Limit	1.7	1.8	1.7	1.5	82	30	280	12	1.5	410	130	130	1000 (BTV)	1000 (BTV)
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.16	1.16	1.22	1.16	12.2	1.83 U	12.1 U	12.4	0.8	1.2 U	40.8	9.5	41 U	150
Max. >= Limit	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	92.1% (LN)	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	Lognormal	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	12	0	0	12	11	11	12	10
% Nondetects	0%	0%	0%	0%	0%	100%	100%	0%	0%	100%	92%	92%	100%	83%
Est. Mean*	--	--	--	--	--	--	--	7.03	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	8.09	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	pass	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	3	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	Pass	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 4

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-04-1	1.01 J	1.44 -	1.43 -	1.44 -	6.47 -	3.23 U	2.31 J	0.787 -	6.0 -	3.9 UJ
A6P1-C-04-3	0.896 J	1.14 -	1.08 -	1.14 -	4.65 J	14.4 U	2.69 J	0.698 -	3.9 U	3.9 UJ
A6P1-C-04-3-D	0.826 J	1.22 -	1.23 -	1.22 -	6.18 -	13.5 U	3.88 J	0.698 -	4.2 -	3.9 UJ
A6P1-C-04-4	0.758 J	0.850 -	0.860 -	0.850 -	5.19 -	12.5 U	3.95 J	0.404 -	3.9 U	3.9 UJ
A6P1-C-04-6	0.786 J	0.875 -	0.878 -	0.875 -	6.30 -	11.8 U	4.99 J	0.518 -	1.6 J	4.0 UJ
A6P1-C-04-7	0.694 J	0.729 -	0.744 -	0.729 -	6.25 -	9.07 U	4.04 J	0.446 -	19.7 U	19.7 UJ
A6P1-C-04-8	0.889 J	1.17 -	1.16 -	1.17 -	5.01 -	5.23 U	4.77 J	0.755 -	3.9 U	3.9 UJ
A6P1-C-04-9	0.929 J	1.30 -	1.32 -	1.30 -	6.80 -	8.19 U	3.72 J	0.863 -	3.9 U	3.9 UJ
A6P1-C-04-10	0.808 J	1.09 -	1.07 -	1.09 -	3.50 J	16.0 U	4.66 J	0.823 -	3.9 U	3.9 UJ
A6P1-C-04-11	0.981 J	0.981 -	0.967 -	0.981 -	4.77 -	11.5 U	7.23 J	0.803 -	4.1 U	4.1 UJ
A6P1-C-04-13	1.22 J	1.25 -	1.26 -	1.25 -	6.71 -	15.3 U	8.34 J	0.817 -	18.7 -	4.1 J
A6P1-C-04-15	1.01 J	1.14 -	1.14 -	1.14 -	5.76 -	15.3 U	6.22 J	0.650 -	4.3 U	4.3 UJ
A6P1-C-04-16	1.07 J	1.13 -	1.15 -	1.13 -	6.35 -	12.0 U	5.66 J	0.676 -	38.7 U	38.7 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.22	1.44	1.43	1.44	6.8	16 U	8.34	0.863	18.7	4.1
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	8	11
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	67%	92%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 5

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-05-1	0.600 -	0.467 -	0.483 -	0.467 -	2.03 -	8.27 U	5.42 -	0.393 -	3.5 U	2.9 J
A6P1-C-05-2	0.703 -	0.528 -	0.495 -	0.528 -	4.10 -	10.1 U	6.00 -	0.488 -	3.7 U	3.7 U
A6P1-C-05-4	0.591 -	0.381 -	0.384 -	0.381 -	1.69 -	7.79 U	4.23 -	0.271 -	3.7 U	3.7 U
A6P1-C-05-4-D	0.591 -	0.443 -	0.456 -	0.443 -	2.65 -	8.24 U	5.06 -	0.308 -	3.6 U	3.6 U
A6P1-C-05-5	0.751 -	0.570 -	0.617 -	0.570 -	3.61 -	3.78 U	3.37 -	0.320 -	3.6 U	3.6 U
A6P1-C-05-6	0.568 -	0.443 -	0.446 -	0.443 -	3.76 -	6.52 U	4.50 -	0.282 -	3.6 U	3.6 U
A6P1-C-05-8	0.893 -	0.798 -	0.804 -	0.798 -	4.32 -	6.84 U	6.83 -	0.633 -	3.9 U	3.9 U
A6P1-C-05-9	1.14 -	1.24 -	1.27 -	1.24 -	5.98 -	11.7 U	5.46 -	0.933 -	4.1 U	4.1 U
A6P1-C-05-10	0.718 -	0.700 -	0.703 -	0.700 -	2.93 -	10.9 U	6.53 -	0.658 -	3.7 U	3.7 U
A6P1-C-05-11	1.02 -	1.09 -	1.08 -	1.09 -	4.82 -	14.1 U	7.87 -	0.785 -	4.0 U	4.0 U
A6P1-C-05-13	1.05 -	1.17 -	1.18 -	1.17 -	7.99 -	12.2 U	7.05 -	0.819 -	4.4 U	4.4 U
A6P1-C-05-15	0.913 -	0.923 -	0.912 -	0.923 -	3.71 -	14.1 U	6.11 -	0.619 -	3.9 U	3.9 U
A6P1-C-05-16	1.02 -	0.986 -	0.980 -	0.986 -	5.64 -	6.89 U	4.55 -	0.749 -	4.1 U	25.8 -
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.14	1.24	1.27	1.24	7.99	14.1 U	7.87	0.933	4.4 U	25.8
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	12	10
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	100%	83%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 6

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-06-1	0.890 -	0.853 -	0.849 -	0.853 -	12.7 J	7.40 U	6.82 J	0.601 J	6.7 -	1.7 J
A6P1-C-06-2	0.959 -	0.878 -	0.833 -	0.878 -	14.6 J	4.46 U	5.60 J	0.527 J	3.5 J	2.0 J
A6P1-C-06-2-D	1.03 -	0.969 -	0.966 -	0.969 -	19.6 J	9.24 J	6.79 J	0.570 J	4.2 U	3.5 J
A6P1-C-06-4	0.754 -	0.660 -	0.671 -	0.660 -	13.0 J	9.21 U	6.83 J	0.546 J	4.3 U	4.3 U
A6P1-C-06-5	0.861 -	0.792 -	0.800 -	0.792 -	16.3 J	10.7 U	7.16 J	0.563 J	4.6 UJ	4.6 UJ
A6P1-C-06-7	0.913 -	0.811 -	0.825 -	0.811 -	19.1 J	7.51 U	5.56 J	0.442 J	4.3 U	4.3 U
A6P1-C-06-8	0.770 -	0.720 -	0.725 -	0.720 -	16.1 J	6.90 U	5.50 J	0.466 J	18.4 J	6.4 J
A6P1-C-06-10	1.05 -	1.24 -	1.26 -	1.24 -	6.19 J	9.65 U	10.6 J	0.892 J	4.3 UJ	4.3 UJ
A6P1-C-06-11	1.06 -	1.01 -	0.998 -	1.01 -	15.0 J	14.5 U	6.15 J	0.600 J	4.3 U	4.3 U
A6P1-C-06-12	0.901 -	0.746 -	0.751 -	0.746 -	4.04 J	5.16 U	7.08 J	0.413 J	4.0 U	4.0 U
A6P1-C-06-14	0.606 -	0.350 -	0.350 -	0.350 -	3.39 J	7.23 U	3.10 J	0.172 J	3.8 UJ	3.8 UJ
A6P1-C-06-15	0.755 -	0.554 -	0.569 -	0.554 -	3.50 J	8.73 U	5.55 J	0.396 J	4.2 U	2.1 J
A6P1-C-06-16	0.687 -	0.518 -	0.513 -	0.518 -	4.28 J	9.99 U	6.14 J	0.265 J	3.8 U	3.8 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.06	1.24	1.26	1.24	19.6	9.24	10.6	0.892	18.4	6.4
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	11	0	0	9	8
% Nondetects	0%	0%	0%	0%	0%	92%	0%	0%	75%	67%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 7

