CERTIFICATION REPORT FOR AREA 9, PHASE II

FERNALD CLOSURE PROJECT
FERNALD, OHIO

MARCH 2004

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PI	Area 1, Phase I
A1PII	Area 1, Phase II
A9PI	Area 9, Phase I
A9PII	Area 9, Phase II
ASCOC	area-specific constituent of concern
ASL	analytical support level
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
HAMDC	highest allowable minimum detectable concentration
HPGe	high-purity germanium (detector)
ICP-MS	inductively coupled plasma-mass spectroscopy
IEMP	Integrated Environmental Monitoring Plan
LCS	laboratory control sample
MDC	minimum detectable concentration
mg/kg	milligrams per kilogram
NaI	sodium iodide
OSDF	On-Site Disposal Facility
OU	Operable Unit
pCi/g	picoCuries per gram
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RA14	Removal Action 14
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Studies
ROD	Record of Decision
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
TPU	Total Propagated Uncertainty
UCL	Upper Confidence Level
V&V	verification and validation
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria

EXECUTIVE SUMMARY

Area 9, Phase II (A9PII) underwent the certification process during the spring of 2003. The results of the process indicated that 8 of 11 certification units (CUs) have below-final remediation level (FRL) conditions for all constituents of concern (COCs). The three remaining CUs have special conditions associated with beryllium soil concentrations due to previous removal actions that left subsurface soil on the ground surface. However, these beryllium levels are within the background levels. All other COCs are below their respective FRLs. The subsurface conditions in the plowed area for all COCs are consistent with and/or within the background conditions. This Certification Report presents the certification results and the factors considered by the U.S. Department of Energy (DOE) to determine that soils in A9PII do not require remediation.

A9PII totals 12.9 acres. 12.6 acres are off-property located south of Area 9, Phase I (A9PI) and east of Area 1, Phase II (A1PII), along the eastern property boundary of the FCP; and 0.3 acres are located north of Area 1, Phase I (A1PI) and is situated between the northern FCP fence line and State Route 126. Both areas are addressed in this report since they are adjacent to on-property areas that were excavated for remediation purposes and therefore require certification. Both A1PI and A1PII were remediated and certified between 1997 and 2000.

Portions of A9PII were remediated during Removal Action 14 as discussed in the A9PII Certification Design Letter (DOE 2003a). Consistent with the Sitewide Excavation Plan (SEP, DOE 1998a), this area underwent precertification activities between October 2002 and March 2003, including the use of real-time instrumentation as well as physical sampling and analysis. As discussed in the Certification Design Letter for A9PII, following remediation of the uranium hot spot encountered during precertification activities, it was determined that no additional remediation efforts were necessary prior to certification.

At the request of the Ohio Environmental Protection Agency (OEPA), dioxins were evaluated for their conditions in A9PII. Based on the data obtained during precertification activities, it was concluded that the insignificant concentrations at which dioxins and furans are present in A9PII are well within the acceptable risk level per Environmental Protection Agency (EPA) guidelines, as described in the CDL. Moreover, dioxins and furans are not area-specific constituents of concern (ASCOCs) as prescribed by the Sitewide Excavation Plan. Therefore, dioxins and furans were not included as ASCOCs during the final certification.

The CDL was finalized in December 2003 to address the final certification approach for A9PII, including the subsurface baseline confirmation and the surface certification. Certification sampling was conducted in each CU to verify that the certification criteria set forth in the SEP were achieved. Additionally, composite sampling in the 12 to 36-inch depth interval in the plowed area was performed to confirm that the subsurface concentrations are consistent with and/or within background subsurface conditions and cultivation activities did not result in unacceptable re-distribution of potential surface contamination to deeper depths.

The certification samples collected in Spring 2003 were analyzed at off-site laboratories from the FCP Approved Laboratories List per the Sitewide Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ, DOE 2002a).

The results of the subsurface samples in the plowed area confirmed that the levels of all constituents were consistent with the means and/or were less than the 95th percentile of the background levels as required in the SEP with its associated addendum (DOE 2001a).

Out of 11 CUs sampled, all CUs passed the SEP surface certification criteria except for one constituent (beryllium) in three CUs (3, 4, and 6). The three CUs did not pass one of the SEP certification criteria [95 percent upper confidence limit on the mean is *less* than the Operable Unit (OU) 5 FRL] and the results of the *a posteriori* test indicated numerous additional samples would be necessary to differentiate the mean from the FRL. In the case of these CUs, they are located in cultivated portions of A9PII and are either centered on or adjacent to a Removal Action 14 area. As discussed in Section 4.1 of the CDL, the area encompassed by CUs 3 and 4 was not backfilled after approximately one to one and a half feet of soil was excavated in 1993. There is clearly a depression with a very distinct soil color in this general area. The crops grow very sporadically throughout the extent of this area unlike the surrounding area, which indicates soil conditions are different from the surrounding area. Therefore, the 'surface' of these two CUs is truly representative of the subsurface conditions. A similar situation was identified in a quadrant of CU 6. Results from previously collected samples show that beryllium concentrations are elevated in the newly defined 'surface' for these CUs, which is indicative of subsurface conditions as demonstrated in the Addendum to the CERCLA/RCRA Background Soil Study (DOE 2001b). Since the concentration of beryllium cannot be differentiated from the FRL, the 'surface' samples were compared to subsurface background conditions for baseline confirmation and found to be within the background levels.
After evaluating all of the information presented in this report, DOE has determined that no soil remediation needs to be performed in A9PII.

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 9, Phase II (A9PII) do not contain any constituents which exceed established final remediation levels (FRLs) and/or background conditions and therefore do not require remediation. This report presents the final certification results for the certification units (CUs) and subsurface zone identified in the A9PII Certification Design Letter (CDL, DOE 2003a).

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, with final disposal of the excavated material in the On-Site Disposal Facility (OSDF) or an off-site disposal facility if the waste acceptance criteria (WAC) are exceeded. The OU5 Remedial Investigation Report (DOE 1995a) defined the potential extent of soil contamination exceeding the FRLs and, in general, indicated widespread contamination 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. In the SEP, the FCP was divided into ten remedial areas; this report addresses A9PII.

1.3 AREA DESCRIPTION

A9PII consists of 12.6-acre parcel of off-property land that is south of Area 9, Phase I (A9PI) and east of Area 1, Phase II (A1PII), located along the eastern property boundary of the FCP. Consistent with the SEP, off-site property immediately adjacent to an on-property area that was remediated will require certification. A1PII was remediated and certified between 1998 and 2000. The boundary for A9PII located east of the FCP is shown on Figure 1-1.

A9PII also includes 0.3 acres located north of Area 1, Phase I (A1PI) and is located between the northern FCP fence line and State Route 126. As discussed in the Area 1, Phase I Certification Report (DOE 1998b), during initial certification efforts of the adjacent A1PI CU O-20, two separate issues caused failure of the CU. The first was due to a total uranium hot spot identified during certification activities and

real-time confirmation scanning. The hot spot was a result of metal debris found in the area and not aerial deposition. The hot spot was subsequently delineated and excavated, and an additional certification sample was collected. The second issue was high data variability for radium-228 which was the result of an elevated radium-228 result. To increase the confidence level, additional random samples for radium-228 were sampled and analyzed, and when the additional data was integrated with the original data set, the upper confidence level (UCL) on the mean met the FRL. Following the uranium hot spot removal and additional sampling for radium-228, CU O-20 was certified. As a response to the U. S. Environmental Protection Agency (EPA) on Specific Comment #4 to the draft A1PI Certification Report, DOE stated that additional samples would be collected north of CU O-20. This part of A9PII, which is located within the FCP property boundary, will serve as a buffer between A1PI and off-property, and the boundary is shown on Figure 1-1.

1.4 SCOPE

A9PII totals 12.9 acres; 12.6 acres are off-property that is south of Area 9, Phase I (A9PI) and east of A1PII, located along the eastern property boundary of the FCP, and 0.3 acres are located on-property north of A1PI and is located between the northern FCP fence line and State Route 126. Both areas are addressed in this report since they are adjacent to on-property areas that were excavated for remediation purposes and therefore require certification. Both A1PI and A1PII were remediated and certified between 1997 and 2000.

In the SEP, the FCP was divided into distinct remedial areas and phases for soil remediation, based on the OUs' 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). For A9PII, the certification strategy varied slightly from SEP Approach E because much of the soil in this area has been plowed, thus eliminating the original surface layer of soil. Although the SEP defines the general certification requirements, there are some undefined details for off-property certification due to various land-use conditions and potential requests of property owners, which will require regulatory approval in order to complete the certification. In this instance, there was a need to evaluate subsurface soils to ensure that soil cultivation had no impact below the plowed zone. The strategy for subsurface soil certification is outlined in an addendum to the SEP, Section 3.4.8 (DOE 2001a).

1.5 OBJECTIVES

The objectives of this Certification Report are:

- Provide an overview of previous precertification activities conducted in A9PII
- Describe the analytical methods, data validation processes, data reduction and statistical processes used to support the certification process
- Present the statistical analysis of the sampling results for all the CUs within A9PII, which show the certification criteria, including FRL attainment, hot spot criteria, and background conditions, have been met in most of the surface area and the entire subsurface zone in the plowed area
- Present the conclusion regarding the need, or lack there of, for soil remediation.

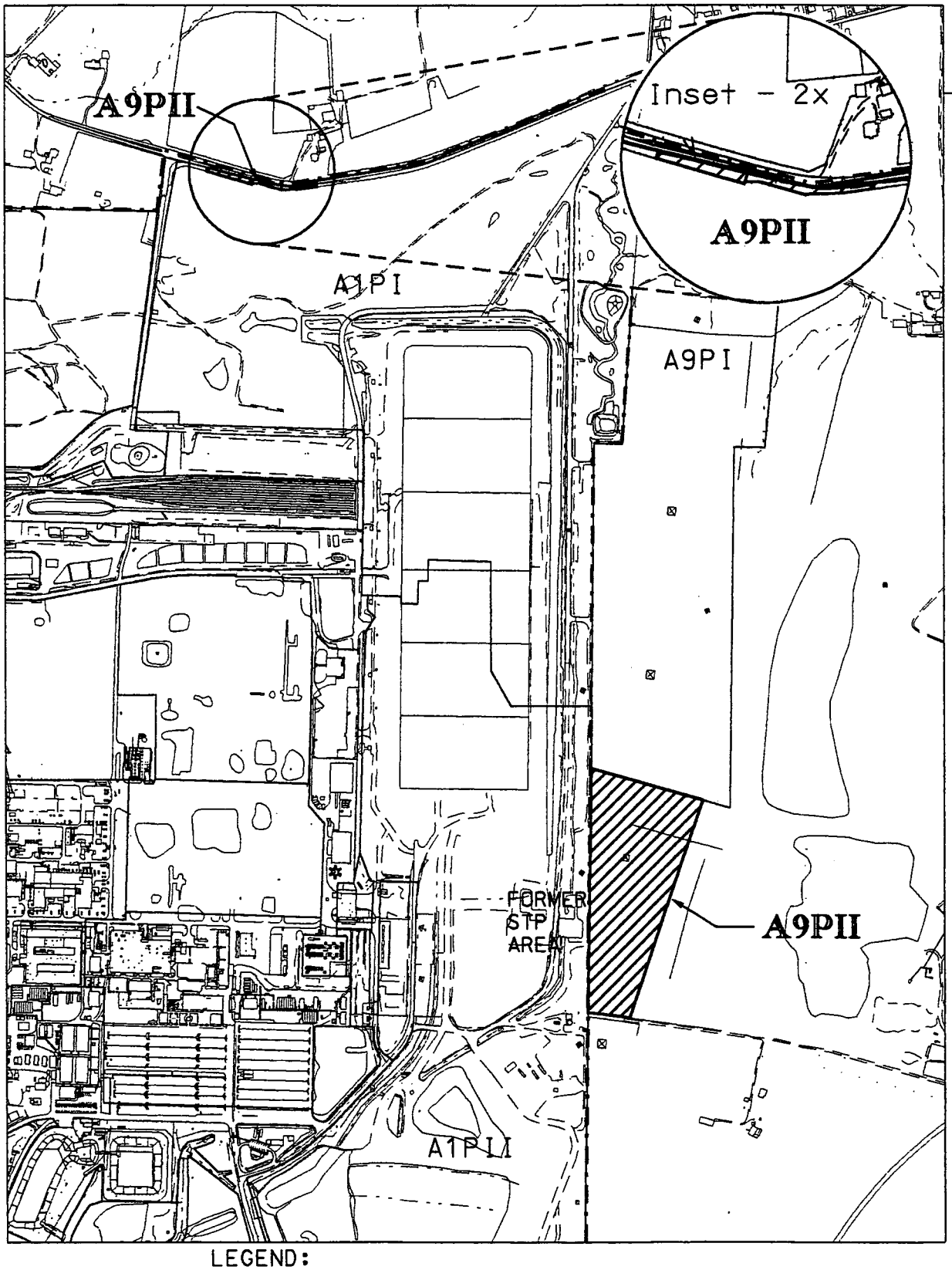
1.6 REPORT FORMAT

This certification report is presented in six sections with supporting documentation and data in Appendix A. The sections of this report are as follows:

Section 1.0	Introduction: Purpose, background, area description and objectives of the report
Section 2.0	Certification Approach: The CU design and approach to sampling and analysis used for certification
Section 3.0	Overview of Field Activities: Area preparation/survey, sampling and changes to work scope
Section 4.0	Analytical Methodologies, Data Validation Processes 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	Variance/Field Change Notices (V/FCNs) for A9PII Certification Project Specific Plan (PSP)

1.7 FCP CONTROLLED CERTIFICATION MAP

In order to track certification and characterization for reuse areas at the FCP, DOE has included a controlled map (Figure 1-2) showing the status of the soil remediation areas and phased areas with all Certification Reports and CDLs. Note that this figure has been revised to show the certification status of A9PII.



LEGEND:

AREA 9, PHASE II CERTIFICATION BOUNDARIES

FEMP BOUNDARY

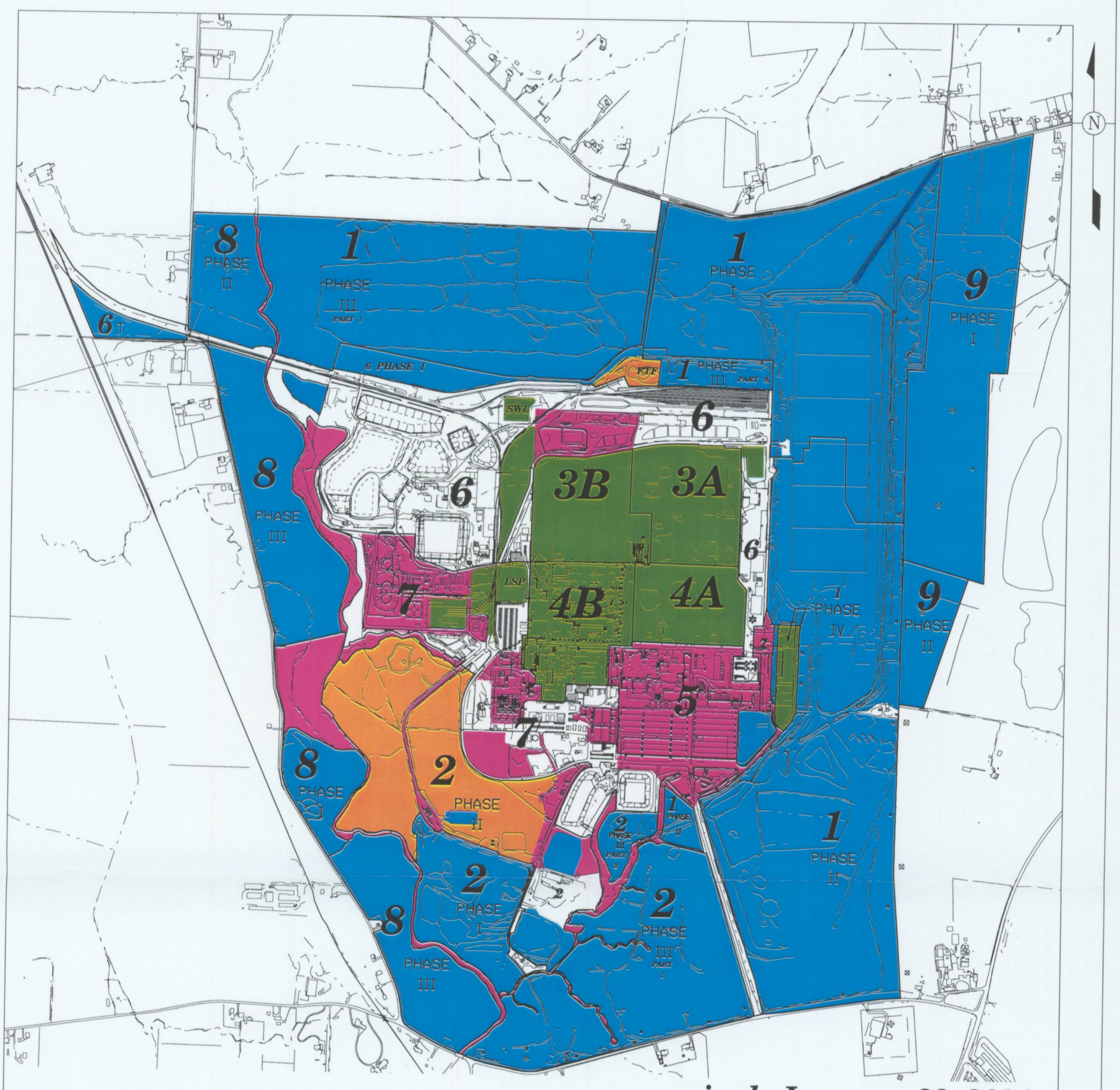
SCALE

800 400 0 800 FEET

FIGURE 1-1. AREA 9, PHASE II LOCATION MAP

STATE PLANAR COORDINATE SYSTEM 1983

27-JAN-2004



revised January 23, 2004

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	4.2	0	0.2
AREA 2	175.0	107.6	53.2	0	6.7	7.5
AREA 3A/4A	41.5	0	0	41.5	0	0
AREA 3B/4B	47.8	0	0	47.8	0	0
AREA 5	31.8	3.2	0	0	28.6	0
AREA 6	142.0	17.4	2.7	7.7	9.3	104.8
AREA 7	84.9	0	0	7.2	39.4	38.2
AREA 8	98.9	98.9	0	0	0	0
AREA 9	0.75	0	0	0	0	0.75*
PR/SSOD/PPDD	32.3	0	0	0	32.3	0
TOTAL ON SITE	1049.5	617.3	55.9	108.4	116.3	151.6
AREA 9	84.5	84.5	0	0	0	0
TOTAL OFF SITE	84.5	84.5	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.