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-07-1	0.961 -	1.04 -	1.01 -	1.04 -	12.5 J	7.10 U	7.78 -	0.753 -	2.3 J	4.8 U
A6P1-C-07-2	0.893 -	0.828 -	0.827 -	0.828 -	8.30 J	12.6 U	6.63 -	0.538 -	4.6 U	4.6 U
A6P1-C-07-4	0.888 -	0.776 -	0.757 -	0.776 -	3.58 J	13.8 U	4.99 -	0.464 -	4.0 U	4.0 U
A6P1-C-07-5	0.807 -	0.714 -	0.718 -	0.714 -	4.53 J	11.9 U	5.98 -	0.488 -	4.0 U	4.0 U
A6P1-C-07-7	0.852 -	0.798 -	0.791 -	0.798 -	2.45 J	7.10 U	7.15 -	0.585 -	4.0 U	4.0 U
A6P1-C-07-8	0.845 -	0.823 -	0.822 -	0.823 -	4.38 J	13.9 U	6.66 -	0.542 -	4.0 U	4.0 U
A6P1-C-07-9	0.660 -	0.580 -	0.576 -	0.580 -	8.04 J	11.3 U	4.89 -	0.424 -	2.7 J	4.1 U
A6P1-C-07-10	0.639 -	0.525 -	0.528 -	0.525 -	10.1 J	11.7 U	24.3 -	0.395 -	3.0 J	2.1 J
A6P1-C-07-11	0.946 -	0.948 -	0.923 -	0.948 -	12.5 J	14.6 U	7.89 -	0.738 -	4.4 U	4.4 U
A6P1-C-07-13	1.03 -	1.08 -	1.11 -	1.08 -	21.0 J	12.4 U	10.3 -	0.829 -	2.9 J	4.8 U
A6P1-C-07-13-D	1.10 -	1.16 -	1.18 -	1.16 -	19.9 J	14.1 U	12.1 -	1.04 -	4.6 U	4.6 U
A6P1-C-07-15	0.866 -	0.893 -	0.893 -	0.893 -	10.6 J	10.6 U	5.76 -	0.537 -	4.5 U	4.5 U
A6P1-C-07-16	0.960 -	1.03 -	1.03 -	1.03 -	22.0 J	7.19 U	5.24 -	0.499 -	3.1 J	4.8 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.1	1.16	1.18	1.16	22	14.6 U	24.3	1.04	3.1	2.1
Max. >= Limit	No	No	No	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	< 0.01% (LN)	--	--	--
Test Procedure	--	--	--	--	--	--	Median (Sign)	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	7	11
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	58%	92%
Est. Mean*	--	--	--	--	--	--	6.65	--	--	--
UCL	--	--	--	--	--	--	7.78	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	Pass	--	--	--
a posteriori Sample	--	--	--	--	--	--	9	--	--	--
Size calculation	--	--	--	--	--	--	Pass	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-08-1	0.853 -	0.856 -	0.853 J	0.856 -	6.64 -	4.2 U	5.58 -	0.526 J	4.0 U	4.0 U
A6P1-C-08-3	1.01 -	1.26 -	1.27 J	1.26 -	6.64 -	2.87 U	12.3 -	0.855 J	4.6 U	4.6 U
A6P1-C-08-4	0.861 -	0.780 -	0.766 J	0.780 -	5.75 -	14.5 U	7.86 -	0.619 J	4.3 U	4.3 U
A6P1-C-08-5	0.830 -	0.737 -	0.746 J	0.737 -	6.29 -	3.63 U	5.15 -	0.494 J	3.9 U	3.9 U
A6P1-C-08-6	0.804 -	0.808 -	0.805 J	0.808 -	6.95 -	12.6 U	5.42 -	0.463 J	4.0 U	4.0 U
A6P1-C-08-8	0.918 -	0.753 -	0.848 J	0.753 -	6.08 -	6.22 U	6.01 -	0.461 J	4.0 U	4.0 U
A6P1-C-08-10	0.956 -	0.899 -	0.899 J	0.899 -	5.36 -	5.62 U	7.51 -	0.740 J	4.2 U	4.2 U
A6P1-C-08-10-D	1.02 -	0.930 -	0.928 J	0.930 -	5.55 -	5.52 U	5.47 -	0.566 J	4.3 U	4.3 U
A6P1-C-08-11	0.986 -	1.07 -	1.08 J	1.07 -	3.23 -	10.2 U	10.2 -	0.804 J	4.2 UJ	4.2 UJ
A6P1-C-08-12	0.938 -	0.741 -	0.752 J	0.741 -	4.45 -	5.47 U	7.24 -	0.518 J	4.1 U	4.1 U
A6P1-C-08-14	0.762 -	0.670 -	0.667 J	0.670 -	4.24 -	13.7 U	6.09 -	0.483 J	3.7 U	3.7 U
A6P1-C-08-15	0.779 -	0.763 -	0.784 J	0.763 -	3.88 -	11.6 U	3.85 -	0.309 J	3.8 U	3.8 U
A6P1-C-08-16	0.969 -	0.778 -	0.768 J	0.778 -	5.38 -	8.31 U	3.48 -	0.637 J	4.0 U	4.0 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.02	1.26	1.27	1.26	6.95	14.5 U	12.3	0.855	4.6 U	4.6 U
Max. >= Limit	No	No	No	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	91.1% (LN)	--	--	--
Test Procedure	--	--	--	--	--	--	Lognormal	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	12	12
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	100%	100%
Est. Mean*	--	--	--	--	--	--	6.76	--	--	--
UCL	--	--	--	--	--	--	7.94	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	pass	--	--	--
a posteriori Sample	--	--	--	--	--	--	3	--	--	--
Size calculation	--	--	--	--	--	--	Pass	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

CERTIFICATION UNIT 9

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-09-1	1.08 -	0.904 -	0.897 -	0.904 -	7.39 -	11.3 U	6.68 -	0.686 -	4.4 UJ	4.4 UJ
A6P1-C-09-2	1.20 -	1.00 -	1.01 -	1.00 -	8.68 -	12.9 U	5.30 -	0.696 -	4.5 UJ	4.5 UJ
A6P1-C-09-3	0.863 -	0.795 -	0.797 -	0.795 -	5.10 -	10.7 U	6.26 -	0.670 -	4.0 UJ	4.0 UJ
A6P1-C-09-5	1.25 -	0.995 -	0.999 -	0.995 -	15.7 -	6.24 U	6.79 -	0.781 -	4.7 UJ	4.7 UJ
A6P1-C-09-6	0.708 -	0.738 -	0.754 -	0.738 -	5.62 -	4.11 U	6.86 -	0.560 -	4.0 UJ	4.0 UJ
A6P1-C-09-6-D	0.834 -	0.804 -	0.807 -	0.804 -	5.74 -	5.66 U	5.88 -	0.560 -	4.0 UJ	4.0 UJ
A6P1-C-09-8	1.17 -	1.01 -	1.00 -	1.01 -	6.42 -	12.2 U	8.29 -	0.684 -	2.5 J	4.2 UJ
A6P1-C-09-9	1.09 -	0.912 -	0.903 -	0.912 -	3.71 -	10.4 U	6.53 -	0.697 -	4.2 UJ	4.2 UJ
A6P1-C-09-11	0.976 -	0.880 -	0.901 -	0.880 -	5.03 -	11.7 U	6.63 -	0.611 -	4.1 UJ	4.1 UJ
A6P1-C-09-12	1.33 -	1.17 -	1.20 -	1.17 -	6.56 -	11.3 U	7.67 -	0.729 -	4.2 UJ	4.2 UJ
A6P1-C-09-13	1.12 -	0.797 -	0.806 -	0.797 -	5.57 -	11.4 U	7.73 -	0.597 -	2.3 J	4.0 UJ
A6P1-C-09-15	1.57 -	1.16 -	1.17 -	1.16 -	4.95 -	6.14 U	14.6 -	0.970 -	4.2 UJ	4.2 UJ
A6P1-C-09-16	0.874 -	0.695 -	0.699 -	0.695 -	5.19 -	9.67 U	5.90 -	0.497 -	4.0 UJ	4.0 UJ
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.57	1.17	1.2	1.17	15.7	12.9 U	14.6	0.97	2.5	4.7 UJ
Max. >= Limit	No	No	No	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	< 0.01% (LN)	--	--	--
Test Procedure	--	--	--	--	--	--	Median (Sign)	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	10	12
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	83%	100%
Est. Mean*	--	--	--	--	--	--	6.74	--	--	--
UCL	--	--	--	--	--	--	7.67	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	Pass	--	--	--
a posteriori Sample	--	--	--	--	--	--	5	--	--	--
Size calculation	--	--	--	--	--	--	Pass	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 10

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-10-2	0.881 -	0.903 -	0.904 -	0.903 -	6.03 J	13.4 U	6.29 -	0.651 J	4.1 U	4.1 U
A6P1-C-10-3	0.878 -	0.846 -	0.838 -	0.846 -	5.13 J	9.27 U	6.51 -	0.595 J	4.0 U	4.0 U
A6P1-C-10-4	1.07 -	1.03 -	1.06 -	1.03 -	7.77 J	11.7 U	6.56 -	0.633 J	4.5 U	19.3 -
A6P1-C-10-5	0.822 -	0.651 -	0.641 -	0.651 -	5.42 J	6.37 U	3.27 -	0.448 J	4.0 UJ	4.0 UJ
A6P1-C-10-6	0.918 -	0.785 -	0.803 -	0.785 -	3.99 J	4.66 U	11.1 -	0.658 J	3.9 U	3.9 U
A6P1-C-10-8	1.11 -	1.01 -	0.986 -	1.01 -	3.31 J	10.8 U	17.1 -	0.810 J	4.1 U	4.1 U
A6P1-C-10-9	0.980 -	1.02 -	1.01 -	1.02 -	4.82 J	7.42 U	3.93 -	0.342 J	4.4 U	4.4 U
A6P1-C-10-10	0.941 -	0.835 -	0.834 -	0.835 -	6.23 J	15.1 U	8.60 -	0.682 J	4.0 U	9.7 -
A6P1-C-10-11	1.02 -	0.850 -	0.868 -	0.850 -	2.12 UJ	12.7 U	6.37 -	0.609 J	4.1 UJ	4.1 UJ
A6P1-C-10-11-D	0.954 -	0.931 -	0.906 -	0.931 -	4.86 J	13.8 U	6.30 -	0.524 J	4.0 U	4.0 U
A6P1-C-10-14	0.894 -	0.965 -	0.945 -	0.965 -	5.79 J	16.9 U	5.41 -	0.527 J	4.2 U	4.2 U
A6P1-C-10-15	1.06 -	1.01 -	0.992 -	1.01 -	6.18 J	7.52 U	7.70 -	0.626 J	4.2 U	3.5 J
A6P1-C-10-16	0.824 -	0.825 -	0.818 -	0.825 -	4.33 J	5.44 U	7.33 -	0.532 J	4.2 U	4.2 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.11	1.03	1.06	1.03	7.77	16.9 U	17.1	0.81	4.5 U	19.3
Max. >= Limit	No	No	No	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	65.4% (LN)	--	--	--
Test Procedure	--	--	--	--	--	--	Lognormal	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	0	9
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	0%	75%
Est. Mean*	--	--	--	--	--	--	7.54	--	--	--
UCL	--	--	--	--	--	--	9.20	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	pass	--	--	--
a posteriori Sample	--	--	--	--	--	--	4	--	--	--
Size calculation	--	--	--	--	--	--	Pass	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 11