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

v:\5cj31\dgn\bmp\cert-tmap4.dgn

STATE PLANAR COORDINATE SYSTEM 1983

09-MAR-2004

5407

2.0 CERTIFICATION APPROACH

2.1 CERTIFICATION STRATEGY

This section summarizes the area-specific constituent of concern (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 A9PII specific strategy is described in the CDL for A9PII.

2.1.1 Area-Specific Constituents of Concern

As committed in the SEP, the sitewide primary radiological constituents of concern (COCs) (total uranium, radium-226, radium-228, thorium-228, and thorium-232) were retained as ASCOCs for this remediation effort. The secondary COCs were selected as described in Section 2.1.3.

2.1.2 ASCOC Selection Criteria

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

- It was retained as an ASCOC in adjacent FCP soil remediation areas;
- It is listed as a soil COC in the OU5 ROD, and it is listed as an ASCOC in Table 2-7 of the SEP for the Remediation Area of interest (Note: Table 2-7 does not include off-property Area 9);
- Analytical results show that a contaminant is present above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated contract-required detection limits (CRDLs);
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment; 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.

2.1.3 ASCOC Selection Process for A9PII North of A1PI

The ASCOC selection process for Area 9 varied slightly. As discussed in Section 1.3, the portion of A9PII located along the north boundary of the FCP is being certified as a result of a response to an EPA comment to the A1PI Certification Report that DOE would sample for total uranium and radium-228 during Area 9 certification. Two CUs (CU 1 and CU 11) were located north of A1PI between the fence line and State Route 126, and will serve as a buffer between A1PI and off-property.

For CU 1, only total uranium was retained as a COC. The single purpose of this CU was to determine if the uranium metal contamination in A1PI migrated offsite. For CU 11, radium-228 was the only COC retained. Sampling for radium-228 in the area north of A1PI CU O-20 is being performed in response to the EPA comment mentioned in Section 1.3.

2.1.4 ASCOC Selection Process for A9PII East of the FCP

Total uranium, radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary COCs, and were therefore retained as ASCOCs for the remaining A9PII CUs located east of the FCP (CUs 2-10). The remaining suite of ASCOCs analyzed during certification of the A9PII CUs located east of the FCP was based on the suite of ASCOCs from the adjacent FCP soil remediation area. Therefore, the ASCOCs for each of the A9PII CUs located east of the FCP include the suite of ASCOCs for the adjacent A1PII remediation area. The ASCOCs will be certified to the more stringent off-property soil FRLs identified in the OU5 ROD. The selected A9PII ASCOCs for the CUs east of A1PII are listed in Table 2-1, along with their applicable FRLs.

At the request of the Ohio Environmental Protection Agency (OEPA), dioxins were evaluated for their applicability to A9PII. Based on the data obtained during precertification activities, it was concluded that the concentrations at which very limited dioxins and furans are present in A9PII are well within the acceptable risk level per Environmental Protection Agency (EPA) guidelines. Moreover, dioxins and furans are not area-specific constituents of concern (ASCOCs) as prescribed by the Sitewide Excavation Plan. Therefore, dioxins and furans were not included as ASCOCs.

2.2 CERTIFICATION APPROACH

2.2.1 Certification Design

The certification design for A9PII followed the general approach outlined in Section 3.4 of the SEP; approach E, described in Section 4.5 of the SEP, was used as a basis for certification design. However, the certification strategy varied slightly from SEP Approach E because much of the soil in this area has been plowed, thus eliminating the original surface layer of soil. There was also a need to evaluate subsurface soils to ensure that soil cultivation has had no impact below the plowed zone. In the unplowed areas, the top 6 inches of soil were certified. In the cultivated areas, soil certification was performed at two depths. Surface was certified to a depth of 1 foot. The subsurface was compared to the background levels to a depth of 12 to 36 inches, as described in Section 3.4.8 of the SEP Addendum.

Historical land uses, soil COC data, precertification data and topography were used to establish CU boundaries. Because there were no FCP production-related land uses in A9PII, Removal Action 14, precertification data, the hot spot excavation, agricultural land use, and the topography of A9PII were the main drivers for CU delineation. The on-property remediation of A1PI and A1PII was also a key factor in CU determination. As a result, eleven CUs were established for A9PII, ten Group 1 CUs and one Group 2 CU, allowing for more concentrated sampling and better ensure that excavation activities had no effect on the soil in A9PII. The CUs are shown on Figures 2-1 and 2-2, and have been established in A9PII as follows:

- CU A9PII-1 and CU A9PII-11 — Group 1 CUs on-property just north of the FCP fence line in the unplowed portion of A9PII that required certification sampling from 0 to 6 inches. These are buffer CUs between the remediated portion of A1PI and off-property.
- CU A9PII-2 — Group 2 CU east of the FCP property line in the unplowed and wooded northeast corner of A9PII that required certification sampling from 0 to 6 inches.
- CU A9PII-3 – CU A9PII-10 — Group 1 CUs along the east FCP property fence line in the cultivated portion of A9PII that required certification sampling from 0 to 36 inches.

2.2.2 Sample Selection Process

Certification sampling locations were selected according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were then generated by randomly selecting an easting and northing coordinate within the boundaries of each sub-CU, then testing those locations against the minimum distance criteria for the CU. If the minimum distance criteria were not met, an alternative random location was selected for that sub-CU, and all the locations were re-tested. This process continued until the minimum distance criteria were met for all 16 sampling locations. All sub-CUs and planned A9PII certification sampling locations are shown on Figures 2-3 and 2-4. Four of the 16 sample locations in each CU are designated with a "V," indicating archive sample locations. One sample location in each CU is designated with a "D," indicating a duplicate sample collection location. One sample location in each CU that is located in the cultivated portion of A9PII is designated with a "*," indicating an additional baseline confirmation sample location.

2.2.3 Certification Sampling

CU 1 and CU 11

Samples were collected from 0 to 6 inches at all 16 locations in each CU. Twelve samples per CU were submitted for analysis. The four samples designated as "archive" were stored in the event they were needed for further analysis.

CU 2

Samples were collected from 0 to 6 inches at all 16 locations in CU 2. Twelve samples per CU were submitted for analysis. The four samples designated as "archive" were stored in the event they were needed for further analysis.

CU 3 Through CU 10

Composite samples were collected from 0 to 12 inches at all 16 locations in each CU. Twelve samples per CU were submitted for analysis. The four samples designated as "archive" were stored for possible future analysis. At each of the four "archive" locations, plus one of the remaining 12 locations, a composite sample was collected from 12 to 36 inches. These samples are designated as baseline confirmation samples per Section 3.4.8 of the SEP Addendum. All five 12 to 36 inch interval samples were analyzed for baseline confirmation to provide data for comparisons to background conditions.

2.2.4 Statistical Analysis

Surface Samples (0 to 6-inch and 0 to 12-inch)

Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal, the first criterion compares the 95 percent UCL on the mean of each primary COC to its FRL, or the 90 percent UCL on the mean of each secondary ASCOC. On an individual CU basis, any ASCOC with the 95 percent UCL (for primary ASCOCs) or 90 percent UCL (for secondary ASCOCs) above the FRL results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate the second criterion; the *a posteriori* test will be performed to determine whether the sample size is sufficient for a meaningful conclusion of this comparison. The second criterion is the hot spot criterion, which states that primary or secondary ASCOC results must not exceed two times the FRL. When the given UCL on the mean for each COC is less than its FRL and the hotspot criterion is met, the CU will be considered certified.

In the event that a CU passes the *a posteriori* test but fails certification, the following two scenarios will be evaluated: 1) localized contamination, and 2) widespread contamination. Details on the evaluation and responses to these possible outcomes are provided in Section 3.4.5 of the SEP.

Subsurface Baseline Confirmation Samples (12 to 36-inch)

As described in Section 3.4.8 of the SEP Addendum, statistical analyses for the baseline confirmation samples (subsurface) compare the subsurface soil data to background concentrations. If all of the baseline confirmation data in the entire area (i.e., all 40 or more samples) to be certified are less than the 95th percentile background concentration for each COC, then the impacted area is not extended and the background area below/outside the impacted zone is considered certified. If any COC has a baseline confirmation result equal to or exceeding the 95th percentile background concentration, statistics of the baseline confirmation data set for each COC are evaluated. If those COC-specific baseline confirmation results are less than the corresponding background population, based on a population-to-population comparison (i.e., t-test or Wilcoxon tests) or cannot be differentiated at 99 percent UCL, then the original impacted zone is not extended and the zone below/outside the impacted area is considered certified.

If any COC-specific data population is higher than the background population, more statistical evaluations of the data are required. For example, all baseline confirmation data from any CU with concentration(s) higher than the 95th percentile background concentration will be grouped into a subset for evaluation. If the UCL of the mean of this subset of data for each COC is less than the 95th percentile background concentration, then the original impacted area is not extended, and the zone below/outside the impacted surface CU is considered certified.

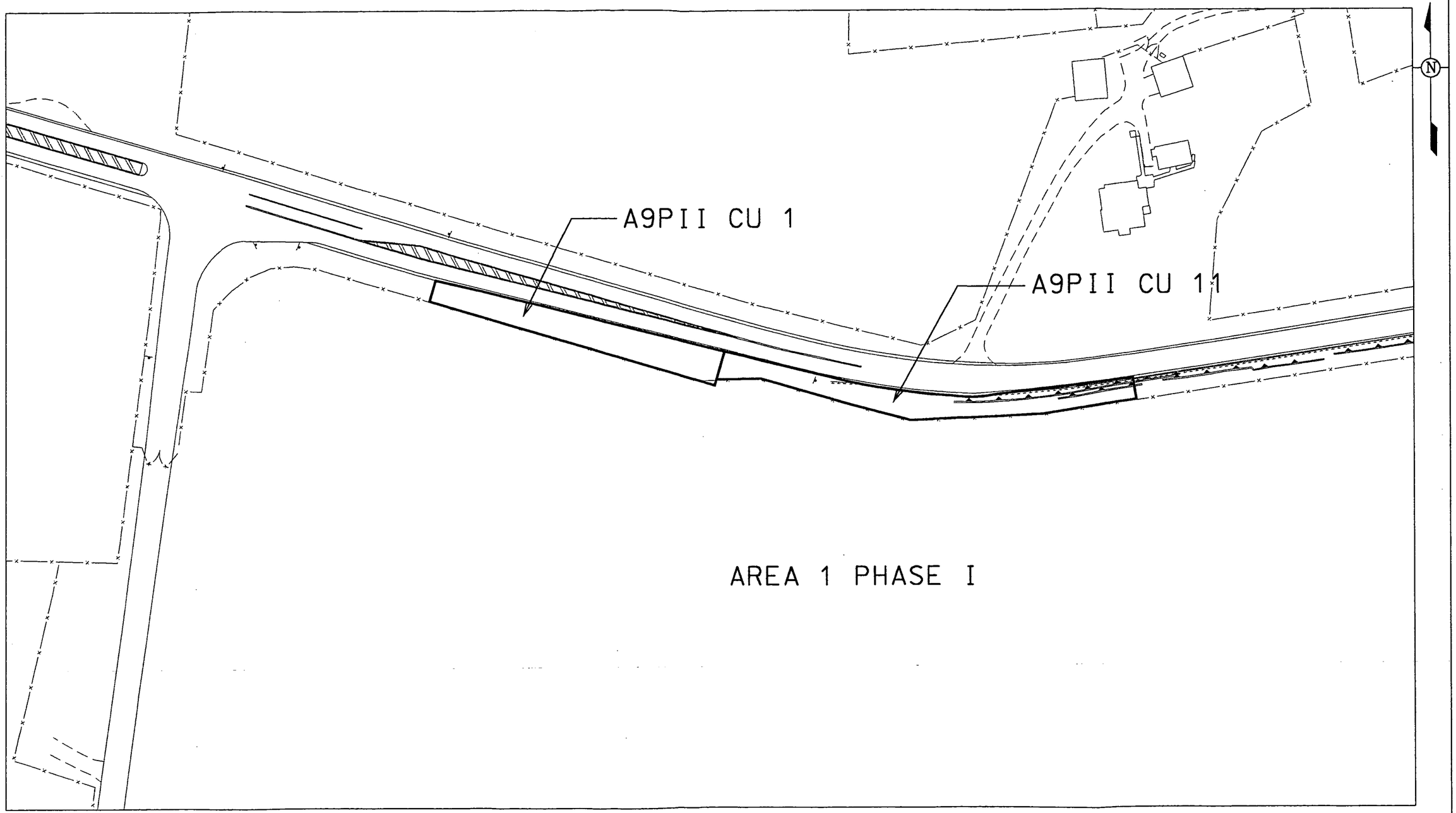
If the UCL of the mean of this subset of data for any COC is greater than the 95th percentile background concentration, then a portion of the originally designated background zone will be designated as impacted. This newly designated impacted zone will require FRL certification. The reduced background certification area will require re-analyses using the remaining baseline confirmation data to confirm that background conditions exist. Guidelines of the baseline confirmation process are defined in the SEP Addendum, Section 3.4.5, Procedures for Non-Attainment Scenarios.

TABLE 2-1
ASCOC LIST FOR A9PII CERTIFICATION UNITS EAST OF A1PII

ASCOC	Off-Property FRL / *BTV*	Reason Retained
Total Uranium	50 mg/kg	Retained as a primary ASCOC sitewide
Radium-226	1.5 pCi/g	Retained as a primary ASCOC sitewide
Radium-228	1.4 pCi/g	Retained as a primary ASCOC sitewide
Thorium-228	1.5 pCi/g	Retained as a primary ASCOC sitewide
Thorium-232	1.4 pCi/g	Retained as a primary ASCOC sitewide
Technetium-99	1.0 pCi/g	ASCOC for A1PII
Antimony	0.61 mg/kg	ASCOC for A1PII*
Arsenic	9.6 mg/kg	ASCOC for A1PII
Beryllium	0.62 mg/kg	ASCOC for A1PII
Lead	400 mg/kg / *200 mg/kg*	ASCOC for A1PII*
Molybdenum	13 mg/kg / *10 mg/kg*	ASCOC for A1PII*
Aroclor-1254	0.04 mg/kg	ASCOC for A1PII
Aroclor-1260	0.04 mg/kg	ASCOC for A1PII
Tetrachloroethene	1.0 mg/kg	ASCOC for A1PII

BTV – benchmark toxicity value
mg/kg – milligrams per kilogram
pCi/g – picoCuries per gram

*Ecological COC



LEGEND:

——— A9PII NORTH CU BOUNDARIES

SCALE

80 40 0 80 FEET

v:\5cj31\dgn\bmp\a9p2n_005.dgn STATE PLANAR COORDINATE SYSTEM 1983 27-JAN-2004

FIGURE 2-1. A9PII NORTH OF A1PI CU BOUNDARIES

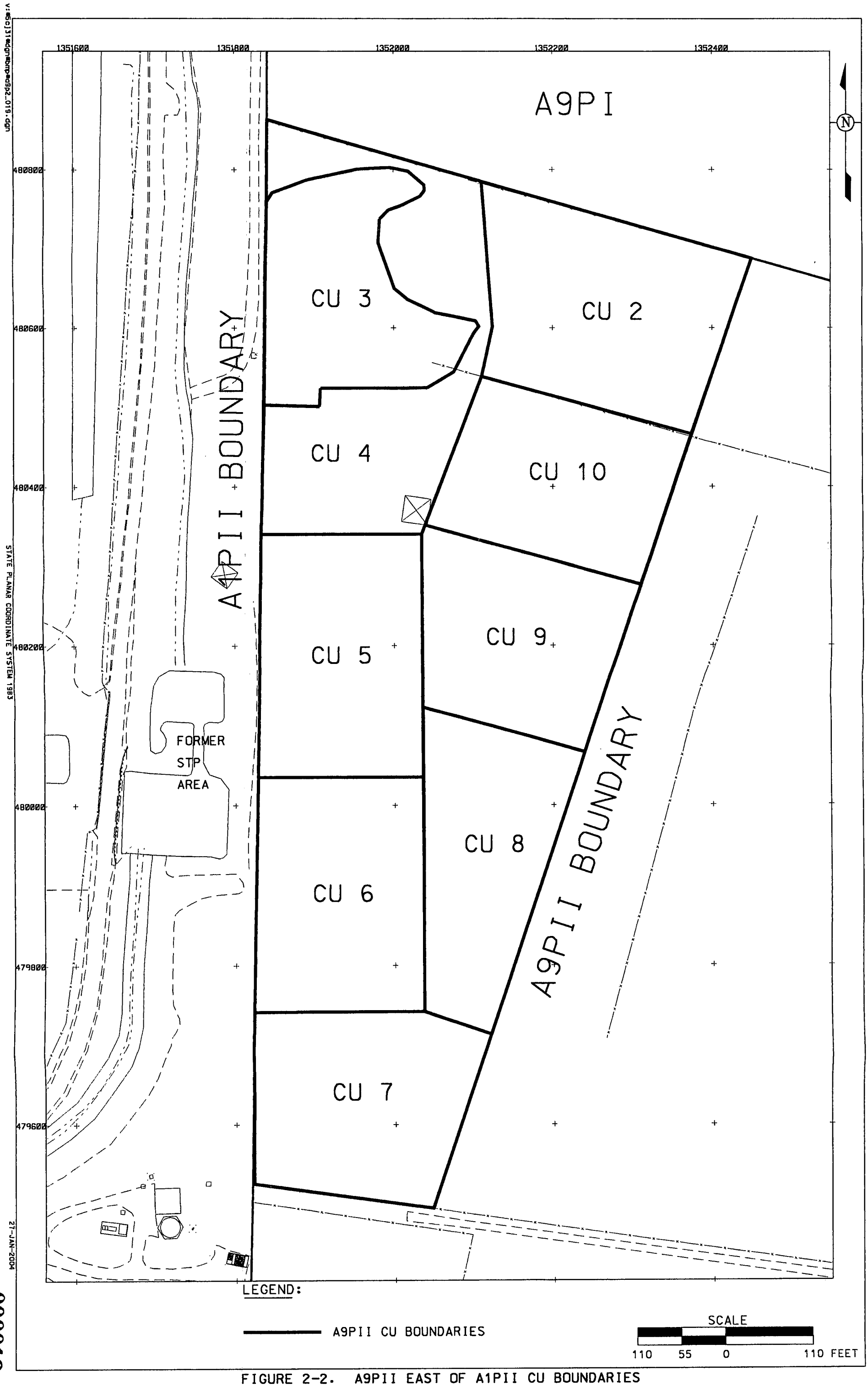
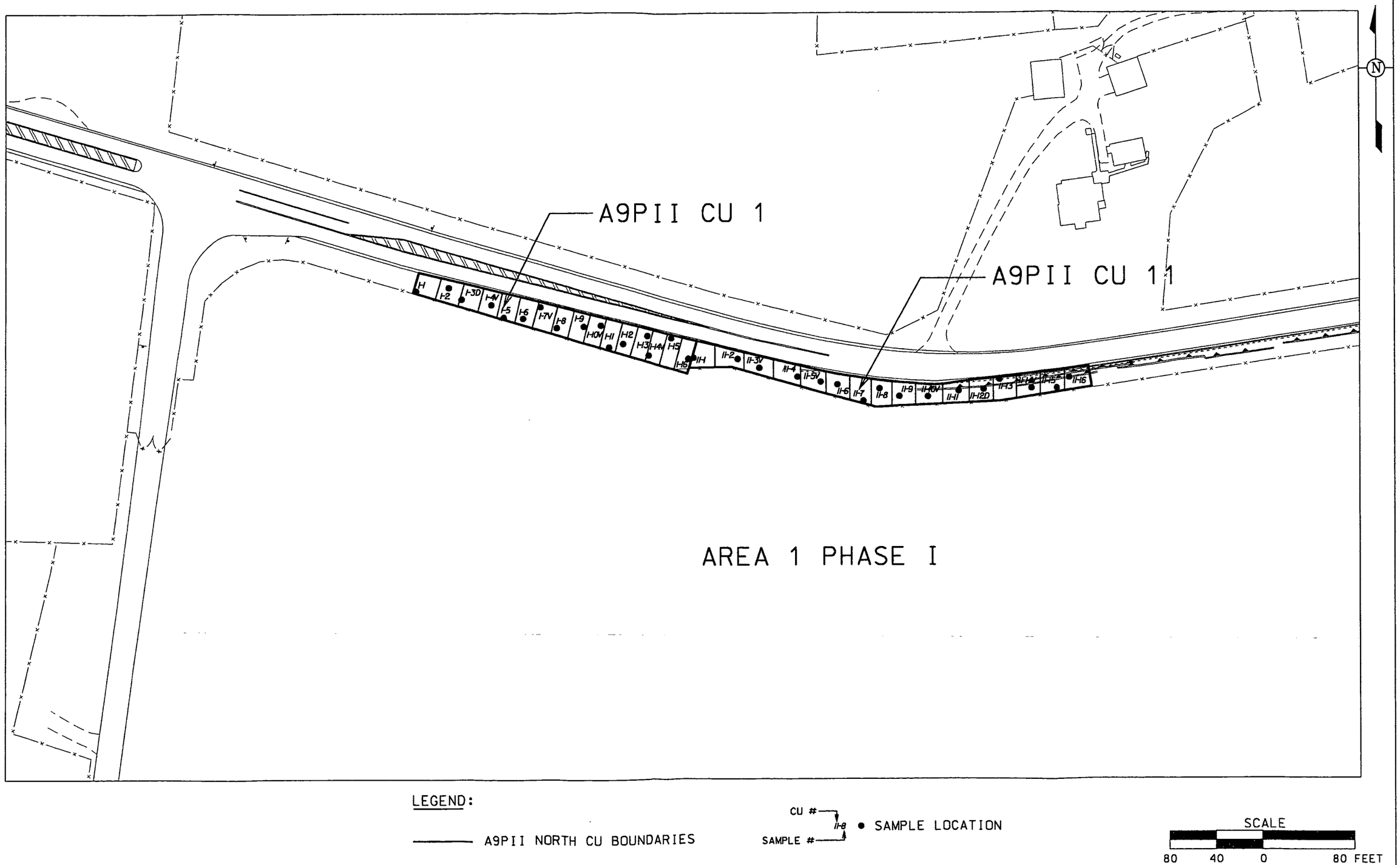


FIGURE 2-2. A9PII EAST OF A1PII CU BOUNDARIES



v:\5oj31\dgn\bmp\a9p2n_006.dgn STATE PLANAR COORDINATE SYSTEM 1983 27-JAN-2004

FIGURE 2-3. A9PII NORTH OF A1PI CU AND SUB-CU BOUNDARIES AND CERTIFICATION SAMPLING LOCATIONS

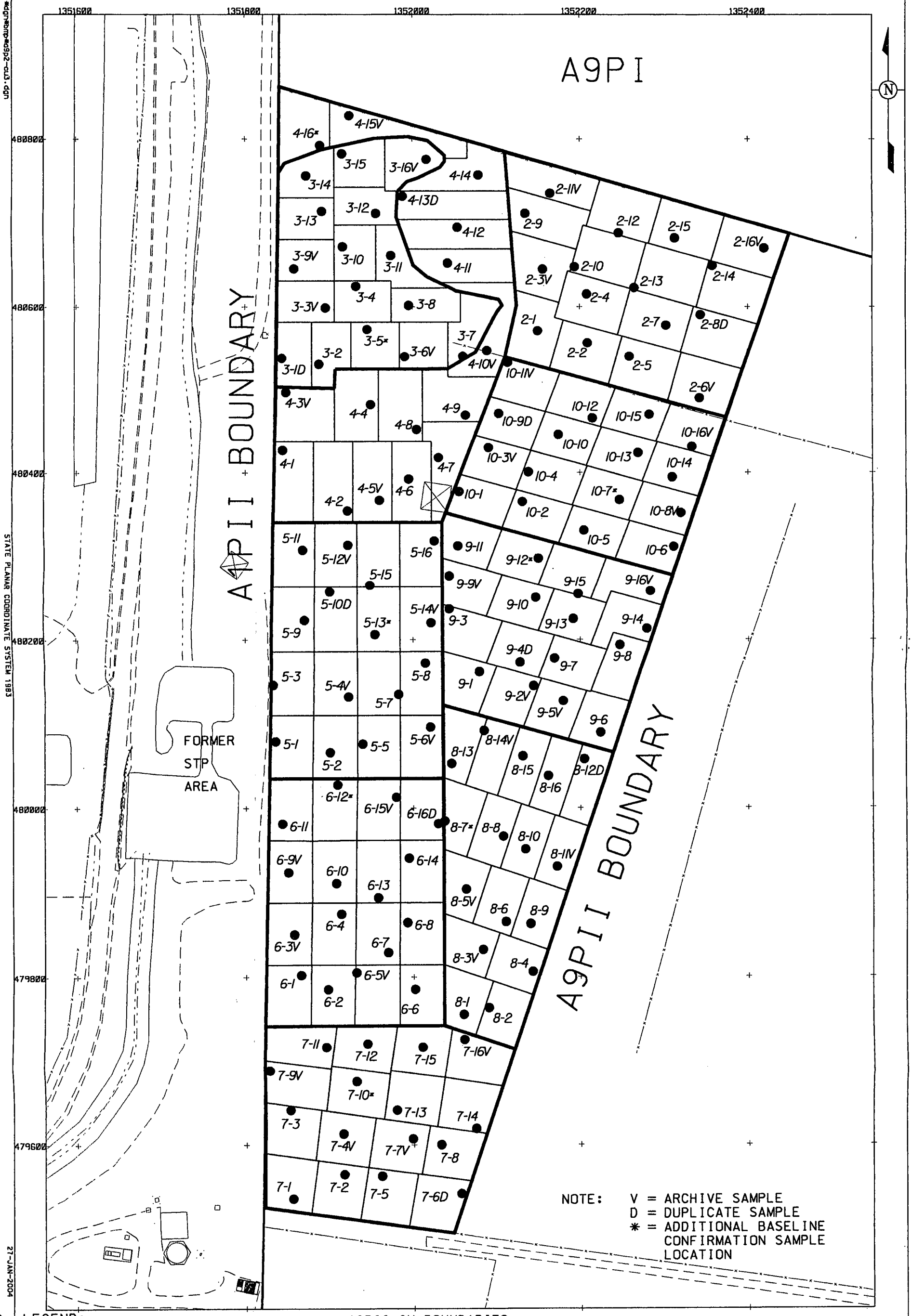


FIGURE 2-4. A9PII EAST OF A1PII CU AND SUB CU BOUNDARIES AND CERTIFICATION SAMPLING LOCATIONS

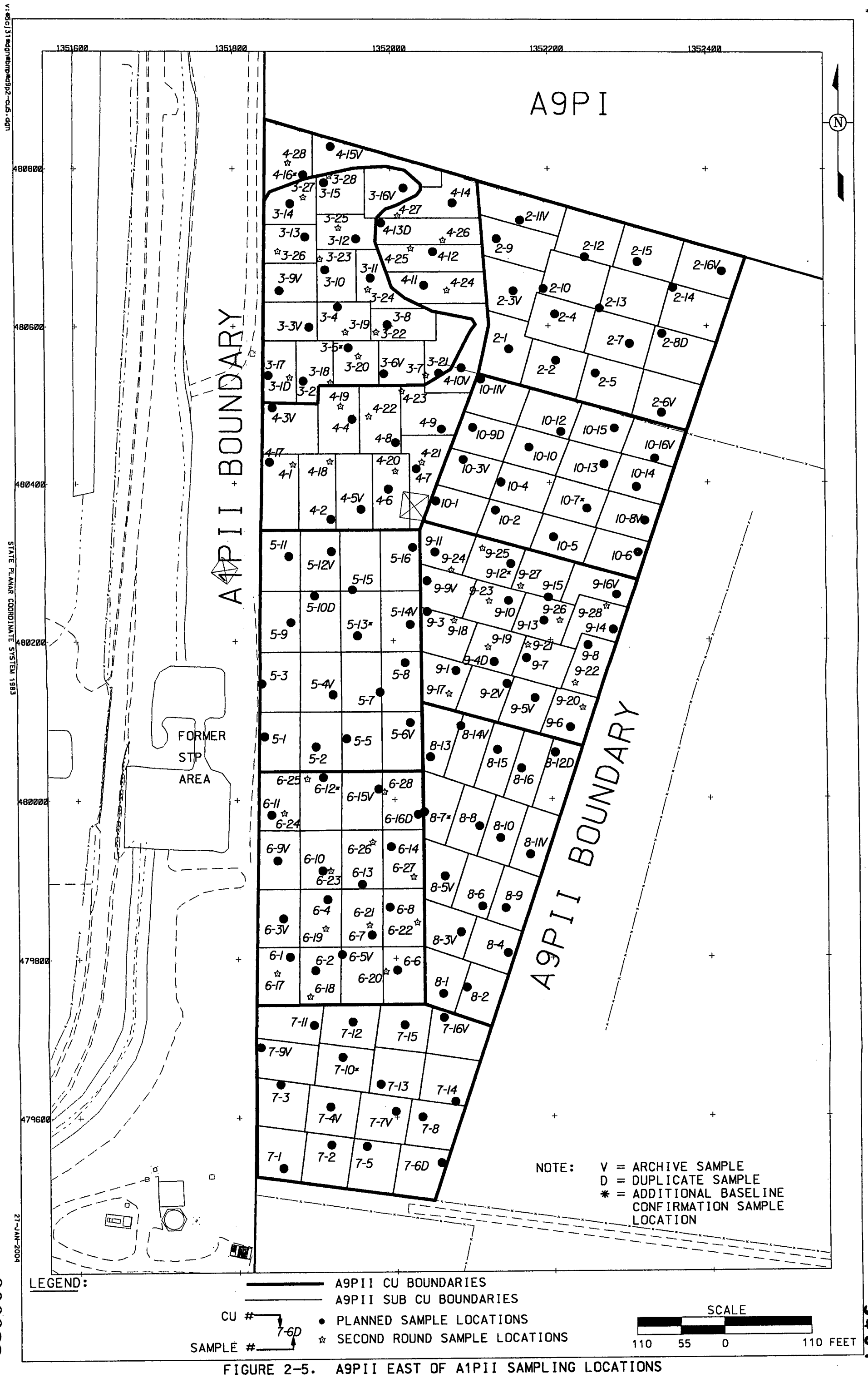


FIGURE 2-5. A9PII EAST OF A1PII SAMPLING LOCATIONS

000022

5407

3.0 OVERVIEW OF FIELD ACTIVITIES

Consistent with the SEP, off-site properties immediately adjacent to on-property areas that were remediated will require certification. As discussed in Section 1.0, 12.9 acres of A9PII are adjacent to on-property areas that were excavated for remediation purposes and therefore required certification sampling.

The portion of A9PII encompassed by CU 1 and CU 11 are located on-site along the north boundary of the FCP between the fence line and State Route 126. CU2 is located east of the FCP in the unplowed and wooded northeast corner of A9PII. CU 3 through CU 10 encompass the entire cultivated section of A9PII, and, as a result, subsurface soils were evaluated in this portion to ensure that cultivation of the soil has had no impact below the plowed zone by pushing potential surface contamination deeper.

3.1 AREA PREPARATION , PRECERTIFICATION AND PRELIMINARY DATA EVALUATION

3.1.1 Area Preparation and Precertification

In preparation of precertification and certification activities, all historical soil data relative to A9PII was evaluated. Soil samples have been collected from A9PII for various projects, including Remedial Investigation/Feasibility Studies (RI/FS), the Integrated Environmental Monitoring Plan (IEMP), and Removal Action 14 (RA14). Removal Action 14 also included excavation of two areas in A9PII located east of the FCP. All historical data and activities related to A9PII are summarized in the CDL for A9PII.

Precertification activities took place in A9PII from October 2002 through March 2003 under the PSP for A9PII Precertification Real-Time Scan (DOE 2002b). Real-time scanning was completed over most of the ground using the mobile sodium iodide (NaI) detectors and high-purity germanium (HPGe) detectors. No pockets of elevated activity were identified during real-time scanning. Physical samples were also collected from A9PII located east of the FCP to determine if cultivation had any influence on the distribution and concentrations of ASCOCs. The results from the analysis of soils from the cultivated area were evaluated against data from the Background Soil Study Addendum and were found to be consistent with results from the Background Soil Study Addendum. All A9PII precertification data are provided in the CDL for A9PII.

Review of historical total uranium data prompted additional physical sampling of four locations, previously sampled during the RI/FS and RA14, to verify the original results. One of the samples was greater than 2XFRL, and additional physical samples were collected and real-time scanning was performed to bound the total uranium hot spot. An area located along the FCP fence line just northeast of the former Sewage Treatment Plant was excavated. The excavated area, approximately 24 feet by eight feet, was backfilled with clean topsoil following confirmation that post-excavation physical surface samples were below the total uranium FRL. Detailed information related to the uranium hot spot excavation are provided in the CDL for A9PII.

Based on the results of all the above sampling events, it was determined that no further excavation would be required prior to certification of A9PII.

3.1.2 Preliminary Data Evaluation

Following the verbal authorization to proceed with certification, the first round of certification sampling began in A9PII in March 2003 and continued into April 2003. The sampling approach is described in the Project Specific Plan for Area 9, Phase II Certification Sampling (2003b) 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.

Sampling in CUs 1 and 2 was completed as originally planned. Statistical analysis of the preliminary data indicated through the *a posteriori* test that a sufficient number of samples had been collected to make a certification decision. No additional field activity was necessary.

The preliminary results from CUs 3 and 4 indicated that some slightly above-FRL concentrations of beryllium were detected. However, statistical analysis of the preliminary data indicated through the *a posteriori* test that there were not enough data points to differentiate the mean from the FRL. A second round of sampling in each CU was conducted. Results of the second *a posteriori* test demonstrated once again that there were not enough data points to differentiate the mean from the FRL (469 more data points needed in CU 3 and 45 more data points for CU 4). The sample results are discussed in Section 5.1. No further field activity was conducted beyond the second round.

Sampling in CU 5 was completed as originally planned. Statistical analysis of the preliminary data indicated through the *a posteriori* test that a sufficient number of samples had been collected to make a certification decision. No additional field activity was necessary.

The preliminary results from CU 6 indicated that some slightly above-FRL concentrations of beryllium were detected. Statistical analysis of the preliminary data indicated through the *a posteriori* test that there were not enough data points to differentiate the mean from the FRL. Results of this *a posteriori* test showed that 13 samples were needed. As only one additional sample was required, the four archives were submitted instead of re-sampling. After archive samples were analyzed, the *a posteriori* test was subsequently performed on the original data plus the archive. The second *a posteriori* test demonstrated once again that there were not enough data points to differentiate the mean from the FRL; however, the UCL on the mean was below FRL, which meets a portion of the certification requirement. The sample results are discussed in Section 5.1. Based on the findings, no further field activity was conducted.

Sampling in CUs 7 and 8 was completed as originally planned. Statistical analysis of the preliminary data indicated through the *a posteriori* test that a sufficient number of samples had been collected to make a certification decision. No additional field activity was necessary.

The preliminary results from CU 9 indicated that some slightly above-FRL concentrations of beryllium were detected. Statistical analysis of the preliminary data indicated through the *a posteriori* test that there were not enough data points to differentiate the mean from the FRL. A second round of sampling in this each CU was conducted. Results of the second *a posteriori* test demonstrate that a sufficient number of samples were collected to make a certification decision. No further field activity was conducted beyond the second sampling round.

Sampling in CUs 10 and 11 was completed as originally planned. Statistical analysis of the preliminary data indicated through the *a posteriori* test that a sufficient number of samples had been collected to make a certification decision. No additional field activity was necessary.

3.2 CHANGES TO SCOPE OF WORK

The scope of work for A9PII certification sampling was documented in the final CDL. There were additions and changes to the scope as documented in two V/FCNs. The first was V/FCN 21130-PSP-0001-16, written to the Project Specific Plan for Area 9, Phase II Precertification Real-Time Scan (2001b). At the time the V/FCN was written, only verbal approval had been given to the

PSP for Area 9, Phase II Certification Sampling. The V/FCN was written to the PSP for Area 9, Phase II Precertification Real-Time Scan since the V/FCN could not be written to a plan that was not approved. The second V/FCN was 21130-PSP-0003-01. Copies of both V/FCNs are included in Appendix B of this report.

V/FCN 21130-PSP-0001-16 documents the collection of additional samples for beryllium analysis from CUs 3, 4, and 9 since the statistical analysis (*a posteriori* test) of beryllium results from the planned samples in these CUs indicated that additional samples were needed. Locations of the additional samples are shown in Figure 2-5.

For CU 6, archive samples were submitted for beryllium analysis, as documented in V/FCN 21130-PSP-0003-01. Statistical analysis (*a posteriori* test) of beryllium results from planned samples in CU 6 indicated that additional samples were needed.

4.0 ANALYTICAL METHODOLOGIES, DATA VALIDATION PROCESSES AND DATA REDUCTION

4.1 ANALYTICAL METHODOLOGIES

Radiological, metal, and organic samples were sent off-site for analysis. The laboratories 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 (QA/QC) requirements.