	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-11-1	0.945 -	0.848 -	0.842 -	0.848 -	8.91 J	12.5 U	5.91 J	0.491 -	2.5 J	3.8 U
A6P1-C-11-2	0.962 -	0.941 -	0.959 -	0.941 -	7.42 J	9.96 U	4.95 J	0.445 -	2.0 J	1.6 J
A6P1-C-11-3	1.14 -	1.15 -	1.15 -	1.15 -	13.3 J	6.21 U	6.71 J	0.819 -	3.9 U	3.9 U
A6P1-C-11-5	0.773 -	0.715 -	0.719 -	0.715 -	19.4 J	11.2 U	4.64 J	0.347 -	4.1 -	1.5 J
A6P1-C-11-6	0.660 -	0.511 -	0.518 -	0.511 -	4.30 J	8.85 U	3.82 J	0.219 -	3.6 U	3.6 U
A6P1-C-11-7	0.809 -	0.630 -	0.636 -	0.630 -	4.28 J	11.3 U	4.43 J	0.349 -	3.6 U	3.6 U
A6P1-C-11-9	0.838 -	0.717 -	0.727 -	0.717 -	8.77 J	4.94 U	7.17 J	0.519 -	3.8 U	3.8 U
A6P1-C-11-9-D	0.814 -	0.759 -	0.751 -	0.759 -	6.54 J	6.16 U	6.82 J	0.456 -	3.8 U	3.8 U
A6P1-C-11-10	0.892 -	0.840 -	0.807 -	0.840 -	8.01 J	12.0 U	5.53 J	0.520 -	3.9 U	3.9 U
A6P1-C-11-12	0.969 -	0.865 -	0.848 -	0.865 -	6.25 J	12.8 U	3.49 J	0.423 -	3.8 U	3.8 U
A6P1-C-11-14	0.886 -	0.940 -	0.946 -	0.940 -	5.78 J	11.1 U	5.52 J	0.646 -	3.8 U	3.8 U
A6P1-C-11-15	0.764 -	0.621 -	0.614 -	0:621 -	5.91 J	10.6 U	5.57 J	0.302 -	3.7 U	3.7 U
A6P1-C-11-16	0.808 -	0.748 -	0.748 -	0.748 -	4.02 J	10.5 U	6.87 J	0.431 -	3.8 U	3.8 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.14	1.15	1.15	1.15	19.4	12.8 U	7.17	0.819	4.1	1.6
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	9	10
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	75%	83%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-12-2	0.659 -	0.592 -	0.598 -	0.592 -	4.55 J	5.83 U	6.35 -	0.398 -	3.9 U	3.9 U
A6P1-C-12-3	0.707 -	0.695 -	0.694 -	0.695 -	5.05 J	9.28 U	5.65 -	0.507 -	4.0 U	4.0 U
A6P1-C-12-4	0.759 -	0.761 -	0.747 -	0.761 -	5.36 J	8.98 U	6.27 -	0.540 -	4.0 U	4.0 U
A6P1-C-12-5	0.816 -	0.721 -	0.726 -	0.721 -	6.95 -	3.13 U	4.48 -	0.542 -	4.0 U	4.0 U
A6P1-C-12-5-D	0.797 -	0.726 -	0.729 -	0.726 -	7.69 -	4.07 U	5.37 -	0.469 -	4.1 U	4.1 U
A6P1-C-12-6	0.751 -	0.711 -	0.725 -	0.711 -	4.70 J	9.69 U	4.89 -	0.588 -	3.8 U	3.8 U
A6P1-C-12-8	0.689 -	0.738 -	0.724 -	0.738 -	8.60 -	25.7 U	6.35 -	0.577 -	4.0 U	4.0 U
A6P1-C-12-10	0.756 -	0.711 -	0.705 -	0.711 -	5.00 -	8.42 U	4.90 -	0.605 -	3.8 U	3.8 U
A6P1-C-12-11	0.803 -	0.723 -	0.716 -	0.723 -	2.92 J	11.8 U	5.66 -	0.589 -	3.8 U	3.8 U
A6P1-C-12-12	0.805 -	0.716 -	0.716 -	0.716 -	4.27 J	6.14 U	4.67 -	0.524 -	3.8 U	3.8 U
A6P1-C-12-13	0.915 -	1.13 -	1.15 -	1.13 -	31.5 -	12.9 U	6.05 -	0.602 -	4.0 U	4.0 U
A6P1-C-12-14	0.813 -	0.750 -	0.750 -	0.750 -	11.3 -	4.96 U	5.40 -	0.496 -	2.4 J	4.0 U
A6P1-C-12-15	0.822 -	0.835 -	0.848 -	0.835 -	8.98 -	5.19 U	5.61 -	0.550 -	3.3 J	4.0 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	0.915	1.13	1.15	1.13	31.5	25.7 U	6.35	0.605	3.3	4.1 U
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	10	12
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	83%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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	Primary COCs					Secondary COCs				
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-13-1	0.873 -	0.869 -	0.882 -	0.869 -	9.66 -	10.8 U	4.5 -	0.477 -	3.9 J	4.0 U
A6P1-C-13-3	0.840 -	0.754 -	0.762 -	0.754 -	12.3 -	6.65 U	5.08 -	0.483 -	4.0 U	4.0 U
A6P1-C-13-4	0.913 -	0.877 -	0.911 -	0.877 -	10.8 -	7.56 U	5.24 -	0.574 -	3.6 J	4.1 U
A6P1-C-13-5	0.774 -	0.771 -	0.787 -	0.771 -	8.01 -	4.86 U	6.22 -	0.555 -	4.1 U	4.1 U
A6P1-C-13-7	0.849 -	0.800 -	0.805 -	0.800 -	10.1 -	5.82 U	5.15 -	0.525 -	3.6 J	4.2 U
A6P1-C-13-8	0.765 -	0.694 -	0.697 -	0.694 -	5.40 -	6.40 U	5.61 -	0.571 -	4.0 U	4.0 U
A6P1-C-13-1-D	0.781 -	0.762 -	0.763 -	0.762 -	8.40 -	5.50 U	5.50 -	0.494 -	2.5 J	4.1 U
A6P1-C-13-10	0.743 -	0.727 -	0.720 -	0.727 -	3.66 -	2.55 U	5.56 -	0.567 -	4.1 U	4.1 U
A6P1-C-13-11	0.691 -	0.651 -	0.656 -	0.651 -	3.76 -	6.33 U	5.28 -	0.453 -	3.9 U	3.9 U
A6P1-C-13-12	0.831 -	0.792 -	0.838 -	0.792 -	7.20 -	7.55 U	5.61 -	0.539 -	4.0 U	4.0 U
A6P1-C-13-13	0.711 -	0.700 -	0.702 -	0.700 -	4.35 -	6.00 U	5.13 -	0.428 -	3.9 U	3.9 U
A6P1-C-13-14	0.838 -	0.790 -	0.806 -	0.790 -	6.68 -	6.79 U	5.39 -	0.505 -	4.0 UJ	4.0 UJ
A6P1-C-13-15	0.752 -	0.754 -	0.748 -	0.754 -	7.02 -	8.07 U	5.23 -	0.478 -	4.1 U	4.1 U
Limit	1.7	1.8	1.7	1.5	82	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	0.913	0.877	0.911	0.877	12.3	10.8 U	6.22	0.574	3.9	4.2 U
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	8	12
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	67%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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CERTIFICATION UNIT 14