Laboratory analysis of certification samples was conducted using approved analytical methods, as discussed in Appendix H of the SEP. The minimum detection level (MDL) was set at 10 percent of the FRL but the low off-property FRLs resulted in difficulties for the laboratories to meet 10 percent of the FRL for some analytes. In those instances, the MDL was set as low as reasonable below the FRL. Analyses were conducted to analytical support level (ASL) D or E, where the MDL 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 all of the analytical data. All data were validated. Any samples rejected during this validation would be re-analyzed, or an archive sample would have been substituted if there were insufficient material available from the initial sample. Once data were validated as required, results were entered into the FCP Sitewide Environmental Database (SED).

4.1.1 Chemical Methods

Metals

The planned certification samples were analyzed for metals by inductively coupled plasma-mass spectroscopy (ICP-MS). Additional samples submitted for beryllium analysis were analyzed by ICP.

Aroclor

Samples were analyzed for aroclor-1254 and aroclor-1260 using gas chromatography.

Tetrachloroethene

Samples for tetrachloroethene were analyzed by gas chromatography/mass spectroscopy.

4.1.2 Radiochemical Methods

The radiochemical analytical methods depended on the specific nuclides of interest. Performance-based specification criteria included highest allowable minimum detectable concentration (HAMDC), percent

overall tracer/chemical recovery, percent matrix spike recovery, method blank concentration, percent recovery of laboratory control sample, and relative error ration 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 spectroscopy, 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)

The validation qualifier assigned to the total uranium value was the same as the uranium-238 qualifier.

Radium-226

Samples were analyzed by gamma spectroscopy, 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. The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all A9PII certification results.

Radium-228

Following gamma spectroscopy analysis, radium-228 was also quantified by measuring gamma rays emitted by members of its decay chain. The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all A9PII certification results.

Isotopic Thorium

Isotopic thorium (thorium-228 and thorium-232) was quantified by measuring gamma rays emitted by members of its decay chain by gamma spectroscopy. The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all A9PII certification results.

Technetium-99

Technetium-99 was quantified by using a liquid scintillation counter.

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, as well as Section 11.2 and Appendix D of the SCQ, 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
- Laboratory control sample (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 Level D. This validation included the same review process as for Level B, but included a systematic review of the raw data and recalculations. All of the analytical data from four CUs were validated to Level D, while all remaining analytical data from the other seven CUs were validated to Level 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 this 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 a redundant analysis (Z), or qualified as estimated (J) and/or nondetects (U). No results were qualified as rejected (R).

4.3 DATA REDUCTION

Each sample used to support the A9PII area certification decision was entered in the SED with the following information:

Field Information

- Sample Identification Number - A unique number assigned to each discrete sample point. This number contains an indicator value that depicts the sample depth from surface. For example:

  A9P2-C5-8^2-RMP

  where:

  A9P2 = Area 9, Phase II
  C5 = Certification Unit number
  8 = Eight sample location within the CU
  2 = Depth indicator (1 = surface for CUs 1, 2 and 11; 2 = surface for CUs 3 through 10; and 6 = subsurface for CUs 3 through 10)
  RMP = "R" indicates radiological analysis; "M" indicates metals analysis; "P" indicates aroclors analysis; "L" indicates tetrachloroethene;

- Coordinate Information - Northing and Easting locations.

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 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 higher 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.

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) - 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 asses 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). The Data Validation Section evaluates the reported TPU as described in the SCQ in Section 11.2 and Appendix D to assess the impact on the data quality and will qualify the data 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.

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, ISSUES AND EVALUATION

5.1.1 Surface Certification Results

The validated results from surface CUs were subjected to statistical analysis described in the SEP. In those instances where submittal of archive samples was required, and where re-sampling was conducted, the additional results were evaluated along with those from the initial sampling round. Appendix A contains the statistical results for the first and any subsequent rounds of sampling. It should be noted that the analyses for each CU and, more importantly, the results of the analyses from each CU were not completed in numerical progression consistent with the numbering of the CUs in A9PII. To the contrary, the analyses were performed roughly in the order in which the CUs were sampled. The sampling progression depended on many factors, including weather and daily field conditions.

CUs 1, 2, 5, 7, 8, 10, and 11 had no issues throughout the entire sampling, analytical, and validation process, and have passed all requirements necessary for certification (see Appendix A.1). Additionally, no individual result in all of A9PII was greater than two times its associated FRL, whereby demonstrating that all of the data for each ASCOC pass the hot spot criterion.

Beryllium was the only constituent that presented an issue for the surface CUs in A9PII. The following discussion addresses the original results, applicable archive results, and any second round sampling results related to the following CUs: 3, 4, 6, and 9.

Beryllium

The beryllium data for CUs 3 and 4 underwent the *a posteriori* test after the preliminary data evaluation were received. The *a posteriori* test indicated that 48 samples and 22 samples, respectively, were needed to differentiate between the mean and the FRL (see Appendix A.1). An additional 12 samples were collected from each CU and were submitted for analysis. The *a posteriori* test was performed on the resulting combined data set for each CU, which now indicated that 469 samples were needed for CU 3 and 45 samples were needed for CU 4 in order to statistically differentiate between the mean and the FRL

(see Appendix A.3). As described in section 4.1.1 of the CDL, CU 3 and CU 4 are located in cultivated portions of A9PII and are centered on the Removal Action 14 area. This area was not backfilled after approximately one to one and a half feet of soil was excavated in 1993. There is clearly a depression with a very distinct soil color in this general area. The crops grow very sporadically throughout the extent of CUs 3 and 4 unlike the surrounding area, which indicates soil conditions are different from the surrounding area. Therefore, the 'surface' of these CUs is truly representative of the subsurface conditions. Since these 'surface' CUs (both CU 3 and CU 4) cannot be differentiated from the FRL for beryllium, the data from both of these 'surface' CUs was added to the baseline confirmation data set and statistically evaluated against subsurface background conditions. These statistics are discussed in Section 5.1.2. Based on the baseline confirmation results for these CUs, it is believed that the source of elevated beryllium conditions is from the natural subsurface and is not attributed to aerial deposition.

While completing final statistics for the beryllium data for CU 6, this CU underwent the *a posteriori* test. While the data met the certification requirement of 95% UCL on the mean, the *a posteriori* test indicated that potentially one additional sample was needed to differentiate between the mean and the FRL (see Appendix A.1). Therefore, the archives were submitted in lieu of an additional round of sampling, as the four of them were more than the required additional sample. The resulting combined data set again indicated that the CU met certification requirements based on passing the 95% UCL requirement but again failed the *a posteriori* test, which indicated that potentially an additional 31 samples were needed to differentiate between the mean and the FRL (see Appendix A.3). The results of the *a posteriori* tests accentuate the fact that the mean for beryllium in this CU is less than but nearly equal to the FRL.

Upon further evaluation of the data, it was noted that only the small northwest quadrant of CU 6 contained the majority of the higher beryllium results. This quadrant, represented by samples A9P2-C6-9-2, A9P2-C6-10-2, A9P2-C6-11-2, A9P2-C6-12-2, was isolated and the remainder of the samples from CU 6 were statistically evaluated as an independent CU. These statistics, which are presented in Appendix A.4, demonstrate that this reduced CU passes all of the certification requirements. The northwest quadrant was then considered potentially impacted at the surface. However, the small area is located adjacent to a formerly remediated area where excavation activities during Removal Action 14 likely would have impacted the area and commingled the surface soil with the subsurface soil. The four samples from this quadrant were statistically evaluated consistent with the baseline confirmation approach (see Appendix A.4). It was determined that the mean baseline confirmation results were less than the mean corresponding background concentration based on a population-to-population comparison.

Therefore, this quadrant is not significantly different than subsurface background conditions. Since the first requirement of certification was met for the majority of the CU, the hot spot criterion was met with no samples being greater than 2x the FRL, and the concentrations of the small northwest quadrant are within the subsurface background conditions for beryllium, DOE concludes that this area is still protective of human health and does not require remediation.

The beryllium data for CU 9 underwent the *a posteriori* test after the preliminary data evaluation. The *a posteriori* test indicated that additional samples were needed to differentiate between the mean and the FRL (see Appendix A.1). An additional round of samples were collected from CU 9 and submitted for analysis. The *a posteriori* test was performed on the resulting combined data set whereby indicating that enough samples had been colleted to statistically differentiate between the mean and the FRL. This, coupled with the fact that the UCL on the mean was less than the FRL and the hot spot criterion was met for this CU, demonstrates that CU 9 has met all of the certification requirements. (see Appendix A.3).

5.1.2 Baseline Confirmation

Baseline confirmation samples were collected from the 12 to 36-inch depth interval at five locations per CU in the plowed zone (CU 3 through CU 10), which resulted in 40 samples being analyzed. Consistent with the SEP Addendum, which requires at least 40 samples per property, the samples were homogenized in the field and the required mass was sent to the appropriate laboratories for analysis. Where applicable, each constituent was then compared to the 95th percentile of the subsurface background concentration.

Aroclor-1254, aroclor-1260, tetrachloroethene, and technetium-99 were not included in the baseline confirmation process because these analytes were not included in the Background Soil Study Addendum, and thus the 95th percentile background concentrations have not been established for these constituents.

For antimony, all of the results were non-detects. Therefore, there is no basis for comparison. Moreover, each certification result for this constituent was well below the established off-property FRL, with the highest non-detect value being 0.088 mg/kg.

For beryllium, the results from the "surface" samples within CU3 and CU4, which are truly representative of subsurface conditions resulting from an area scrape that was not backfilled (see section 1.1), were included with the subsurface data set. This yielded 88 sample results to be used in the statistical analysis for beryllium. The beryllium results indicated that none of the baseline confirmation data exceeded the

95th percentile background concentration of 1.44 mg/kg. In accordance with the SEP addendum, this baseline data set does not require statistical evaluation since all data was below the 95th percentile background concentration. Therefore, the results for beryllium were concluded to satisfy the baseline confirmation requirement. Appendix A.2 presents a summary of the subsurface sample results.

For molybdenum all of the baseline confirmation sample results were less than the 95th percentile background concentration of 5.24 mg/kg. In accordance with the SEP addendum, this baseline data set does not require statistical evaluation since all data was below the 95th percentile background concentration. Therefore, the results for molybdenum were concluded to satisfy the baseline confirmation requirement. Appendix A.2 presents a summary of the subsurface sample results.

The following discussion addresses, on a constituent basis, the baseline confirmation results and statistical analyses for the remaining COCs. This discussion includes arsenic, lead, radium-226, radium-228, thorium-228, thorium-232, and total uranium.

Arsenic

The arsenic results indicated that some of the baseline confirmation data exceeded the 95th percentile background concentration of 12.4 mg/kg. In accordance with the SEP addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for arsenic exceeded background concentrations. Further statistical analyses were conducted. The data for each CU, relative to arsenic, was compared to the 95th percentile of the background concentration and any CU that did not have a single result above the 95th percentile was eliminated from any subsequent statistical analyses and was considered as passing certification. CU 4 was excluded and the remaining CUs were considered as a distinct data set, where the 95 percent UCL on the mean of this set was compared to the 95th percentile of the background concentration. It was determined that the 95 percent UCL of the mean for this data set was less than the 95th percentile of the background concentration and therefore passed baseline confirmation for arsenic. The arsenic levels are statistically within the subsurface background conditions. Appendix A.2 presents a summary of the subsurface sample results

Lead

The lead results indicated that some of the baseline confirmation data exceeded the 95th percentile background concentration of 30.6 mg/kg. In accordance with the SEP addendum, the baseline data set was

statistically evaluated. It was determined that the mean baseline confirmation results were less than the mean corresponding background concentration based on a population-to-population comparison. Therefore, the results for lead were concluded to be statistically less than the background concentrations, thus satisfying the baseline confirmation requirement. Appendix A.2 presents a summary of the subsurface sample results.

Radium-226

The radium-226 results indicated that some of the baseline confirmation data exceeded the 95th percentile subsurface background concentration of 1.56 pCi/g. In accordance with the SEP Addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for radium-226 exceeded background concentrations. Further statistical analyses were conducted. Any CU that did not contain a result that was greater then the 95th percentile of background concentration for radium-226 was excluded from further statistical analysis. CUs 4, 5, 6, 7, 8, and 10 were excluded. The 95 percent UCL on the mean for the remaining data set, relative to radium-226, was compared to the 95th percentile of the background concentration. It was determined that the 95 percent UCL of the mean for this data set was less than the 95th percentile of the background concentration and therefore passed baseline confirmation for radium-226. The radium-226 levels are statistically within the subsurface background conditions. Appendix A.2 presents a summary of the subsurface sample results.

Radium-228

The radium-228 results indicated that some of the baseline confirmation data exceeded the 95th percentile subsurface background concentration of 1.27 pCi/g. In accordance with the SEP Addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for radium-228 exceeded the mean background concentrations. Further statistical analyses were conducted. Any CU that did not contain a result that was greater then the 95th percentile of background concentration for radium-228 was excluded from further statistical analysis. All CUs except CU 4 were excluded. The 95 percent UCL on the mean for the remaining data set, relative to radium-228, was compared to the 95th percentile of the background concentration. It was determined that the 95 percent UCL of the mean for this data set was less than the 95th percentile of the background concentration and therefore passed baseline confirmation for radium-228. The radium-228 levels are statistically within the subsurface background conditions. Appendix A.2 presents a summary of the subsurface sample results.

Thorium-228

The thorium-228 results indicated that some of the baseline confirmation data exceeded the 95th percentile subsurface background concentration of 1.25 pCi/g. In accordance with the SEP Addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for thorium-228 exceeded the mean background concentrations. Further statistical analyses were conducted. Any CU that did not contain a result that was greater then the 95th percentile of background concentration for thorium-228 was excluded from further statistical analysis. All CUs were excluded except for CUs 3, 4, and 6. The 95 percent UCL on the mean for the remaining data set, relative to thorium-228, was compared to the 95th percentile of the background concentration. It was determined that the 95 percent UCL of the mean for this data set was less than the 95th percentile of the background concentration and therefore passed baseline confirmation for thorium-228. The thorium-228 levels are statistically within the subsurface background condition. Appendix A.2 presents a summary of the subsurface sample results.

Thorium-232

The thorium-232 results indicated that some of the baseline confirmation data exceeded the 95th percentile subsurface background concentration of 1.27 pCi/g. In accordance with the SEP Addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for thorium-232 exceeded the mean background concentrations. Further statistical analyses were conducted. Any CU that did not contain a result that was greater then the 95th percentile of background concentration for thorium-232 was excluded from further statistical analysis. All CUs except CU 4 were excluded. The 95 percent UCL on the mean for the remaining data set, relative to thorium-232, was compared to the 95th percentile of the background concentration. It was determined that the 95 percent UCL of the mean for this data set was less than the 95th percentile of the background concentration and therefore passed baseline confirmation for thorium-232. The thorium-232 levels are statistically within the subsurface background conditions. Appendix A.2 presents a summary of the subsurface sample results.

Total Uranium

The total uranium results indicated that some of the baseline confirmation data exceeded the 95th percentile subsurface background concentration of 4.56 mg/kg. In accordance with the SEP Addendum, the baseline data set was statistically evaluated. It was determined that, based on a comparison of the mean baseline confirmation results with the mean corresponding background concentration, the results for total uranium

exceeded background concentrations. Further evaluation was necessary. Any CU that did not contain a result that was greater then the 95th percentile of background concentration for total uranium was to be excluded from further statistical analysis. However, every CU in the subsurface data set contained a result that exceeded the 95th percentile background concentration of 4.56 mg/kg. Therefore, no CU could be excluded. Based on guidance from the SEP addendum, this indicated that uranium was above background in the subsurface and every CU in the cultivated area (CUs 3 through 10) must be considered as potentially impacted. This newly designated impacted zone requires the same statistical certification process as described for the surface CUs.

The five subsurface results for each CU were statistically evaluated in the same manner as the surface CUs. (see Appendix A.5) As indicated by the results in Appendix A.5, each subsurface CU passed all of the certification requirements including the *a posteriori* test.

As a conservative approach and to further emphasize the passing condition, the five results from each subsurface CU were combined with the associated surface CU. The certification statistics were then performed on the combined data set. The results, also shown in Appendix A.5, corroborate the conclusion that uranium passes the certification requirements in each subsurface CU.

5.2 A9PII CERTIFICATION CONCLUSIONS

DOE recognizes that CU 3, CU 4, and CU 6 have special conditions related to beryllium. However, based on the available data, all certification requirements are met or baseline confirmation results demonstrate that beryllium is consistent with corresponding background conditions. Therefore, DOE submits that the levels at which beryllium is present in these CUs are protective of human health and meet the intent of the soil certification program. Furthermore, all certification requirements have been satisfied for the remainder of Area 9 Phase II. Therefore, based on all the sampling results presented in this report, DOE has determined that no further remedial actions are required in A9PII and the certification activities for Area 9 Phase II are complete.

6.0 PROTECTION OF CERTIFIED AREAS

The area of certification is located outside the FCP boundaries. Therefore, FCP Procedure EP-0008 does not apply. The intent of protecting certified areas is to prevent recontamination by routine remedial work in adjacent areas. There is no future plan for remedial work near A9PII that could potentially impact the certification status. No formal procedures will be implemented to protect A9PII from recontamination other than the procedures that already exist, which cover fugitive dust emissions from the entire FCP boundary. No land use restrictions will be required.

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APPENDIX A

CERTIFICATION SAMPLES, ANALYTICAL RESULTS AND STATISTICS TABLES

APPENDIX A
STATISTICAL ABBREVIATIONS AND SYMBOLS

The procedure used to determine if the data are to be assumed to be either normally distributed or lognormally distributed is outlined in Section G.2.3 of Appendix G to the SEP. The second paragraph under "Step 3: Perform the Shapiro-Wilk Test to evaluate if the data are normally or lognormally distributed" states that "If the Shapiro-Wilk Test indicates both normal and lognormal distributions fit the data, the distribution with the highest p-value will be used in the Student's t-Test (Section G.2.2.2) to make the certification decision." Therefore, the distribution testing procedure is not a matter of transforming the data and then testing for lognormality only when the normality assumption fails as the comment seems to imply. The method is to test both normality and lognormality and select the distribution that "best" fits the data as defined by the test yielding the higher p-value above a minimum acceptable value. The minimum acceptable p-value for acceptance of a distribution was set at 0.05.

Abbreviations:

W-Statistic Probability – Shapiro-Wilk probability of the "better" fit – either normal or lognormal (note: a value less than 0.05 indicates that neither normality nor lognormality could be accepted, but the highest p-value is still shown.)

t-Test (N) – indicates that the normal distribution is best fit to data with a p-value greater than or equal to 0.05.

t-Test (LN) – indicates that the lognormal distribution is best fit to data with a p-value greater than or equal to 0.05.