	Primary COCs					Secondary COCs					
Sample ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Thorium-230	Arsenic	Beryllium	Aroclor-1254	Aroclor-1260
A6P1-C-14-1	1.04 J	1.13 J	1.13 J	1.13 J	5.07 -	0.0552 U	14.9 U	3.92 -	0.459 -	3.9 U	3.9 U
A6P1-C-14-2	1.02 J	1.04 J	1.04 J	1.04 J	5.72 -	0.0215 U	6.35 U	4.50 -	0.380 -	4.1 U	4.1 U
A6P1-C-14-3	1.09 J	1.21 J	1.23 J	1.21 J	5.88 -	0.0193 U	6.04 U	7.34 -	0.453 -	3.9 U	3.9 U
A6P1-C-14-5	1.08 J	1.24 J	1.22 J	1.24 J	5.82 -	0.0366 U	11.2 U	11.4 -	0.954 -	4.1 U	4.1 U
A6P1-C-14-5-D	1.41 J	1.56 J	1.56 J	1.56 J	7.35 -	0.0471 U	13.8 U	15.9 -	1.10 -	4.3 U	4.3 U
A6P1-C-14-7	0.918 J	0.973 J	0.959 J	0.973 J	5.48 -	0.0434 U	5.47 U	6.16 -	0.758 -	3.8 U	3.8 U
A6P1-C-14-8	0.957 J	1.52 J	1.52 J	1.52 J	4.24 -	0.0703 U	7.69 U	4.08 -	0.934 -	4.2 U	4.2 U
A6P1-C-14-9	1.05 J	1.22 J	1.22 J	1.22 J	5.60 -	0.0348 U	11.3 U	3.43 -	0.788 -	4.0 U	4.0 U
A6P1-C-14-10	0.914 J	1.40 J	1.43 J	1.40 J	5.85 -	0.0327 U	13.5 U	3.93 -	0.909 -	4.2 U	4.2 U
A6P1-C-14-12	0.914 J	1.29 J	1.30 J	1.29 J	5.58 -	0.0426 U	11.9 U	2.93 -	0.700 -	4.1 U	4.1 U
A6P1-C-14-13	0.894 J	1.17 J	1.17 J	1.17 J	11.6 -	0.479 -	6.43 U	4.34 -	0.752 -	7.0 -	3.5 J
A6P1-C-14-14	0.901 J	1.26 J	1.26 J	1.26 J	5.50 -	0.0966 U	10.3 U	3.81 -	0.843 -	4.2 U	4.2 U
A6P1-C-14-15	0.957 J	1.33 J	1.34 J	1.33 J	4.45 -	0.0479 U	15.6 U	3.40 -	0.738 -	4.0 U	4.0 U
Limit	1.7	1.8	1.7	1.5	82	1.4	280	12	1.50	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	ug/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%
Max. Result	1.41	1.56	1.56	1.56	11.6	0.479	15.6 U	15.9	1.1	7	3.5
Max. >= Limit	No	No	No	Yes	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	95.9% (LN)	--	--	--	< 0.01% (LN)	--	--	--
Test Procedure	--	--	--	Lognormal	--	--	--	Median (Sign)	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	11	12	0	0	11	11
% Nondetects	0%	0%	0%	0%	0%	92%	100%	0%	0%	92%	92%
Est. Mean*	--	--	--	1.26	--	--	--	4.01	--	--	--
UCL	--	--	--	1.36	--	--	--	4.50	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	pass	--	--	--	Pass	--	--	--
a posteriori Sample	--	--	--	5	--	--	--	5	--	--	--
Size calculation	--	--	--	Pass	--	--	--	Pass	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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	Secondary COCs			
Sample ID	Bezene	Toluene	Ethylbenzene	Xylenes, Total
FTFOSLSM6-1	0.011 U	0.011 U	0.011 U	0.033 U
FTFOSLSM6-2	0.011 U	0.011 U	0.011 U	0.032 U
FTFOSLSM6-3	0.011 U	0.011 U	0.011 U	0.033 U
FTFOSLSM6-4	0.009 U	0.009 U	0.009 U	0.027 U
FTFOSLSM6-5	0.012 U	0.012 U	0.012 U	0.036 U
FTFOSLSM6-6	0.013 U	0.013 U	0.013 U	0.038 U
FTFOSLSM6-7	0.011 U	0.011 U	0.011 U	0.032 U
FTFOSLSM6-8	0.012 U	0.012 U	0.012 U	0.036 U
Limit				
Units	mg/kg	mg/kg	mg/kg	mg/kg
Conf. Level	90%	90%	90%	90%
Max. Result	0.013 U	0.013 U	0.013 U	0.038 U
Max. >= Limit	No	No	No	No
W-statistic Prob. #	--	--	--	--
Test Procedure	--	--	--	--
Sample Size	12	12	12	12
Nondetects	12	12	12	12
% Nondetects	100%	100%	100%	100%
Est. Mean*	--	--	--	--
UCL	--	--	--	--
Prob. > Limit	--	--	--	--
Pass / Fail	--	--	--	--

a posteriori Sample	--	--	--	--
Size calculation	--	--	--	--

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

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APPENDIX B

VARIANCE/FIELD CHANGE NOTICES FOR THE A6PI CERTIFICATION PSP

VARIANCE/FIELD CHANGE NOTICE LOG FOR THE PROJECT SPECIFIC PLAN FOR AREA 6, PHASE I CERTIFICATION SAMPLING

Variance No.	Variance Date	Variance Description	Significant? (Y or N)	Date Signed	Date Distributed	EPA/OEPA Approval
20600-PSP-0004-1	8/06/03	Documents the re-collection of soil samples from CU 1 for metals, PCBs, PAHs, and VOCs. Samples previously collected arrived at offsite lab 2 days late and out of proper temperature range.	N	8/07/03	8/07/03	N/A
20600-PSP-0004-2	9/02/03	Documents the moves of three borings. All new locations were verified against the Minimum Distance Criteria and have no conflicts.	Y	9/02/03	9/03/03	9/03/03
20600-PSP-0004-3	9/10/03	Samples are being collected to bound the above-FRL arsenic area laterally and vertically.	Y	9/10/03	9/10/03	9/10/03
20600-PSP-0004-4	9/10/03	The two borings will be sampled to confirm that activities associated with the rail yard are not adversely impacting the soil in CU2.	Y	9/10/03	9/10/03	9/10/03

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VARIANCE / FIELD CHANGE NOTICE

Significant? (Yes or No) NO

V/F: 20600-PSP-0004-1

WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0

PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling

Date: 08/06/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the resampling of surface samples in Certification Unit (CU) 1 for Area 6, Phase I (A6PI).

On July 29 and 31, 2003, all samples for CU 1, as specified in the PSP, were collected. Samples were shipped on July 31, 2003 but did not arrive at the offsite laboratory until August 4, 2003. Upon arrival at the offsite laboratory, the temperature of the samples was approximately 22° C. Samples collected for Metals/PCBs/PAHs (TAL D) and VOCs (TAL F) were required to be kept between 2° and 6° C. Since this did not happen, the samples are to be recollected. The samples for TAL F are to be collected and identified as specified in the PSP. The samples for TAL D only require about 250 grams of soil for analysis and the suite identifier in the sample ID will be "^MPS". See Attachment 1 for a new list of the sample IDs for the TAL D samples.

Samples collected for radiological analysis (TAL C) did not require temperature preservation, and the offsite laboratory was instructed to proceed with analysis. Since each sample for TAL C and TAL D were included in one container with one sample ID, the suite identifier will be changed in the sample ID to be "^R" to reflect that only TAL C (radiological) will be analyzed from the samples that were collected on July 29 and 31, 2003. See Attachment 1 for a new list of the sample IDs for the TAL C samples.

One trip blank will be required and rinsates are also to be collected for this sampling event. The sample IDs are to be identified as specified in the PSP. Samples submitted under this V/FCN will be analyzed to ASL D requirements. Field validation is required and the analytical data is to be validated to VSL D, as specified in the PSP.

Justification:

Samples previously collected were not maintained at required temperature during shipment to an offsite laboratory, therefore samples are being recollected.

Per Section 3.4 of the PSP, the changes to the PSP will be documented with a V/FCN

REQUESTED BY: Denise Arico

Date: 08/06/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: K. Foster	8/7/03	X	PROJECT MANAGER: J.D. Chiou	8/7/03
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: Miller	8/7/03
X	ANALYTICAL CUSTOMER SUPPORT: Madden	8/12/03		RTIMP Manager	
X 8/14/03	WAO		X	Sampling Manager: T. Buhrlage for T.E.B.	8/7/03

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	CHARACTERIZATION MANAGER: Frank Miller	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

ATTACHMENT 1

New Sample IDs for TAL C Samples Collected on July 29 & 31, 2003
A6P1-C-01-1^R
A6P1-C-01-3^R
A6P1-C-01-4^R
A6P1-C-01-5^R
A6P1-C-01-6^R
A6P1-C-01-8^R
A6P1-C-01-9^R
A6P1-C-01-9^R-D
A6P1-C-01-10^R
A6P1-C-01-11^R
A6P1-C-01-13^R
A6P1-C-01-15^R
A6P1-C-01-16^R

New Sample IDs for TAL D Samples Collected under this V/FCN
A6P1-C-01-1^MPS
A6P1-C-01-3^MPS
A6P1-C-01-4^MPS
A6P1-C-01-5^MPS
A6P1-C-01-6^MPS
A6P1-C-01-8^MPS
A6P1-C-01-9^MPS
A6P1-C-01-9^MPS-D
A6P1-C-01-10^MPS
A6P1-C-01-11^MPS
A6P1-C-01-13^MPS
A6P1-C-01-15^MPS
A6P1-C-01-16^MPS

VARIANCE / FIELD CHANGE NOTICE

Significant? (Yes or No): YES

V/F: 20600-PSP-0004-2

WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0

Page: 1 of 1

PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling

Date: 09/02/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance documents the moves of three boring locations. The affected locations and their moves are as follows:

LOCATION	ORIGINAL NORTHING	ORIGINAL EASTING	DISTANCE and DIRECTION MOVED	NEW NORTHING*	NEW EASTING*
A6P1-C-01-13	482574.69	1349411.65	23 feet (ft) East	**482574.69**	**1349434.65**
A6P1-C-02-7	482524.23	1349120.8	27.1 ft East	**482524.25**	**1349147.90**
A6P1-C-09-1	482730.59	1346817.89	11.17 ft West	**482730.59**	**1346806.72**

* Changes are shown in bold.

All new locations were verified against the Minimum Distance Criteria and have no conflicts.

Justification:

As identified in the PSP, a variance must be submitted to document any boring location that is moved a distance greater than 3 feet from the planned location.

1. The original sample location for A6P1-C-01-13 was in a deep and muddy portion of an excavated area. The location was re-located to a flatter surface where a boring could be safely sampled.
2. The original sample location for A6P1-C-02-7 was located under sealand containers. The location was relocated to an accessible area.
3. The original sample location for A6P1-C-09-07 was located in dense shrubbery. The location was relocated to an accessible area.

Per Section 3.4 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 09/02/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: R. Friske	9/3/03	X	PROJECT MANAGER: J.D. Chion	9/3/03
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: F. Miller	9/2/03
X 9/3/03	ANALYTICAL CUSTOMER SUPPORT:			RTIMP Manager	
X 9/3/03	WAD		X	Sampling Manager: T. Buhrlage	9/2/03

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	CHARACTERIZATION MANAGER: Frank Miller	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

VARIANCE / FIELD CHANGE NOTICE	Significant (Yes or No) YES	V/F: 20600-PSP-0004-3
WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0		Page: 1 of 5
PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling		Date: 09/10/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance documents the collection of samples from four bounding borings for a FRL exceedance in CU 7. A two-times FRL arsenic result was identified in boring A6P1-C-07-10.

The bounding borings are as follows:

- A6P1-C-07-17 will be collected five feet north of A6P1-C-07-10.
- A6P1-C-07-18 will be collected five feet east of A6P1-C-07-10.
- A6P1-C-07-19 will be collected five feet south of A6P1-C-07-10.
- A6P1-C-07-20 will be collected five feet west of A6P1-C-07-10.

All four bounding borings will be sampled in the 0-0.5 feet interval. Boring A6P1-C-07-10 will be sampled in three deeper intervals in order to bound the boring at depth. The Sampling and Analytical Requirements are listed in Attachment 1 and the sample information is listed in Attachment 2. See Figure 1 for boring locations.

The first Sample ID is identified as A6P1-C-07-10^2-M.

Where:

A6P1 = Area 6 Phase I
C-07 = CU 7
10 = tenth sample location
^ = differentiates between the location identifier and the sample identifier
2 = depth interval 0.5 – 1 feet
M = metals analysis

Surveying required: Yes
Field QC samples required: No
Field data validation: Yes
Analytical data validation: Yes
Data package requirements: Full data package within 7 days.

The highest total uranium result for this area is 22 mg/kg from boring A6P1-C-07-16.

VARIANCE / FIELD CHANGE NOTICE	Significant? (Yes or No) YES	V/F: 20600-PSP-0004-3
WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0		Page: 1 of 5
PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling		Date: 09/10/03

Justification:
A sample collected under the PSP for this area showed an above-FRL (two-times FRL) concentration in boring A6P1-C-07-10. These borings and samples are being collected to bound the above-FRL area laterally and vertically.

Per Section 3.4 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton Date: 09/10/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: R. Priske	9/10/03	X	PROJECT MANAGER: J.D. Ohlou	9/10/03
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: F. Miller	9/10/03
X	ANALYTICAL CUSTOMER SUPPORT:			RIIMP Manager	
X 9/10/03	WAO		X	Sampling Manager: T. Buhrlage for T.E.B	9/10/03

VARIANCE/FCN APPROVED [X]YES [ ]NO REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	CHARACTERIZATION MANAGER: Frank Miller	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

ATTACHMENT 1
SAMPLING AND ANALYTICAL REQUIREMENTS

TAL 20600-PSP-0004-3-I

COMPONENT	MDL
Arsenic	1.2 mg/kg

Analyte	Sample Matrix	Lab	ASL	TAT*	Preservative	Holding Time	Container	Sample Volume/ Mass
TAL I	Soil	Off-site	D	24 hours	Cool 4°C	6 months	Plastic	50 g

*TAT signifies when the data is due back to the project, irrespective of data entry into the database.