Sign Test – the Sign test was used because one of the following situations occurred:

1. there were greater than 50 percent non-detects,
2. between 15 and 50 percent non-detects and data not symmetrically distributed,
3. less than 15 percent non-detects, but fails Shapiro-Wilk test for both normality and lognormality and data not symmetrically distributed.

Wilcoxon SR – the Wilcoxon Signed Rank procedure was used because of one of the following situations:

1. between 15 and 50 percent non-detects and data symmetrically distributed,
2. less than 15 percent non-detects, but fails Shapiro-Wilk test for both normality and lognormality and data symmetrically distributed.

Note: Data was considered to be "symmetrically distributed" if the Standardized Skewness had an Absolute Value of less than or equal to 2.00 (i.e., between –2.00 and 2.00).

Number of NDs – number of non-detects.

@ - maximum result was below the FRL indicating that no statistical result needed to be reported.

APPENDIX A.1
SURFACE SAMPLING RESULTS AND STATISTICS FIRST SAMPLING ROUND

CERTIFICATION UNIT 1

	Primary COC
ID	Uranium, Total
A9P2-C1-01^1	6.03 -
A9P2-C1-02^1	4.27 -
A9P2-C1-03^1	7.56 -
A9P2-C1-03^1-D	7.69 -
A9P2-C1-05^1	8.79 -
A9P2-C1-06^1	6.80 -
A9P2-C1-08^1	3.92 -
A9P2-C1-09^1	4.69 -
A9P2-C1-11^1	4.98 -
A9P2-C1-12^1	4.28 -
A9P2-C1-13^1	5.37 -
A9P2-C1-15^1	1.93 -
A9P2-C1-16^1	5.95 -
Limit	82
Units	ug/kg
Conf. Level	95%
Max. Result	8.79
Max. > = Limit	No
W-statistic Prob. *	- -
Test Procedure	- -
Sample Size	12
Nondetects	0
% Nondetects	0.0%
Est. Mean **	- -
UCL	- -
Prob. > Limit	- -
Pass / Fail	- -

a posteriori Sample	- -
Size calculation	- -

Footnotes for Appendix A.1

The maximum value of the two duplicates was used in all statistical equations.

* W-Statistic Probability is the highest calculated probabilitiy 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 (Normal or N) and the log-transformed data (LogNormal or LN) to test for lognormality.

** Estimated Mean = Estimated measure of central tendency (Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)

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CERTIFICATION UNIT 2

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C2-01^1	1.120 -	1.130 -	1.220 -	1.130 -	34.8 J	0.114 J	4.7 UJ	4.7 U	6.32 J	0.639 J	26.4 J	0.630 J	0.465 U	2.8 U
A9P2-C2-02^1	1.360 -	1.170 -	1.210 -	1.170 -	19.2 J	0.101 J	4.5 UJ	4.5 U	6.10 J	0.590 J	26.6 J	0.616 J	0.399 U	2.6 U
A9P2-C2-04^1	1.280 -	1.130 -	1.130 -	1.130 -	33.7 J	0.108 J	4.7 UJ	4.7 U	6.63 J	0.557 J	26.1 J	0.725 J	0.468 U	2.8 U
A9P2-C2-05^1	1.130 -	1.020 -	1.040 -	1.020 -	31.4 -	0.107 J	4.7 UJ	4.7 U	5.26 J	0.481 J	24.5 J	0.822 J	0.424 U	2.6 U
A9P2-C2-07^1	1.140 -	1.090 -	1.090 -	1.090 -	25.8 J	0.083 J	4.4 UJ	4.4 U	4.10 J	0.324 -	19.4 J	0.677 J	0.397 U	2.4 U
A9P2-C2-08^1	1.090 -	1.040 -	1.050 -	1.040 -	26.6 J	0.089 J	4.8 UJ	4.8 U	4.73 J	0.412 J	20.6 J	0.891 J	0.381 U	2.5 U
A9P2-C2-08^1-D	1.110 -	1.050 -	1.040 -	1.050 -	31.9 J	0.091 J	4.6 UJ	4.6 U	5.54 J	0.437 J	21.8 J	0.982 J	0.362 U	2.4 U
A9P2-C2-09^1	1.430 J	1.120 -	1.120 -	1.120 -	11.9 J	0.075 J	4.3 UJ	4.3 U	8.59 J	0.764 J	17.1 J	0.685 J	0.433 U	2.4 U
A9P2-C2-10^1	1.320 -	1.160 -	1.170 -	1.160 -	23.6 J	0.100 J	4.5 UJ	4.5 U	8.59 J	0.651 J	26.3 J	0.838 J	0.397 U	2.4 U
A9P2-C2-12^1	1.210 -	1.130 -	1.130 -	1.130 -	27.4 J	0.083 J	4.6 UJ	4.6 U	4.78 J	0.361 -	19.8 J	0.673 J	0.393 U	2.7 U
A9P2-C2-13^1	1.310 -	0.990 -	0.980 -	0.990 -	12.0 J	0.079 J	4.2 UJ	4.2 U	5.94 J	0.400 J	15.3 J	0.778 J	0.421 U	2.2 U
A9P2-C2-14^1	1.100 -	1.060 -	1.070 -	1.060 -	27.0 J	0.084 J	4.6 UJ	4.6 U	4.33 J	0.369 -	19.4 J	0.760 J	0.421 U	2.2 U
A9P2-C2-15^1	1.210 -	1.170 -	1.170 -	1.170 -	22.9 J	0.100 J	4.5 UJ	4.5 U	5.53 J	0.404 J	24.2 J	0.906 J	0.388 U	2.4 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.43	1.17	1.22	1.17	34.8	0.114	4.8	4.8 U	8.59	0.764	26.6	0.982	0.468 U	2.8 U
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	--	--	--	--	--	--	--	--	--	58.5% (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	0	12	12	0	0	0	0	12	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Est. Mean **	--	--	--	--	--	--	--	--	--	0.499	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	0.562	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	pass	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	7	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	Pass	--	--	--	--

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CERTIFICATION UNIT 3

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C3-01^2	1.300 -	1.030 -	1.010 -	1.030 -	11.0 -	0.037 UJ	4 J	2.9 J	6.82 J	0.684 J	19.3 J	0.637 J	0.375 U	2.5 UJ
A9P2-C3-01^2-D	1.300 -	1.030 -	1.010 -	1.030 -	11.0 -	0.058 UJ	4.6 -	2.4 J	6.68 J	0.658 J	16.5 J	0.785 J	0.348 U	2.1 UJ
A9P2-C3-02^2	1.140 -	1.030 -	1.030 -	1.030 -	7.64 -	0.062 UJ	4.6 -	4.1 U	7.99 J	0.716 J	20 J	1.000 J	0.377 U	2.1 UJ
A9P2-C3-04^2	0.921 -	0.816 -	0.901 -	0.816 -	7.46 -	0.045 UJ	2.9 J	4 U	4.41 J	0.443 J	9.9 J	0.691 J	0.391 U	1.9 UJ
A9P2-C3-05^2	1.130 -	0.970 -	0.980 -	0.970 -	5.46 -	0.041 UJ	4 U	4 U	5.65 J	0.568 J	12.8 J	0.648 J	0.432 U	1.9 UJ
A9P2-C3-07^2	1.270 -	1.220 -	1.230 -	1.220 -	18.4 -	0.072 UJ	4.2 U	4.2 U	8.84 J	0.609 J	22.1 J	0.745 J	0.401 U	2.3 UJ
A9P2-C3-08^2	1.020 -	0.951 -	0.956 -	0.951 -	5.67 -	0.094 UJ	4.1 U	4.1 U	9.49 J	1.080 J	63.3 J	0.888 J	0.328 U	2.1 UJ
A9P2-C3-10^2	0.936 -	0.810 -	0.812 -	0.810 -	5.28 -	0.045 UJ	1.3 J	4 U	4.96 J	0.460 J	10.6 J	0.688 J	0.306 U	2.3 UJ
A9P2-C3-11^2	0.770 -	0.832 -	0.836 -	0.832 -	5.10 -	0.047 UJ	4 U	4 U	5.25 J	0.441 J	12.5 J	0.741 J	0.315 U	2.2 UJ
A9P2-C3-12^2	0.892 -	0.943 -	0.965 -	0.943 -	7.58 -	0.047 UJ	4.1 U	4.1 U	5.10 J	0.533 J	11.1 J	0.360 J	0.352 U	1.9 UJ
A9P2-C3-13^2	0.729 -	0.761 -	0.758 -	0.761 -	6.05 -	0.043 UJ	2.8 J	3.9 U	4.19 J	0.379 J	8.7 J	0.636 J	0.325 U	2.1 UJ
A9P2-C3-14^2	1.110 -	0.958 -	0.948 -	0.958 -	5.60 -	0.038 UJ	4.1 U	4.1 U	5.11 J	0.552 J	10.3 J	0.588 J	0.342 U	2.1 UJ
A9P2-C3-15^2	1.160 -	1.110 -	1.110 -	1.110 -	16.7 -	0.063 UJ	4.3 U	4.3 U	6.47 J	0.622 J	19.3 J	0.589 J	0.326 U	2.2 UJ
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.3	1.22	1.23	1.22	18.4	0.094 UJ	4.6	2.9	9.49	1.08	63.3	1.00	0.432 U	2.5 UJ
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	--	--	--	--	--	--	--	--	--	51.5% (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	7	11	0	0	0	0	12	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	58.3%	91.7%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Est. Mean **	--	--	--	--	--	--	--	--	--	0.591	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	0.666	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	Inconclusive***	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	48	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	Fail	--	--	--	--

Footnotes for Appendix A.1, Certification Unit 3

*** This CU was remediated to a depth of approximately 1.5 feet and not backfilled during Removal Action 14. Therefore this CU is considered to be representative of subsurface conditions. The statistics for this CU will be included with the subsurface baseline confirmation data set.

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CERTIFICATION UNIT 4

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C4-01^2	1.080 J	1.210 -	1.210 -	1.210 -	26.2 J	0.043 UJ	4.3 U	4.3 UJ	5.67 J	0.691 J	19.7 J	0.454 J	0.340 U	2.4 U
A9P2-C4-02^2	1.160 J	1.200 -	1.230 -	1.200 -	18.4 J	0.049 UJ	4.3 U	4.3 UJ	7.05 J	0.759 J	18.3 J	0.458 J	0.321 -	2.2 U
A9P2-C4-04^2	1.170 J	1.150 -	1.140 -	1.150 -	19.4 J	0.049 UJ	4.2 U	4.2 UJ	6.49 J	0.532 J	19.4 J	0.469 J	0.428 -	2.1 U
A9P2-C4-06^2	1.180 J	1.130 -	1.120 -	1.130 -	12.3 J	0.054 UJ	4.2 U	4.2 UJ	7.11 J	0.624 J	19.8 J	0.715 J	0.362 -	2.3 U
A9P2-C4-07^2	1.060 J	1.200 -	1.190 -	1.200 -	13.9 J	0.085 UJ	4.2 U	4.2 UJ	14.90 J	0.869 J	40.6 -	1.200 -	0.338 U	2.4 U
A9P2-C4-08^2	1.170 J	1.170 -	1.160 -	1.170 -	18.4 J	0.069 UJ	4.2 U	4.2 UJ	9.08 J	0.633 J	26.8 -	0.692 J	0.346 U	2 U
A9P2-C4-09^2	1.150 J	1.080 -	1.090 -	1.080 -	13.7 J	0.056 UJ	4.2 U	4.2 UJ	5.91 J	0.519 J	16.8 J	0.556 J	0.290 U	2.3 U
A9P2-C4-11^2	1.130 J	1.170 -	1.200 -	1.170 -	14.1 J	0.055 UJ	4.3 U	4.3 UJ	6.75 J	0.646 J	19.9 J	0.502 J	0.276 -	2.3 U
A9P2-C4-12^2	1.220 J	1.140 -	1.150 -	1.140 -	14.1 J	0.061 UJ	4.3 U	4.3 UJ	6.54 J	0.597 J	19.7 J	0.528 J	0.259 U	2 U
A9P2-C4-13^2	1.140 J	1.100 -	1.120 -	1.100 -	13.6 J	0.060 UJ	4.3 U	4.3 UJ	8.14 J	0.646 J	19.4 J	0.683 J	0.293 U	2 U
A9P2-C4-13^2-D	0.956 J	1.100 -	1.110 -	1.100 -	13.6 J	0.053 UJ	4.2 U	4.2 UJ	6.81 J	0.601 J	17 J	0.579 J	0.296 U	2.1 U
A9P2-C4-14^2	1.100 J	1.190 -	1.200 -	1.190 -	12.6 J	0.076 UJ	4.2 U	4.2 UJ	10.50 J	0.811 J	29.2 -	0.992 J	0.311 U	2.5 U
A9P2-C4-16^2	1.010 J	1.100 -	1.100 -	1.100 -	14.9 J	0.076 UJ	4.3 U	4.3 U	8.82 J	0.792 J	19.9 J	0.690 J	0.342 U	2.1 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.22	1.21	1.23	1.21	26.2	0.085 UJ	4.3 U	4.3 U	14.9	0.869	40.6	1.2	0.428	2.5 U
Max. > = Limit	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
W-statistic Prob. *	--	--	--	--	--	--	--	--	20.4% (LN)	68.5% (LN)	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	Lognormal	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	12	0	0	0	0	8	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	66.7%	100.0%
Est. Mean **	--	--	--	--	--	--	--	--	8.08	0.677	--	--	--	--
UCL	--	--	--	--	--	--	--	--	9.09	0.724	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	pass	Inconclusive***	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	9	22	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	Pass	Fail	--	--	--	--

Footnote for Appendix A.1, Certification Unit 4

***This CU was remediated to a depth of approximately 1.5 feet and not backfilled during Removal Action 14. Therefore this CU is considered to be representative of subsurface conditions. The statistics for this CU will be included with the subsurface baseline confirmation data set.

000048

5407

CERTIFICATION UNIT 5

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C5-01^2	1.150 -	0.710 -	0.709 -	0.710 -	4.31 -	0.048 UJ	3.8 UJ	3.8 U	5.74 J	0.482 J	10.0 J	1.150 -	0.316 U	2.1 U
A9P2-C5-02^2	1.400 -	1.220 -	1.220 -	1.220 -	16.6 -	0.052 UJ	4.2 UJ	4.2 U	6.34 J	0.639 J	18.2 J	0.537 J	0.375 U	2.4 U
A9P2-C5-03^2	0.973 -	0.670 -	0.696 -	0.670 -	3.83 -	0.050 UJ	3.8 UJ	3.8 U	5.80 J	0.442 J	10.0 J	1.220 -	0.289 U	1.7 U
A9P2-C5-05^2	1.320 -	1.150 -	1.160 -	1.150 -	25.3 -	0.083 UJ	4.2 UJ	4.2 U	5.94 J	0.542 J	18.8 J	0.622 J	0.343 U	2.0 U
A9P2-C5-07^2	1.140 -	1.180 -	1.180 -	1.180 -	19.9 -	0.075 UJ	6.9 J	4.2 U	5.61 J	0.564 J	17.0 J	0.596 J	0.363 U	2.5 U
A9P2-C5-08^2	1.290 -	1.230 -	1.260 -	1.230 -	14.6 -	0.054 UJ	4.2 UJ	4.2 U	6.64 J	0.637 J	18.6 J	0.725 J	0.382 U	2.5 U
A9P2-C5-09^2	1.050 -	0.956 -	0.943 -	0.956 -	18.2 -	0.059 UJ	3.9 UJ	3.9 U	5.18 J	0.434 J	15.7 J	0.681 J	0.374 J	1.9 U
A9P2-C5-10^2	1.310 -	1.140 -	1.130 -	1.140 -	24.0 -	0.067 UJ	3.2 J	4.2 U	6.47 J	0.523 J	20.7 -	0.646 J	0.742 J	2.4 U
A9P2-C5-10^2-D	1.280 -	1.180 -	1.150 -	1.180 -	23.6 -	0.075 UJ	4.2 UJ	4.2 U	5.73 J	0.494 J	19.0 J	0.627 J	0.489 -	2.6 U
A9P2-C5-11^2	1.440 -	1.190 -	1.200 -	1.190 -	30.2 -	0.096 UJ	4.2 UJ	4.2 U	7.24 J	0.589 J	23.3 -	0.671 J	0.525 -	2.5 U
A9P2-C5-13^2	1.200 -	1.080 -	1.080 -	1.080 -	17.4 -	0.063 UJ	4.2 UJ	4.2 U	7.00 J	0.563 J	18.7 J	0.631 J	0.466 J	2.1 U
A9P2-C5-15^2	1.240 -	1.160 -	1.170 -	1.160 -	21.4 -	0.067 UJ	2 J	4.2 U	5.47 J	0.518 J	17.3 J	0.548 J	0.344 U	2.0 U
A9P2-C5-16^2	1.220 -	1.200 -	1.180 -	1.200 -	13.7 -	0.075 UJ	4.2 UJ	4.2 U	8.42 J	0.754 J	19.7 J	0.890 J	0.378 U	2.3 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.44	1.23	1.26	1.23	30.2	0.096 UJ	6.9	4.2 U	8.42	0.754	23.3	1.22	0.742	2.6 U
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	- -	- -	- -	- -	- -	- -	- -	- -	- -	88.3% (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	12	0	0	0	0	8	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	66.7%	100.0%
Est. Mean **	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.558	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.595	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	pass	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -	9	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -	Pass	- -	- -	- -	- -