ATTACHMENT 2

Location ID	Northing	Easting	Depth Below Overlying Material	Depth ID*	Analysis	Sample ID
A6P1-C-07-10	482594.08	1347480.98	0.5-1	2	TAL I	A6P1-C-07-10^2-M
			3-3.5	7	TAL I	A6P1-C-07-10^7-M
			3.5-4	8	TAL I	A6P1-C-07-10^8-M
A6P1-C-07-17	482599.08	1347480.98	0-0.5	1	TAL I	A6P1-C-07-17^1-M
A6P1-C-07-18	482594.08	1347485.98	0-0.5	1	TAL I	A6P1-C-07-18^1-M
A6P1-C-07-19	482589.08	1347480.98	0-0.5	1	TAL I	A6P1-C-07-19^1-M
A6P1-C-07-20	482594.08	1347475.98	0-0.5	1	TAL I	A6P1-C-07-20^1-M

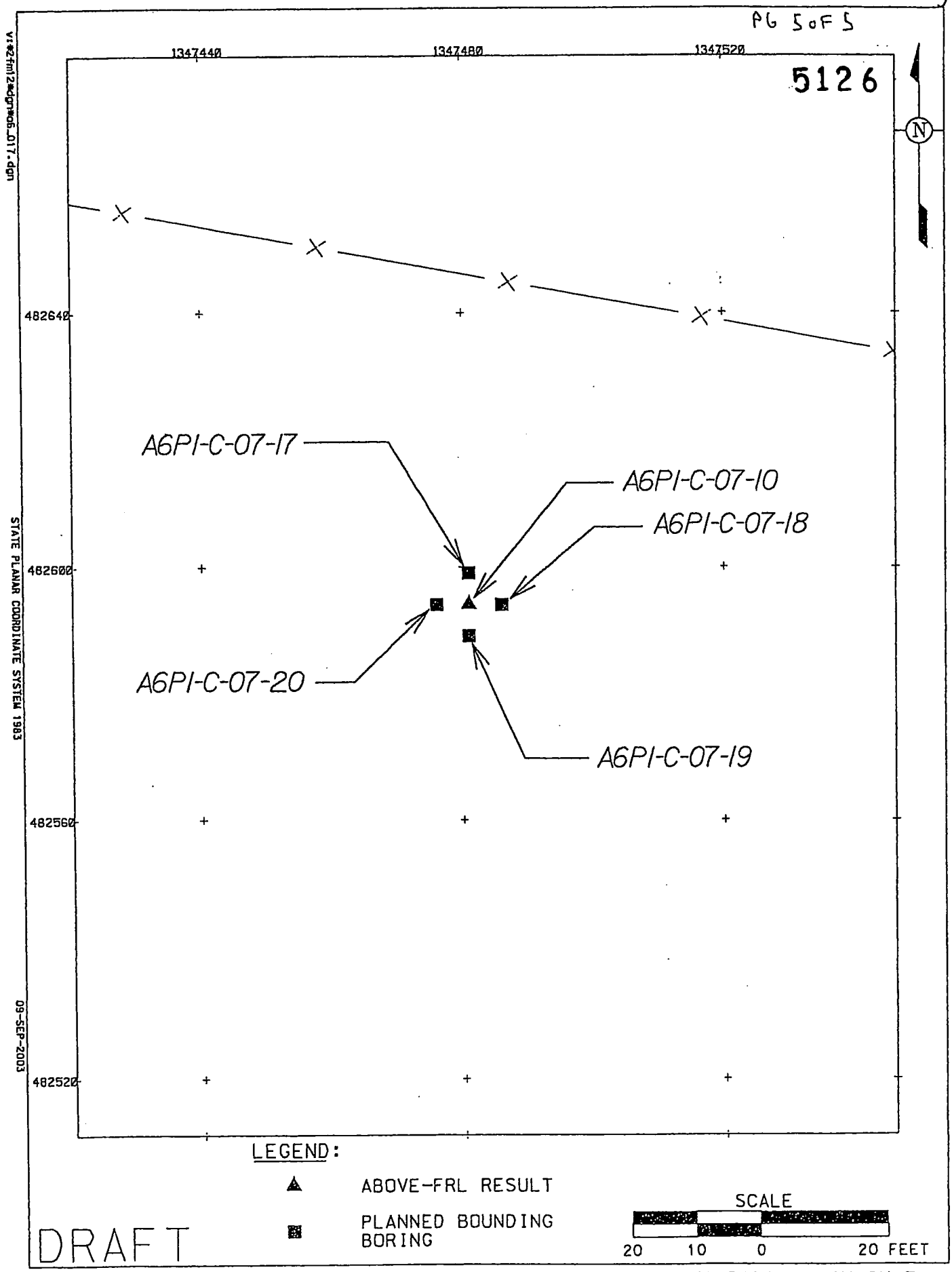

FIGURE 1. ABOVE-FRL LOCATONS AND PLANNED BOUNDING BORINGS IN CU 7

VARIANCE / FIELD CHANGE NOTICE	Significant? (Yes or No) YES	V/F: 20600-PSP-0004-4
WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0		Page: 1 of 6
PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling		Date: 09/10/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):
This Variance documents the collection of samples from two additional borings in CU 2.

The first boring (A6P1-C-02-17) is located under a sealand container. The sealand container will be moved to allow for sampling. The second boring (A6P1-C-02-18) is located under a trailer. Both borings will be field located by the Sampling Team Lead and surveyed after sampling.

Both borings will be sampled in the 0-0.5 feet interval (below overlying material). The Sampling and Analytical Requirements are listed in Attachment 1, target analytes are listed in Attachment 2, and the sample information is listed in Attachment 3. See Figure 1 for boring locations.

The first Sample ID is identified as A6P1-C-02-17^RMPS.

Where:

A6P1 = Area 6 Phase I
C-07 = CU 7
17 = seventeenth sample location
^ = differentiates between the location identifier and the sample identifier
RMPS = Suite Identifier
- "R" for radiological
- "M" for metals
- "P" for PCBs
- "S" for semi-volatiles
- "L" for volatiles

Surveying required: Yes
Field QC samples required: Yes, trip blank
Field data validation: Yes
Analytical data validation: Yes
Data package requirements: Yes

The highest total uranium result for this area is 12.2 mg/kg from boring A6P1-C-03-11.

VARIANCE / FIELD CHANGE NOTICE	Significant (Yes or No) YES	V/F: 20600-PSP-0004-4
WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0004 REV 0		Page: 2 of 6
PROJECT TITLE: Project Specific Plan for Area 6, Phase I Certification Sampling		Date: 09/10/03

Justification:
The two borings will be sampled to confirm that activities associated with the rail yard are not adversely impacting the soil in CU2.