000049

5407

CERTIFICATION UNIT 6

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C6-01^2	0.949 -	1.010 -	1.010 -	1.010 -	19.7 -	0.064 UJ	4.2 UJ	4.2 U	4.95 -	0.357 J	18.8 J	0.801 J	0.493 -	2.5 U
A9P2-C6-02^2	0.902 -	1.060 -	1.060 -	1.060 -	19.7 -	0.065 UJ	4 UJ	4 U	4.34 -	0.299 J	16.6 J	0.773 J	0.360 -	2.3 U
A9P2-C6-04^2	0.988 -	0.921 -	0.917 -	0.921 -	19.7 -	0.058 UJ	4.2 UJ	4.2 U	6.27 -	0.431 J	25.3 -	0.878 J	0.363 U	2.1 U
A9P2-C6-06^2	1.170 -	0.979 -	0.944 -	0.979 -	10.7 -	0.045 UJ	4.2 UJ	4.2 U	7.98 -	0.404 J	15.2 J	1.320 -	0.369 U	2.2 U
A9P2-C6-07^2	1.190 -	1.110 -	1.110 -	1.110 -	17.0 -	0.041 UJ	4.1 UJ	4.1 U	6.01 -	0.374 J	17.2 J	0.944 J	0.385 U	2.4 U
A9P2-C6-08^2	1.020 -	1.050 -	1.040 -	1.050 -	1.95 U	0.052 UJ	4.2 UJ	4.2 U	9.59 -	0.560 J	19 J	1.290 -	0.393 U	2.5 U
A9P2-C6-10^2	1.360 -	1.090 -	1.030 -	1.090 -	16.2 -	0.078 UJ	4.2 UJ	4.2 U	9.22 -	0.741 J	28.2 -	1.070 -	0.372 U	2.4 U
A9P2-C6-11^2	1.350 -	1.160 -	1.160 -	1.160 -	13.6 -	0.048 UJ	4.2 UJ	4.2 U	6.39 -	0.656 J	16.3 J	0.573 J	0.382 U	2.5 U
A9P2-C6-12^2	1.080 -	1.150 -	1.160 -	1.150 -	1.70 -	0.068 UJ	4 UJ	4 U	10.20 -	0.842 J	25 -	0.824 J	0.417 U	2.4 U
A9P2-C6-13^2	1.070 -	1.090 -	1.020 -	1.090 -	1.54 U	0.046 UJ	4 UJ	4 U	4.71 -	0.414 J	17.4 J	0.695 J	0.391 -	2.3 U
A9P2-C6-14^2	1.110 -	1.120 -	1.060 -	1.120 -	1.75 U	0.039 UJ	4.1 UJ	4.1 U	7.02 -	0.632 J	18.9 J	0.759 J	0.459 U	2.3 U
A9P2-C6-16^2	1.200 -	1.140 -	1.140 -	1.140 -	2.03 U	0.074 UJ	4.2 UJ	4.2 U	8.69 -	0.643 J	26.8 -	0.835 J	0.376 -	2.4 U
A9P2-C6-16^2-D	1.200 -	1.130 -	1.120 -	1.130 -	1.48 -	0.058 UJ	4.2 UJ	4.2 U	8.37 -	0.594 J	24.5 -	0.833 J	0.401 U	2.5 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.36	1.16	1.16	1.16	19.7	0.078 UJ	4.2 UJ	4.2 U	10.2	0.842	28.2	1.32	0.493	2.5 U
Max. > = Limit	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
W-statistic Prob. *	- -	- -	- -	- -	- -	- -	- -	- -	50.4% (LN)	50.8% (LN)	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	Lognormal	Lognormal	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	3	12	12	12	0	0	0	0	8	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	25.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	66.7%	100.0%
Est. Mean **	- -	- -	- -	- -	- -	- -	- -	- -	7.15	0.532	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	8.09	0.615	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	pass	pass	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	5	13	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	Pass	Fail	- -	- -	- -	- -

000050

5407

CERTIFICATION UNIT 7

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C7-01^2	1.210 -	1.100 -	1.090 -	1.100 -	12.7 -	0.061 UJ	4.1 UJ	4.1 U	4.61 -	0.496 J	19.8 J	0.724 J	0.462 U	2.4 U
A9P2-C7-02^2	1.160 -	1.070 -	1.040 -	1.070 -	13.1 -	0.077 UJ	4.2 UJ	4.2 U	4.88 -	0.453 J	20.5 J	0.785 J	0.376 U	2.1 U
A9P2-C7-03^2	1.190 -	1.070 -	1.070 -	1.070 -	21.6 -	0.073 UJ	4.3 UJ	4.3 U	5.80 -	0.507 J	21.9 J	0.807 J	0.382 U	2.4 U
A9P2-C7-05^2	0.974 -	1.110 -	1.110 -	1.110 -	14.2 -	0.074 UJ	4.1 UJ	4.1 U	8.23 -	0.515 J	15.8 J	1.290 -	0.401 U	2.5 U
A9P2-C7-06^2	0.828 -	0.958 -	0.952 -	0.958 -	18.3 -	0.094 UJ	4.1 UJ	4.1 U	5.53 -	0.426 J	18.2 J	1.160 -	0.401 U	2.3 U
A9P2-C7-06^2-D	0.873 -	0.948 -	0.942 -	0.948 -	19.0 -	0.083 UJ	4.1 UJ	4.1 U	5.69 -	0.441 J	21.6 J	1.040 -	0.656 -	2.3 U
A9P2-C7-08^2	0.922 -	0.952 -	0.961 -	0.952 -	23.9 -	0.071 UJ	5.6 J	4.2 U	4.40 -	0.399 J	18.2 J	0.904 J	0.338 U	2.4 U
A9P2-C7-10^2	1.130 -	1.030 -	1.030 -	1.030 -	8.53 -	0.075 UJ	4 UJ	4 U	5.14 -	0.522 J	17.3 J	0.971 J	0.371 U	2 U
A9P2-C7-11^2	1.200 -	1.010 -	1.030 -	1.010 -	20.7 -	0.084 UJ	4.3 UJ	4.3 U	4.85 -	0.505 J	19.1 J	0.811 J	0.372 U	2.1 U
A9P2-C7-12^2	1.080 -	1.070 -	1.080 -	1.070 -	14.1 -	0.059 UJ	4.1 UJ	4.1 U	9.41 -	0.688 J	19.3 J	1.310 -	0.644 -	1.9 U
A9P2-C7-13^2	1.090 -	1.120 -	1.130 -	1.120 -	14.5 -	0.055 UJ	2.5 J	4.2 U	6.75 -	0.455 J	15.3 J	1.070 -	0.386 U	2.2 U
A9P2-C7-14^2	1.220 -	1.070 -	1.060 -	1.070 -	9.59 -	0.062 UJ	4 UJ	4 U	5.60 -	0.401 J	13.5 J	1.130 -	0.479 U	2.1 U
A9P2-C7-15^2	1.280 -	1.140 -	1.150 -	1.140 -	10.6 -	0.068 UJ	4.2 UJ	4.2 U	4.45 -	0.395 J	19.2 J	0.948 J	0.417 U	2.5 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.28	1.14	1.15	1.14	23.9	0.094 UJ	5.6	4.3 U	9.41	0.688	21.9	1.31	0.656	2.5 U
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	- -	- -	- -	- -	- -	- -	- -	- -	- -	16.6% (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	10	12	0	0	0	0	10	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	83.3%	100.0%	0.0%	0.0%	0.0%	0.0%	83.3%	100.0%
Est. Mean **	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.482	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.513	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	pass	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -	3	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -	Pass	- -	- -	- -	- -

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5407

CERTIFICATION UNIT 8

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C8-01^2	1.220 -	1.010 -	0.998 -	1.010 -	12.9 -	0.073 UJ	4.2 UJ	4.2 U	4.68 -	0.375 J	15.7 J	0.852 J	0.436 U	2.4 U
A9P2-C8-02^2	1.200 -	1.020 -	1.030 -	1.020 -	10.6 -	0.067 UJ	4.2 UJ	4.2 U	5.09 -	0.407 J	17.2 J	0.994 J	0.421 U	2.4 U
A9P2-C8-04^2	1.190 -	1.010 -	1.010 -	1.010 -	21.4 -	0.075 UJ	4.2 UJ	4.2 U	6.14 -	0.432 J	16.4 J	1.090 -	0.434 U	2.3 U
A9P2-C8-06^2	1.180 -	1.020 -	1.010 -	1.020 -	16.8 -	0.067 UJ	4.2 UJ	4.2 U	4.19 -	0.363 J	16.7 J	0.789 J	0.444 U	2 U
A9P2-C8-07^2	1.000 -	0.827 -	0.832 -	0.827 -	4.61 -	0.081 UJ	4.2 UJ	4.2 U	8.77 -	0.565 J	12.1 J	1.290 -	0.477 U	2.6 U
A9P2-C8-08^2	1.180 -	1.130 -	1.130 -	1.130 -	16.2 -	0.072 UJ	4.2 UJ	4.2 U	4.88 -	0.389 J	19.2 J	0.758 J	0.468 U	2.3 U
A9P2-C8-09^2	1.330 -	1.120 -	1.130 -	1.120 -	11.4 -	0.060 UJ	4.2 UJ	4.2 U	5.46 -	0.403 J	15.9 J	1.040 -	0.424 U	2.1 U
A9P2-C8-10^2	1.210 -	1.080 -	1.070 -	1.080 -	13.9 -	0.062 UJ	4.2 UJ	4.2 U	4.13 -	0.353 J	19.5 J	0.727 J	0.433 U	2.3 U
A9P2-C8-12^2	1.070 -	0.986 -	0.984 -	0.986 -	11.0 -	0.060 UJ	4.1 UJ	4.1 U	4.74 -	0.343 J	13.4 J	0.855 J	0.450 U	2.5 U
A9P2-C8-12^2-D	1.030 -	0.923 -	0.918 -	0.923 -	11.6 -	0.060 UJ	4.1 UJ	4.1 U	5.24 -	0.371 J	13.7 J	0.985 J	0.449 U	2.4 U
A9P2-C8-13^2	1.210 -	1.170 -	1.190 -	1.170 -	14.3 -	0.067 UJ	4.2 UJ	4.2 U	6.94 -	0.538 J	17.1 J	0.718 J	0.457 U	2.5 U
A9P2-C8-15^2	1.290 -	1.040 -	1.040 -	1.040 -	16.4 -	0.068 UJ	4.2 UJ	4.2 U	5.84 -	0.372 J	21.8 -	0.829 J	0.431 U	2 U
A9P2-C8-16^2	1.220 -	0.997 -	0.994 -	0.997 -	15.1 -	0.054 UJ	4.2 UJ	4.2 U	5.03 -	0.362 J	17.4 J	0.855 J	0.435 U	1.9 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.33	1.17	1.19	1.17	21.4	0.081 UJ	4.2 UJ	4.2 UJ	8.77	0.565	21.8	1.29	0.477 U	2.6 U
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	12	12	0	0	0	0	12	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Est. Mean **	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--	--	--	--
a posteriori Sample	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Size calculation	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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CERTIFICATION UNIT 9

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C9-01^2	1.310 -	1.180 -	1.180 -	1.180 -	14.7 -	0.080 UJ	4.3 UJ	4.3 U	12.30 J	1.070 J	25.1 J	0.940 J	0.427 -	2.4 U
A9P2-C9-03^2	1.430 -	1.190 -	1.190 -	1.190 -	14.3 -	0.061 UJ	4.3 UJ	4.3 U	6.78 J	0.591 J	19 J	0.677 J	0.460 U	2.6 U
A9P2-C9-04^2	1.370 -	1.180 -	1.160 -	1.180 -	14.9 -	0.077 UJ	4.4 UJ	4.4 U	7.04 J	0.525 J	21.3 J	0.763 J	0.444 -	2.5 U
A9P2-C9-04^2-D	1.410 -	1.130 -	1.140 -	1.130 -	12.4 -	0.067 UJ	4.3 UJ	4.3 U	7.26 J	0.520 J	17.7 J	0.758 J	0.427 U	2.4 UJ
A9P2-C9-06^2	1.250 -	0.964 -	0.951 -	0.964 -	9.69 -	0.060 UJ	4.2 UJ	4.2 U	5.62 J	0.364 J	14.3 J	1.010 -	0.796 -	2.4 UJ
A9P2-C9-07^2	1.240 -	1.180 -	1.160 -	1.180 -	12.3 -	0.060 UJ	4.3 UJ	4.3 U	7.68 J	0.450 J	17.5 J	0.895 J	0.542 -	2.5 UJ
A9P2-C9-08^2	1.210 -	1.020 -	1.010 -	1.020 -	14.9 -	0.065 UJ	4.3 UJ	4.3 U	5.45 J	0.384 J	16.9 J	0.855 J	0.472 -	2.5 UJ
A9P2-C9-10^2	1.410 -	1.210 -	1.190 -	1.210 -	14.6 -	0.083 UJ	4.3 UJ	4.3 U	10.60 J	0.699 J	24.9 J	0.913 J	0.717 -	2.6 UJ
A9P2-C9-11^2	1.220 -	1.150 -	1.140 -	1.150 -	9.04 -	0.044 UJ	4.2 UJ	4.2 U	9.94 J	0.963 J	21.4 J	0.814 J	0.399 -	2.6 U
A9P2-C9-12^2	1.420 -	1.130 -	1.150 -	1.130 -	13.9 -	0.090 UJ	4.3 UJ	4.3 U	9.69 J	0.713 J	23.1 J	0.765 J	0.633 -	2.3 U
A9P2-C9-13^2	1.320 -	1.090 -	1.110 -	1.090 -	12.0 -	0.067 UJ	4.3 UJ	4.3 U	6.32 J	0.423 J	20.5 J	0.798 J	0.388 -	2.5 UJ
A9P2-C9-14^2	1.220 -	1.080 -	1.070 -	1.080 -	12.0 -	0.057 UJ	4.2 UJ	4.2 U	4.21 J	0.331 J	15.4 J	0.758 J	0.427 -	2.3 UJ
A9P2-C9-15^2	1.220 -	1.150 -	1.150 -	1.150 -	15.5 -	0.073 UJ	4.2 UJ	4.2 U	6.65 J	0.460 J	23.4 J	0.744 J	0.457 -	2.5 UJ
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.43	1.21	1.19	1.21	15.5	0.090 UJ	4.4 UJ	4.4 U	12.3	1.07	25.1	1.01	0.796	2.6 U
Max. > = Limit	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
W-statistic Prob. *	- -	- -	- -	- -	- -	- -	- -	- -	90.1% (LN)	47.3% (LN)	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	Lognormal	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	12	0	0	0	0	1	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	8.3%	100.0%
Est. Mean **	- -	- -	- -	- -	- -	- -	- -	- -	7.74	0.583	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	8.87	0.690	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	pass	Inconclusive	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	8	37	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	Pass	Fail	- -	- -	- -	- -

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CERTIFICATION UNIT 10

	Primary COCs					Secondary COCs								
ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Antimony	Aroclor-1254	Aroclor-1260	Arsenic	Beryllium	Lead	Molybdenum	Technetium-99	Tetrachloroethene
A9P2-C10-01^2	1.180 -	1.120 -	1.120 -	1.120 -	13.5 J	0.065 UJ	4.1 UJ	4.1 U	7.74 -	0.779 -	15.2 J	0.621 J	0.306 U	2.2 U
A9P2-C10-02^2	1.350 -	1.150 -	1.150 -	1.150 -	19.5 J	0.088 UJ	4.3 UJ	4.3 U	7.54 -	0.643 -	19.4 J	0.800 J	0.314 U	2.4 U
A9P2-C10-04^2	1.360 -	1.120 -	1.140 -	1.120 -	19.0 J	0.083 UJ	4.3 UJ	4.3 U	7.46 -	0.572 -	19.4 J	0.754 J	0.294 U	2.3 U
A9P2-C10-05^2	1.090 -	1.080 -	1.090 -	1.080 -	19.8 J	0.071 UJ	4.4 UJ	4.4 U	4.45 -	0.337 -	19.3 J	0.736 J	0.279 U	2.4 U
A9P2-C10-06^2	0.886 -	0.840 -	0.832 -	0.840 -	20.2 J	0.058 UJ	4.1 UJ	4.1 U	3.86 -	0.321 -	12.0 J	0.938 J	0.272 U	2.4 U
A9P2-C10-07^2	1.170 -	1.050 -	1.040 -	1.050 -	14.7 J	0.055 UJ	4.2 UJ	4.2 U	4.55 -	0.360 -	15.6 J	0.837 J	0.265 U	2.5 U
A9P2-C10-09^2	1.220 -	1.130 -	1.180 -	1.130 -	19.5 J	0.067 UJ	4.3 UJ	4.3 U	6.57 -	0.638 -	18.5 J	0.713 J	0.301 U	2.4 UJ
A9P2-C10-09^2-D	1.270 -	1.060 -	1.030 -	1.060 -	23.5 J	0.073 UJ	4.2 UJ	4.2 U	4.91 -	0.468 -	17.9 J	0.575 J	0.249 U	2.4 U
A9P2-C10-10^2	1.110 -	1.120 -	1.120 -	1.120 -	18.4 -	0.061 UJ	4.2 UJ	4.2 U	6.01 -	0.384 -	22.0 J	0.847 J	0.303 U	2.3 U
A9P2-C10-12^2	1.140 -	1.180 -	1.180 -	1.180 -	14.5 J	0.072 UJ	4.2 UJ	4.2 U	5.35 -	0.347 -	16.3 J	0.787 J	0.301 U	2.2 U
A9P2-C10-13^2	1.160 -	1.070 -	1.050 -	1.070 -	14.9 J	0.077 UJ	4.2 UJ	4.2 U	4.72 -	0.315 -	18.2 J	0.903 J	0.237 U	2.4 U
A9P2-C10-14^2	1.130 -	0.983 -	0.980 -	0.983 -	11.7 J	0.064 UJ	4.1 UJ	4.1 U	6.00 -	0.391 -	13.8 J	1.170 -	0.275 U	2.4 U
A9P2-C10-15^2	1.170 -	1.000 -	0.997 -	1.000 -	15.4 J	0.081 UJ	4.2 UJ	4.2 U	5.99 -	0.348 -	22.0 J	1.150 -	0.350 U	2.4 U
Limit	1.5	1.4	1.5	1.4	50	0.61	40	40	9.6	0.62	400 (200)	13 (10)	1.0	1000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	mg/kg	mg/kg	pCi/g	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.36	1.18	1.18	1.18	23.5	0.088 UJ	4.4 UJ	4.4 U	7.74	0.779	22	1.17	0.35 U	2.5 U
Max. > = Limit	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. *	- -	- -	- -	- -	- -	- -	- -	- -	- -	1.8% (LN)	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -	Wilcoxon	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	12	12	0	0	0	0	12	12
% Nondetects	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Est. Mean **	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.372	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.572	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.0046	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	pass	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -	6	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -	Pass	- -	- -	- -	- -

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CERTIFICATION UNIT 11

ID	Primary COC Radium-228
A9P2-C11-01^1-R	1.000 -
A9P2-C11-02^1-R	0.783 -
A9P2-C11-04^1-R	1.050 -
A9P2-C11-06^1-R	1.110 -
A9P2-C11-07^1-R	1.160 -
A9P2-C11-08^1-R	1.170 -
A9P2-C11-09^1-R	0.977 -
A9P2-C11-11^1-R	0.451 -
A9P2-C11-12^1-R-D	0.734 -
A9P2-C11-12^1-R	0.736 -
A9P2-C11-13^1-R	0.427 -
A9P2-C11-15^1-R	0.757 -
A9P2-C11-16^1-R	0.438 -
Limit	1.8
Units	pCi/g
Conf. Level	95%
Max. Result	1.17
Max. > = Limit	No
W-statistic Prob. *	9.8% (N)
Test Procedure	Normal
Sample Size	12
Nondetects	0
% Nondetects	0.0%
Est. Mean **	0.83825
UCL	0.98463983
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

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APPENDIX A.2
BASELINE CONFIRMATION RESULTS AND STATISTICS

Baseline Confirmation Summary of Constituents
Where No Results Exceeded 95th Percentile Background Concentration

Beryllium (mg/kg) Subsurface

	A9P2
Samples	88
Average	0.720
Median	0.715
Std. Dev.	0.171
Minimum	0.310
Maximum	1.150
95th Percentile Background	1.44

Molybdenum (mg/kg) Subsurface

	A9P2
Samples	40
Average	1.17
Median	1.08
Std. Dev.	0.42
Minimum	0.56
Maximum	2.57
95th Percentile Background	5.24

Baseline Confirmation

Lead (mg/kg) Subsurface

	A9P2	Background
Samples	40	140
Average	18.2	20.0
Median	17.0	19.5
Std. Dev.	7.3	6.5
Minimum	8.2	8.9
Maximum	51.3	42.0
Lower Quartile	13.9	14.5
Upper Quartile	20.5	24.1
UCL-Mean (90%)	19.1	20.5
t-Test Prob.	**0.923**	
F-test (SD) Prob.	**0.295**	
W-test (median) P	**0.976**	
K-S (distr.) Prob.	**0.037**	

INTERPRETATION
No Significant Difference
No Significant Difference
No Significant Difference
Datasets are different

CONCLUSION: There is no evidence that A9P2 is greater than Background.

Baseline Confirmation

Arsenic (mg/kg) Subsurface

	A9P2	Background	INTERPRETATION
Samples	40	140	
Average	10.92	7.54	
Median	11.10	7.40	
Std. Dev.	2.44	2.96	
Minimum	5.99	0.69	
Maximum	17.00	15.80	
Lower Quartile	9.17	5.31	
Upper Quartile	12.65	9.75	
UCL-Mean (90%)	11.42	7.86	
t-Test Prob.	**4.45E-10**		A9P2 > Back at the 99% level
F-test (SD) Prob.	**0.162**		Std. Dev. Similar
W-test (median) P	**2.94E-09**		A9P2 > Back at the 99% level
K-S (distr.) Prob.	**2.24E-07**		A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Arsenic (mg/kg) Subsurface (only CUs with exceedances of Background 95th percentile)

	A9P2	Background 95th Percentile	INTERPRETATION
Samples	35		Excluding CU 4
Average	10.82		
Median	10.80		
Std. Dev.	2.57		
Minimum	5.99		
Maximum	17.00		
Lower Quartile	9.02		
Upper Quartile	12.70		
UCL-Mean (90%)	11.39		
UCL-Mean (95%)	11.56	12.40	
t-Test Prob.	**0.0005**		Okay @ 5%
W-test (median) P	**0.0296**		Okay @ 5%

Baseline Confirmation

Radium-226 (pCi/g) Subsurface

	A9P2	Back
Samples	40	140
Average	1.279	1.174
Median	1.300	1.267
Std. Dev.	0.172	0.302
Minimum	0.830	0.515
Maximum	1.610	1.687
Lower Quartile	1.195	0.880
Upper Quartile	1.390	1.435
UCL-Mean (95%)	1.325	1.216
t-Test Prob.	0.005	
F-test (SD) Prob.	0.000	
W-test (median) P	0.210	
K-S (distr.) Prob.	0.003	

INTERPRETATION
A9P2 > Back at the 99% level
Std. Dev. Dissimilar
A9P2 & Back no sig. diff.
A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Radium-226 (pCi/g) Subsurface (only CUs with exceedances of Background 95th percentile)

	A9P2	Background 95th Percentile
Samples	10	
Average	1.367	
Median	1.335	
Std. Dev.	0.138	
Minimum	1.230	
Maximum	1.610	
Lower Quartile	1.260	
Upper Quartile	1.390	
UCL-Mean (90%)	1.427	
UCL-Mean (95%)	1.447	1.564
t-Test Prob.	0.001	
W-test (median) P	0.007	

Excluding all CUs except 3 & 9

INTERPRETATION
Okay @ 5%
Okay @ 5%

Uranium, Total (mg/kg) Subsurface

	A9P2	Back	INTERPRETATION
Samples	40	140	
Average	5.360	2.557	
Median	5.020	2.568	
Std. Dev.	1.790	1.337	
Minimum	2.220	0.792	
Maximum	11.500	8.823	
Lower Quartile	4.690	1.193	
Upper Quartile	5.810	3.411	
UCL-Mean (95%)	5.837	2.744	
t-Test Prob.	1.71E-12		A9P2 > Back at the 99% level
F-test (SD) Prob.	1.48E-02		Std. Dev. Dissimilar
W-test (median) P	0.00E+00		A9P2 > Back at the 99% level
K-S (distr.) Prob.	0.00E+00		A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Baseline Confirmation

Radium-228 (pCi/g) Subsurface

	A9P2	Back
Samples	40	140
Average	1.123	0.944
Median	1.125	0.997
Std. Dev.	0.091	0.244
Minimum	0.950	0.467
Maximum	1.320	1.321
Lower Quartile	1.070	0.713
Upper Quartile	1.185	1.161
UCL-Mean (95%)	1.217	0.978
t-Test Prob.	**4.05E-07**	
F-test (SD) Prob.	**4.81E-10**	
W-test (median) P	**1.68E-04**	
K-S (distr.) Prob.	**4.51E-06**	

INTERPRETATION
A9P2 > Back at the 99% level
Std. Dev. Dissimilar
A9P2 > Back at the 99% level
A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Radium-228 (pCi/g) Subsurface (only CUs with exceedances of Background 95th percentile)

	A9P2	Background 95th Percentile
Samples	5	
Average	1.216	
Median	1.220	
Std. Dev.	0.032	
Minimum	1.180	
Maximum	1.260	
Lower Quartile	1.190	
Upper Quartile	1.230	
UCL-Mean (95%)	1.230	1.270
t-Test Prob.	**0.0099**	
W-test (median) P	**0.0295**	

Excluding all CUs except 4

INTERPRETATION
Okay @ 5%
Okay @ 5%

Baseline Confirmation

Thorium-228 (pCi/g) Subsurface

	A9P2	Back
Samples	40	140
Average	1.226	0.926
Median	1.130	0.966
Std. Dev.	0.098	0.239
Minimum	0.914	0.459
Maximum	1.320	1.305
Lower Quartile	1.055	0.702
Upper Quartile	1.200	1.135
UCL-Mean (95%)	1.198	0.959
t-Test Prob.	**5.12E-07**	
F-test (SD) Prob.	**8.78E-09**	
W-test (median) P	**6.62E-06**	
K-S (distr.) Prob.	**3.67E-06**	

INTERPRETATION
A9P2 > Back at the 99% level
Std. Dev. Dissimilar
A9P2 > Back at the 99% level
A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Thorium-228 (pCi/g) Subsurface (only CUs with exceedances of Background 95th percentile)

	A9P2	Background 95th Percentile
Samples	15	
Average	1.200	
Median	1.200	
Std. Dev.	0.082	
Minimum	0.977	
Maximum	1.320	
Lower Quartile	1.160	
Upper Quartile	1.250	
UCL-Mean (95%)	1.218	1.250
t-Test Prob.	**0.0025**	
W-test (median) P	**0.0022**	

Excluding all CUs except 3, 4 & 6

INTERPRETATION
Okay @ 5%
Okay @ 5%

Baseline Confirmation

Thorium-232 (pCi/g) Subsurface

	A9P2	Back
Samples	40	140
Average	1.123	0.944
Median	1.125	0.997
Std. Dev.	0.091	0.244
Minimum	0.950	0.467
Maximum	1.320	1.321
Lower Quartile	1.070	0.713
Upper Quartile	1.185	1.161
UCL-Mean (95%)	1.147	0.978
t-Test Prob.	**4.05E-07**	
F-test (SD) Prob.	**4.81E-10**	
W-test (median) P	**1.68E-04**	
K-S (distr.) Prob.	**4.51E-06**	

INTERPRETATION
A9P2 > Back at the 99% level
Std. Dev. Dissimilar
A9P2 > Back at the 99% level
A9P2 > Back at the 99% level

CONCLUSION: There is strong evidence that A9P2 is greater than Background.

Thorium-232 (pCi/g) Subsurface (only CUs with exceedances of Background 95th percentile)

	A9P2	Background 95th Percentile
Samples	5	
Average	1.216	
Median	1.220	
Std. Dev.	0.032	
Minimum	1.180	
Maximum	1.260	
Lower Quartile	1.190	
Upper Quartile	1.230	
UCL-Mean (95%)	1.230	1.270
t-Test Prob.	**0.0099**	
W-test (median) P	**0.0295**	

Excluding all CUs except 4

INTERPRETATION
Okay @ 5%
Okay @ 5%

APPENDIX A.3
SURFACE SAMPLING RESULTS AND STATISTICS SECOND SAMPLING ROUND

CERTIFICATION UNIT 3

ID	Secondary COC Beryllium
A9P2-C3-1^2	0.684 -
A9P2-C3-2^2	0.716 -
A9P2-C3-4^2	0.443 -
A9P2-C3-5^2	0.568 -
A9P2-C3-7^2	0.609 -
A9P2-C3-8^2	1.080 -
A9P2-C3-10^2	0.460 -
A9P2-C3-11^2	0.441 -
A9P2-C3-12^2	0.533 -
A9P2-C3-13^2	0.379 -
A9P2-C3-14^2	0.552 -
A9P2-C3-15^2	0.622 -
A9P2-PC3-17^2	0.927 -
A9P2-PC3-18^2	0.764 -
A9P2-PC3-19^2	0.470 -
A9P2-PC3-20^2	0.622 -
A9P2-PC3-21^2	0.961 -
A9P2-PC3-22^2	0.366 -
A9P2-PC3-23^2	0.678 -
A9P2-PC3-24^2	0.584 -
A9P2-PC3-25^2	0.523 -
A9P2-PC3-26^2	0.608 -
A9P2-PC3-27^2	0.665 -
A9P2-PC3-28^2	0.778 -
Limit	0.62
Units	mg/kg
Conf. Level	90%
Max. Result	1.08
Max. > = Limit	Yes
W-statistic Prob. *	88.0% (LN)
Test Procedure	Lognormal
Sample Size	24
Nondetects	0
% Nondetects	0.0%
Est. Mean **	0.627
UCL	0.679
Prob. > Limit	- -
Pass / Fail	Inconclusive***

a posteriori Sample	469
Size calculation	Fail

Footnotes for Appendix A.3

The maximum value of the two duplicates was used in all statistical equations.

* W-Statistic Probability is the highest calculated probabilitiy 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 (Normal or N) and the log-transformed data (LogNormal or LN) to test for lognormality.

** Estimated Mean = Estimated measure of central tendency (Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)

Footnote for Appendix A.3, Certification Unit 3

***This CU was remediated to a depth of approximately 1.5 feet and not backfilled during Removal Action 14. Therefore this CU is considered to be representative of subsurface conditions. The statistics for this CU will be included with the subsurface baseline confirmation data set.

CERTIFICATION UNIT 4

	Secondary COC
ID	Beryllium
A9P2-C4-1^2	0.691 -
A9P2-C4-2^2	0.759 -
A9P2-C4-4^2	0.532 -
A9P2-C4-6^2	0.624 -
A9P2-C4-7^2	0.869 -
A9P2-C4-8^2	0.633 -
A9P2-C4-9^2	0.519 -
A9P2-C4-11^2	0.646 -
A9P2-C4-12^2	0.597 -
A9P2-C4-13^2	0.646 -
A9P2-C4-14^2	0.811 -
A9P2-C4-16^2	0.792 -
A9P2-PC4-17^2	0.734 -
A9P2-PC4-18^2	0.543 -
A9P2-PC4-19^2	0.637 -
A9P2-PC4-20^2	0.669 -
A9P2-PC4-21^2	0.749 -
A9P2-PC4-22^2	0.484 -
A9P2-PC4-23^2	0.593 -
A9P2-PC4-24^2	0.563 -
A9P2-PC4-25^2	0.713 -
A9P2-PC4-26^2	0.662 -
A9P2-PC4-27^2	0.494 -
A9P2-PC4-28^2	0.708 -
Limit	0.62
Units	mg/kg
Conf. Level	90%
Max. Result	0.869
Max. > = Limit	Yes
W-statistic Prob. *	89.9% (N)
Test Procedure	Normal
Sample Size	24
Nondetects	0
% Nondetects	0.0%
Est. Mean **	0.653
UCL	0.680
Prob. > Limit	- -
Pass / Fail	Inconclusive***

a posteriori Sample	45
Size calculation	Fail

Footnote for Appendix A.3, Certification Unit 4
***This CU was remediated to a depth of approximately 1.5 feet and not backfilled during Removal Action 14. Therefore this CU is considered to be representative of subsurface conditions. The statistics for this CU will be included with the subsurface baseline

CERTIFICATION UNIT 6

	Secondary COC
ID	Beryllium
A9P2-C6-01^2	0.357 J
A9P2-C6-02^2	0.299 J
A9P2-C6-04^2	0.431 J
A9P2-C6-06^2	0.404 J
A9P2-C6-07^2	0.374 J
A9P2-C6-08^2	0.560 J
A9P2-C6-10^2	0.741 J
A9P2-C6-11^2	0.656 J
A9P2-C6-12^2	0.842 J
A9P2-C6-13^2	0.414 J
A9P2-C6-14^2	0.632 J
A9P2-C6-16^2	0.643 J
A9P2-C6-16^2-D	0.594 J
A9P2-C6-03^2	0.590 -
A9P2-C6-05^2	0.469 -
A9P2-C6-09^2	0.687 -
A9P2-C6-15^2	0.781 -
Limit	0.62
Units	mg/kg
Conf. Level	90%
Max. Result	0.842
Max. > = Limit	Yes
W-statistic Prob. *	52.8% (N)
Test Procedure	Normal
Sample Size	16
Nondetects	0
% Nondetects	0.0%
Est. Mean **	0.555
UCL	0.611
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample	31
Size calculation	Fail

CERTIFICATION UNIT 9

	Secondary COC
ID	Beryllium
A9P2-C9-1^2	1.070 -
A9P2-C9-3^2	0.591 -
A9P2-C9-4^2	0.525 -
A9P2-C9-6^2	0.364 -
A9P2-C9-7^2	0.450 -
A9P2-C9-8^2	0.384 -
A9P2-C9-10^2	0.699 -
A9P2-C9-11^2	0.963 -
A9P2-C9-12^2	0.713 -
A9P2-C9-13^2	0.423 -
A9P2-C9-14^2	0.331 -
A9P2-C9-15^2	0.460 -
A9P2-PC9-17^2	0.491 -
A9P2-PC9-18^2	0.534 -
A9P2-PC9-19^2	0.490 -
A9P2-PC9-20^2	0.324 -
A9P2-PC9-21^2	0.402 -
A9P2-PC9-22^2	0.358 -
A9P2-PC9-23^2	0.649 -
A9P2-PC9-24^2	0.671 -
A9P2-PC9-25^2	0.868 -
A9P2-PC9-26^2	0.360 -
A9P2-PC9-27^2	0.633 -
A9P2-PC9-28^2	0.375 -
Limit	0.62
Units	mg/kg
Conf. Level	90%
Max. Result	1.07
Max. > = Limit	Yes
W-statistic Prob. *	26.8% (LN)
Test Procedure	Lognormal
Sample Size	24
Nondetects	0
% Nondetects	0.0%
Est. Mean **	0.547
UCL	0.604
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample	17
Size calculation	Pass

APPENDIX A.4
CERTIFICATION UNIT 6 BERYLLIUM EVALUATION

CERTIFICATION UNIT 6
SURFACE STATISTICS WITHOUT NORTHWEST QUADRANT

ID	DATA
A9P2-C6-01-2	0.357 J
A9P2-C6-02-2	0.299 J
A9P2-C6-04-2	0.431 J
A9P2-C6-06-2	0.404 J
A9P2-C6-07-2	0.374 J
A9P2-C6-08-2	0.560 J
A9P2-C6-13-2	0.414 J
A9P2-C6-14-2	0.632 J
A9P2-C6-16-2	0.643 J
A9P2-C6-3^2-M	0.590 -
A9P2-C6-5^2-M	0.469 -
A9P2-C6-15^2-M	0.781 -
Limit	0.62
Units	mg/kg
Conf. Level	90%
Max. Result	0.781
Max. > = Limit	Yes
W-statistic Prob. #	84.9% (LN)
Test Procedure	Lognormal
Sample Size	12
Nondetects	0
% Nondetects	0.0%
Est. Mean*	0.498
UCL	0.563
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample	7
Size calculation	Pass

Footnote for Appendix A.4

* 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 assump
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality

CERTIFICATION UNIT 6
NORTHWEST QUADRANT BASELINE CONFIRMATION

Beryllium (mg/kg) Surface

	A9P2-CU6 {NW}	Background	INTERPRETATION
Samples	4	140	
Average	0.732	0.775	
Median	0.714	0.745	
Std. Dev.	0.082	0.359	
Minimum	0.656	0.220	
Maximum	0.842	3.050	
Lower Quartile	0.672	0.540	
Upper Quartile	0.792	0.940	
UCL-Mean (90%)	0.771	0.800	
t-Test Prob.	**0.594**		No Significant Difference
F-test (SD) Prob.	**0.031**		Std. Dev. Are Not Equal
W-test (median) P	**0.976**		No Significant Difference
K-S (distr.) Prob.	**0.586**		No Significant Difference

CONCLUSION: There is no evidence that A9P2 is greater than Background.