Per Section 3.4 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton Date: 09/~~02~~10/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: R. Priske	9/10/03	X	PROJECT MANAGER: I.D. Chino	9/10/03
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: F. Miller	9/10/03
X	ANALYTICAL CUSTOMER SUPPORT:			RTIMP Manager	
~~X~~ 3/10/03	WAO		X	Sampling Manager: T. Buhrlage for T.E.B	9/10/03

VARIANCE/FCN APPROVED [X]YES [ ]NO REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	CHARACTERIZATION MANAGER: Frank Miller	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

ATTACHMENT 1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Sample Matrix	Lab	ASL	TAT*	Preservative	Holding Time	Container	Sample Volume/ Mass
TAL C (Radiological)	Solid	Off-site	D (E)	30 Day	Cool to 4°C (due to metals and organics)	12 months	Glass w/ Teflon-lined lid (due to PCBs)	500 g
TAL D (Metals, PCBs, PAHs)						6 months (metals) 14 days (PCBs and PAHs)		
TAL G (VOCs)	Solid	Off-site	D (E)	30 Day	Cool to 4°C	14 days	Glass w/ Teflon-lined lid.Fill to minimize headspace.	20 g
TAL G (VOCs)	Liquid (trip blank)	Off-site	D (E)	30 Day	Cool 4°C H_2SO_4 to pH<2	14 days	3-40 ml glass with Teflon-lined septa and no head space	120 mL

*TAT signifies when the data is due back to the project, irrespective of data entry into the database.

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ATTACHMENT 2
TARGET ANALYTE LISTS

TAL 20600-PSP-0004-C

COMPONENT	MDL
Total Uranium	2.0 mg/kg
Thorium-228	0.17 pCi/g
Thorium-230	28 pCi/g
Thorium-232	0.15 pCi/g
Radium-226	0.17 pCi/g
Radium-228	0.18 pCi/g
Technetium-99	3.0 pCi/g

TAL 20600-PSP-0004-D

COMPONENT	MDL
Aroclor-1254	0.013 mg/kg
Aroclor-1260	0.013 mg/kg
Arsenic	1.2 mg/kg
Beryllium	0.15 mg/kg
Benzo(a)anthracene	0.1 mg/kg
Benzo(a)pyrene	0.1 mg/kg
Benzo(b)fluoranthene	0.1 mg/kg
Benzo(g,h,i)perylene	0.1 mg/kg
Benzo(k)fluoranthene	0.1 mg/kg
Chrysene	0.1 mg/kg
Dibenzo(a,h)anthracene	0.0088 mg/kg
Fluoranthene	1.0 mg/kg
Indeno(1,2,3-cd)pyrene	0.1 mg/kg
Phenanthrene	0.5 mg/kg
Pyrene	1.0 mg/kg

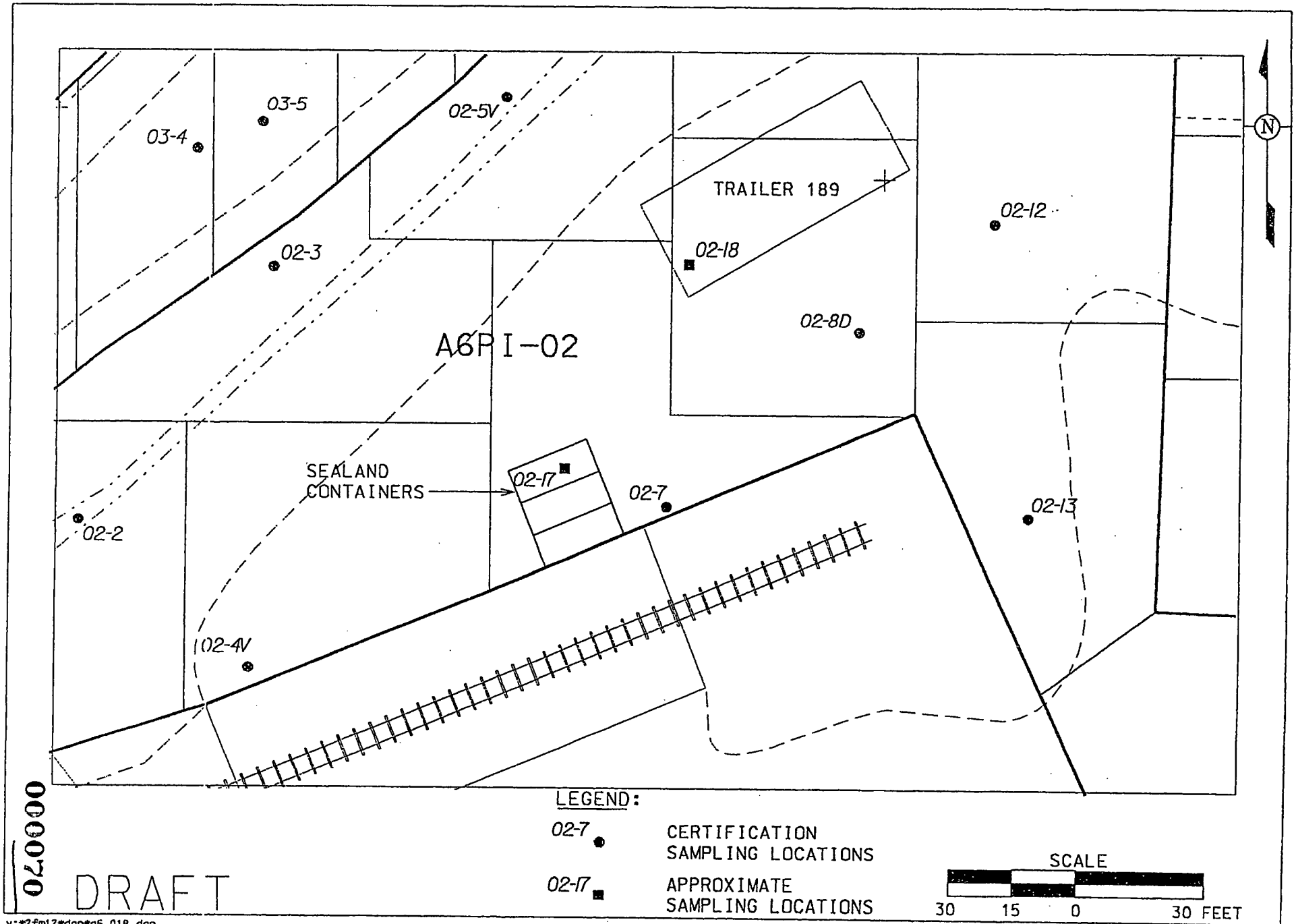
TAL 20600-PSP-0004-G

COMPONENT	MDL (soil)	MDL (water)
1,1-Dichloroethene	0.041 mg/kg	1710 μg/L
Tetrachloroethene	0.36 mg/kg	540 μg/L

ATTACHMENT 3

Location ID	Northing	Easting	Depth Below Overlying Material	Analysis	Sample ID
A6P1-C-02-17	482599.08	1347480.98	0'-0.5'	TAL C&D	A6P1-C-02-17^1-RMPS
			0'-0.5'	TAL G	A6P1-C-02-17^1-L
A6P1-C-02-18	482594.08	1347485.98	0'-0.5'	TAL C&D	A6P1-C-02-18^1-RMPS
			0'-0.5'	TAL G	A6P1-C-02-18^1-L

V/F: 20600-PSP-0004-4
PG: 6 OF 6



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STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 1. ADDITIONAL CERTIFICATION SAMPLING LOCATIONS FOR CU-2

10-SEP-2003

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