APPENDIX A.5
SUBSURFACE URANIUM CERTIFICATION STATISTICS

SUBSURFACE URANIUM CERTIFICATION STATISTICS

CERTIFICATION UNIT 3

ID	DATA
A9P2-C3-16^6	5.020 -
A9P2-C3-3^6	4.830 -
A9P2-C3-5^6	5.540 -
A9P2-C3-6^6	6.320 -
A9P2-C3-9^6	5.200 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	6.32
Max. > = Limit	No
W-statistic Prob. *	49.6% (LN)
Test Procedure	Lognormal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	5.39
UCL	6.00
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 4

ID	DATA
A9P2-C4-10^6	5.630 J
A9P2-C4-15^6	5.950 J
A9P2-C4-16^6	4.490 J
A9P2-C4-3^6	5.710 J
A9P2-C4-5^6	5.820 J
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	5.95
Max. > = Limit	No
W-statistic Prob. *	4.0% (N)
Test Procedure	Normal ***
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	5.52
UCL	6.08
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 5

ID	DATA
A9P2-C5-12^6	4.740 -
A9P2-C5-13^6	9.830 -
A9P2-C5-14^6	2.580 -
A9P2-C5-4^6	2.830 -
A9P2-C5-6^6	4.020 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	9.83
Max. > = Limit	No
W-statistic Prob. *	43.3% (LN)
Test Procedure	Lognormal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	4.88
UCL	11.01
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 6

ID	DATA
A9P2-C6-12^6	5.370 -
A9P2-C6-15^6	4.680 -
A9P2-C6-3^6	5.680 -
A9P2-C6-5^6	6.350 -
A9P2-C6-9^6	5.180 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	6.35
Max. > = Limit	No
W-statistic Prob. *	99.2% (LN)
Test Procedure	Lognormal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	5.46
UCL	6.13
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 7

ID	DATA
A9P2-C7-10^6	4.920 -
A9P2-C7-16^6	4.860 -
A9P2-C7-4^6	4.700 -
A9P2-C7-7^6	3.920 -
A9P2-C7-9^6	6.330 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	6.33
Max. > = Limit	No
W-statistic Prob. *	50.0% (LN)
Test Procedure	Lognormal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	4.96
UCL	5.96
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 8

ID	DATA
A9P2-C8-11^6	5.020 -
A9P2-C8-14^6	5.120 -
A9P2-C8-3^6	4.840 -
A9P2-C8-5^6	5.800 -
A9P2-C8-7^6	11.500 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	11.5
Max. > = Limit	No
W-statistic Prob. *	1.7% (LN)
Test Procedure	Lognormal ***
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	6.49
UCL	10.33
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 9

ID	DATA
A9P2-C9-12^6	7.150 -
A9P2-C9-16^6	3.570 -
A9P2-C9-2^6	6.090 -
A9P2-C9-5^6	9.950 -
A9P2-C9-9^6	4.740 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	9.95
Max. > = Limit	No
W-statistic Prob. *	99.2% (LN)
Test Procedure	Lognormal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	6.40
UCL	10.70
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 10

ID	DATA
A9P2-C10-11^6	3.840 J
A9P2-C10-16^6	2.220 J
A9P2-C10-3^6	4.840 J
A9P2-C10-7^6	4.450 J
A9P2-C10-8^6	4.780 J
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	4.84
Max. > = Limit	No
W-statistic Prob. *	15.6% (N)
Test Procedure	Normal
Sample Size	5
Nondetects	0
% Nondetects	0.0%
Est. Mean **	4.03
UCL	5.06
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

Footnotes for Appendix A.5

* W-Statistic Probability is the highest calculated probabilitiy 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 (Normal or N) and the log-transformed data (LogNormal or LN) to test for lognormality.

** Estimated Mean = Estimated measure of central tendency (Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)

*** Too few data points to reliably use nonparametric procedures so the best fitting parametric distribution was assumed.

SUBSURFACE URANIUM CERTIFICATION STATISTICS
COMBINED WITH SURFACE DATA

CERTIFICATION UNIT 3

ID	DATA
A9P2-C3-1^2	11.000 -
A9P2-C3-1^2-D	11.000 -
A9P2-C3-10^2	5.280 -
A9P2-C3-11^2	5.100 -
A9P2-C3-12^2	7.580 -
A9P2-C3-13^2	6.050 -
A9P2-C3-14^2	5.600 -
A9P2-C3-15^2	16.700 -
A9P2-C3-2^2	7.640 -
A9P2-C3-4^2	7.460 -
A9P2-C3-5^2	5.460 -
A9P2-C3-7^2	18.400 -
A9P2-C3-8^2	5.670 -
A9P2-C3-16^6	5.020 -
A9P2-C3-3^6	4.830 -
A9P2-C3-5^6	5.540 -
A9P2-C3-6^6	6.320 -
A9P2-C3-9^6	5.200 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	18.4
Max. > = Limit	No
W-statistic Prob. *	< 0.01% (LN)
Test Procedure	Median (Sign)
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	5.86
UCL	7.58
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	3 Pass

CERTIFICATION UNIT 4

ID	DATA
A9P2-C4-1^2	26.200 J
A9P2-C4-11^2	14.100 J
A9P2-C4-12^2	14.100 J
A9P2-C4-13^2	13.600 J
A9P2-C4-13^2-D	13.600 J
A9P2-C4-14^2	12.600 J
A9P2-C4-16^2	14.900 J
A9P2-C4-2^2	18.400 J
A9P2-C4-4^2	19.400 J
A9P2-C4-6^2	12.300 J
A9P2-C4-7^2	13.900 J
A9P2-C4-8^2	18.400 J
A9P2-C4-9^2	13.700 J
A9P2-C4-10^6	5.630 J
A9P2-C4-15^6	5.950 J
A9P2-C4-16^6	4.490 J
A9P2-C4-3^6	5.710 J
A9P2-C4-5^6	5.820 J
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	26.2
Max. > = Limit	No
W-statistic Prob. *	9.2% (N)
Test Procedure	Normal
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	12.93
UCL	15.29
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

SUBSURFACE URANIUM CERTIFICATION STATISTICS
COMBINED WITH SURFACE DATA

CERTIFICATION UNIT 5

ID	DATA
A9P2-C5-1^2	4.310 -
A9P2-C5-10^2	24.000 -
A9P2-C5-10^2-D	23.600 -
A9P2-C5-11^2	30.200 -
A9P2-C5-13^2	17.400 -
A9P2-C5-15^2	21.400 -
A9P2-C5-16^2	13.700 -
A9P2-C5-2^2	16.600 -
A9P2-C5-3^2	3.830 -
A9P2-C5-5^2	25.300 -
A9P2-C5-7^2	19.900 -
A9P2-C5-8^2	14.600 -
A9P2-C5-9^2	18.200 -
A9P2-C5-12^6	4.740 -
A9P2-C5-13^6	9.830 -
A9P2-C5-14^6	2.580 -
A9P2-C5-4^6	2.830 -
A9P2-C5-6^6	4.020 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	30.2
Max. > = Limit	No
W-statistic Prob. *	14.1% (N)
Test Procedure	Normal
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	14.28
UCL	17.95
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 6

ID	DATA
A9P2-C6-1^2	19.700 -
A9P2-C6-10^2	16.200 -
A9P2-C6-11^2	13.600 -
A9P2-C6-12^2	1.700 -
A9P2-C6-13^2	1.540 U
A9P2-C6-14^2	1.750 U
A9P2-C6-16^2	2.030 U
A9P2-C6-16^2-D	1.480 -
A9P2-C6-2^2	19.700 -
A9P2-C6-4^2	19.700 -
A9P2-C6-6^2	10.700 -
A9P2-C6-7^2	17.000 -
A9P2-C6-8^2	1.950 U
A9P2-C6-12^6	5.370 -
A9P2-C6-15^6	4.680 -
A9P2-C6-3^6	5.680 -
A9P2-C6-5^6	6.350 -
A9P2-C6-9^6	5.180 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	19.7
Max. > = Limit	No
W-statistic Prob. *	7.6% (LN)
Test Procedure	Lognormal
Sample Size	18
Nondetects	2
% Nondetects	11.1%
Est. Mean **	9.71
UCL	20.28
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	3 Pass

SUBSURFACE URANIUM CERTIFICATION STATISTICS
COMBINED WITH SURFACE DATA

CERTIFICATION UNIT 7

ID	DATA
A9P2-C7-1^2	12.700 -
A9P2-C7-10^2	8.530 -
A9P2-C7-11^2	20.700 -
A9P2-C7-12^2	14.100 -
A9P2-C7-13^2	14.500 -
A9P2-C7-14^2	9.590 -
A9P2-C7-15^2	10.600 -
A9P2-C7-2^2	13.100 -
A9P2-C7-3^2	21.600 -
A9P2-C7-5^2	14.200 -
A9P2-C7-6^2	18.300 -
A9P2-C7-6^2-D	19.000 -
A9P2-C7-8^2	23.900 -
A9P2-C7-10^6	4.920 -
A9P2-C7-16^6	4.860 -
A9P2-C7-4^6	4.700 -
A9P2-C7-7^6	3.920 -
A9P2-C7-9^6	6.330 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	23.9
Max. > = Limit	No
W-statistic Prob. *	36.2% (N)
Test Procedure	Normal
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	12.53
UCL	15.13
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 8

ID	DATA
A9P2-C8-1^2	12.900 -
A9P2-C8-10^2	13.900 -
A9P2-C8-12^2	11.000 -
A9P2-C8-12^2-D	11.600 -
A9P2-C8-13^2	14.300 -
A9P2-C8-15^2	16.400 -
A9P2-C8-16^2	15.100 -
A9P2-C8-2^2	10.600 -
A9P2-C8-4^2	21.400 -
A9P2-C8-6^2	16.800 -
A9P2-C8-7^2	4.610 -
A9P2-C8-8^2	16.200 -
A9P2-C8-9^2	11.400 -
A9P2-C8-11^6	5.020 -
A9P2-C8-14^6	5.120 -
A9P2-C8-3^6	4.840 -
A9P2-C8-5^6	5.800 -
A9P2-C8-7^6	11.500 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	21.4
Max. > = Limit	No
W-statistic Prob. *	24.1% (N)
Test Procedure	Normal
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	11.58
UCL	13.59
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

SUBSURFACE URANIUM CERTIFICATION STATISTICS
COMBINED WITH SURFACE DATA

CERTIFICATION UNIT 9

ID	DATA
A9P2-C9-1^2	14.700 -
A9P2-C9-10^2	14.600 -
A9P2-C9-11^2	9.040 -
A9P2-C9-12^2	13.900 -
A9P2-C9-13^2	12.000 -
A9P2-C9-14^2	12.000 -
A9P2-C9-15^2	15.500 -
A9P2-C9-3^2	14.300 -
A9P2-C9-4^2	14.900 -
A9P2-C9-4^2-D	12.400 -
A9P2-C9-6^2	9.690 -
A9P2-C9-7^2	12.300 -
A9P2-C9-8^2	14.900 -
A9P2-C9-12^6	7.150 -
A9P2-C9-16^6	3.570 -
A9P2-C9-2^6	6.090 -
A9P2-C9-5^6	9.950 -
A9P2-C9-9^6	4.740 -
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	15.5
Max. > = Limit	No
W-statistic Prob. *	4.8% (N)
Test Procedure	Wilcoxon
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	12.15
UCL	14.30
Prob. > Limit	0.00%
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

CERTIFICATION UNIT 10

ID	DATA
A9P2-C10-1^2	13.500 J
A9P2-C10-10^2	18.400 -
A9P2-C10-12^2	14.500 J
A9P2-C10-13^2	14.900 J
A9P2-C10-14^2	11.700 J
A9P2-C10-15^2	15.400 J
A9P2-C10-2^2	19.500 J
A9P2-C10-4^2	19.000 J
A9P2-C10-5^2	19.800 J
A9P2-C10-6^2	20.200 J
A9P2-C10-7^2	14.700 J
A9P2-C10-9^2	19.500 J
A9P2-C10-9^2-D	23.500 J
A9P2-C10-11^6	3.840 J
A9P2-C10-16^6	2.220 J
A9P2-C10-3^6	4.840 J
A9P2-C10-7^6	4.450 J
A9P2-C10-8^6	4.780 J
Limit	50.00
Units	mg/kg
Conf. Level	95%
Max. Result	23.5
Max. > = Limit	No
W-statistic Prob. *	4.2% (N)
Test Procedure	Wilcoxon
Sample Size	18
Nondetects	0
% Nondetects	0.0%
Est. Mean **	14.80
UCL	19.00
Prob. > Limit	0.00%
Pass / Fail	pass

a posteriori Sample Size calculation	2 Pass

APPENDIX B

VARIANCES/FIELD CHANGE NOTICES FOR A9PII CERTIFICATION PROJECT SPECIFIC PLAN

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VARIANCE / FIELD CHANGE NOTICE

Significant? (Yes or No): NO

V/F: 21130-PSP-0003-1

WBS NO.: PROJECT/DOCUMENT/ECDC # 21130-PSP-0003 Rev.0

Page: 1 of 1

PROJECT TITLE: Project Specific Plan for Area 9, Phase II Certification Sampling

Date: 9/5/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the submittal of previously collected archive samples from CU A9P2-C6 for beryllium analysis (TAL I, see below). The four samples shall be submitted to an offsite laboratory with a MDL of 0.062 mg/kg. The required turnaround time is 24 hours (for Certificates of Analysis). A full data package is to follow within 5 days of sample receipt.

Samples submitted under this V/FCN will be analyzed to ASL D requirements. Field validation is required. Analytical data validation is required to VSL B.

21130-PSP-0003-I
(ASL D)

Analyte	Off-Property FRL	MDL
Beryllium	0.62 mg/kg	0.062 mg/kg

Justification:

Statistical analysis (*a posteriori* test) of beryllium results from planned samples in A9PII CU 6 indicate that additional samples are needed for this CU.

REQUESTED BY: Denise Arico Date: 9/5/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE:	11-17-03	X	PROJECT MANAGER: J.D. Chapu	11/17/03
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: F. Miller	11/10/03
X	ANALYTICAL CUSTOMER SUPPORT:	11/10/03		RTIMP Manager	
X	WAO	11/26/03	X	Sampling Manager: T. Buhrlage	11/12/03

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

DISTRIBUTION

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

VARIANCE / FIELD CHANGE NOTICE

Significant (Yes or No): NO

V/F: 21130-PSP-0001-16

WBS NO.: PROJECT/DOCUMENT/ECDC # 21130-PSP-0001 Rev.0

Page: 1 of 4

PROJECT TITLE: Project Specific Plan for Area 9, Phase II Precertification Real-Time Scan

Date: 6/02/03

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of surface samples from Area 9, Phase II (A9PII) located off-property east of the Fernald Closure Project.

Three areas will be designated for sampling. Each area, which represents a certification unit, will have 12 new, random locations identified for sampling (see Figure 1). A total 36 samples will be collected and submitted to an offsite laboratory for beryllium (TAL I) analysis. Each sample is to be collected from the 0-12" interval, and is to be ~~is to be~~ homogenized (per SMPL-01) in the field following collection. dma 6/4/03

The sample IDs and coordinates are identified on Attachment 1 and the sample locations are shown on Figure 1. The TAL and additional sampling and analytical requirements are identified on Attachment 2.

Three rinsate samples are to be collected for this sampling event – one for each area designated for sampling. Samples submitted under this V/FCN will be analyzed to ASL D requirements. Field and analytical data validation are required. Data validation will be to VSL B.

Justification:

Statistical analysis (*a posteriori* test) of beryllium results from planned samples in A9PII CUs 3, 4, and 9 indicated that additional samples are needed for these CUs.

Per Section 2.7 of the PSP, the collection of physical samples will be documented with a V/FCN.

REQUESTED BY: Denise Arico — Date: 6/02/03

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE:	6/9/03	X	PROJECT MANAGER: J.D. Zeiou	6/4/03
	DATA QUALITY MANAGEMENT:		X	CHARACTERIZATION MANAGER: F. Miller	6/4/03
X	ANALYTICAL CUSTOMER SUPPORT:	6/5/03		RTIMP Manager	
X	WAO	6/9/03	X	Sampling Manager: T. Bullage	6/5/03

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
V/FCN 21130-PSP-0001-16
PHYSICAL SAMPLE LOCATIONS AND IDENTIFIERS

CU	LOCATION ID	DEPTH	SAMPLE ID	ANALYSIS	NORTHING	EASTING
3	3-17	0" - 12"	A9P2-PC3-17^2-M	TAL I	480534.33	1351871.45
	3-18		A9P2-PC3-18^2-M		480527.92	1351922.90
	3-19		A9P2-PC3-19^2-M		480591.95	1351942.47
	3-20		A9P2-PC3-20^2-M		480561.36	1351958.78
	3-21		A9P2-PC3-21^2-M		480536.78	1352044.28
	3-22		A9P2-PC3-22^2-M		480591.77	1351981.57
	3-23		A9P2-PC3-23^2-M		480684.43	1351910.81
	3-24		A9P2-PC3-24^2-M		480645.92	1351971.37
	3-25		A9P2-PC3-25^2-M		480724.44	1351934.45
	3-26		A9P2-PC3-26^2-M		480694.24	1351857.57
	3-27		A9P2-PC3-27^2-M		480763.35	1351890.18
	3-28		A9P2-PC3-28^2-M		480790.44	1351923.07
4	4-17	0" - 12"	A9P2-PC4-17^2-M	TAL I	480423.24	1351874.67
	4-18		A9P2-PC4-18^2-M		480427.00	1351921.51
	4-19		A9P2-PC4-19^2-M		480497.98	1351935.45
	4-20		A9P2-PC4-20^2-M		480414.66	1352004.41
	4-21		A9P2-PC4-21^2-M		480425.69	1352038.40
	4-22		A9P2-PC4-22^2-M		480485.28	1351971.34
	4-23		A9P2-PC4-23^2-M		480516.91	1352013.64
	4-24		A9P2-PC4-24^2-M		480644.73	1352071.76
	4-25		A9P2-PC4-25^2-M		480698.14	1352026.00
	4-26		A9P2-PC4-26^2-M		480708.81	1352067.06
	4-27		A9P2-PC4-27^2-M		480739.94	1352009.63
	4-28		A9P2-PC4-28^2-M		480807.02	1351870.75
9	9-17	0" - 12"	A9P2-PC9-17^2-M	TAL I	480132.52	1352070.65
	9-18		A9P2-PC9-18^2-M		480224.72	1352077.81
	9-19		A9P2-PC9-19^2-M		480191.17	1352120.77
	9-20		A9P2-PC9-20^2-M		480114.14	1352240.52
	9-21		A9P2-PC9-21^2-M		480193.96	1352171.47
	9-22		A9P2-PC9-22^2-M		480145.52	1352231.38
	9-23		A9P2-PC9-23^2-M		480249.56	1352122.68
	9-24		A9P2-PC9-24^2-M		480289.41	1352074.88
	9-25		A9P2-PC9-25^2-M		480316.73	1352114.59
	9-26		A9P2-PC9-26^2-M		480224.62	1352212.26
	9-27		A9P2-PC9-27^2-M		480269.19	1352163.02
	9-28		A9P2-PC9-28^2-M		480242.44	1352271.19

ATTACHMENT 2
V/FCN 21130-PSP-0001-16

TAL 21130-PSP-0001-I	
Component	MDL
Beryllium	0.062 mg/kg

SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte (TAL)	Method	Sample Matrix	Lab	ASL	TAT*	Preservation	Holding Time	Container	Minimum Sample Volume/ Mass
Beryllium (TAL I)	ICP or GFAA**	Solid	Offsite	D	4 days	Cool, 4 C	6 months	Glass jar	250 g**
Beryllium (TAL I)	ICP or GFAA	Liquid (Rinsate)	Offsite	D	4 days	HNO3 pH < 2	6 months	Polyethylene	1 Liter

*This TAT signifies when the data is due back to the project. (Irrespective of data entry into the database.)

**Samples are to be homogenized prior to analysis.

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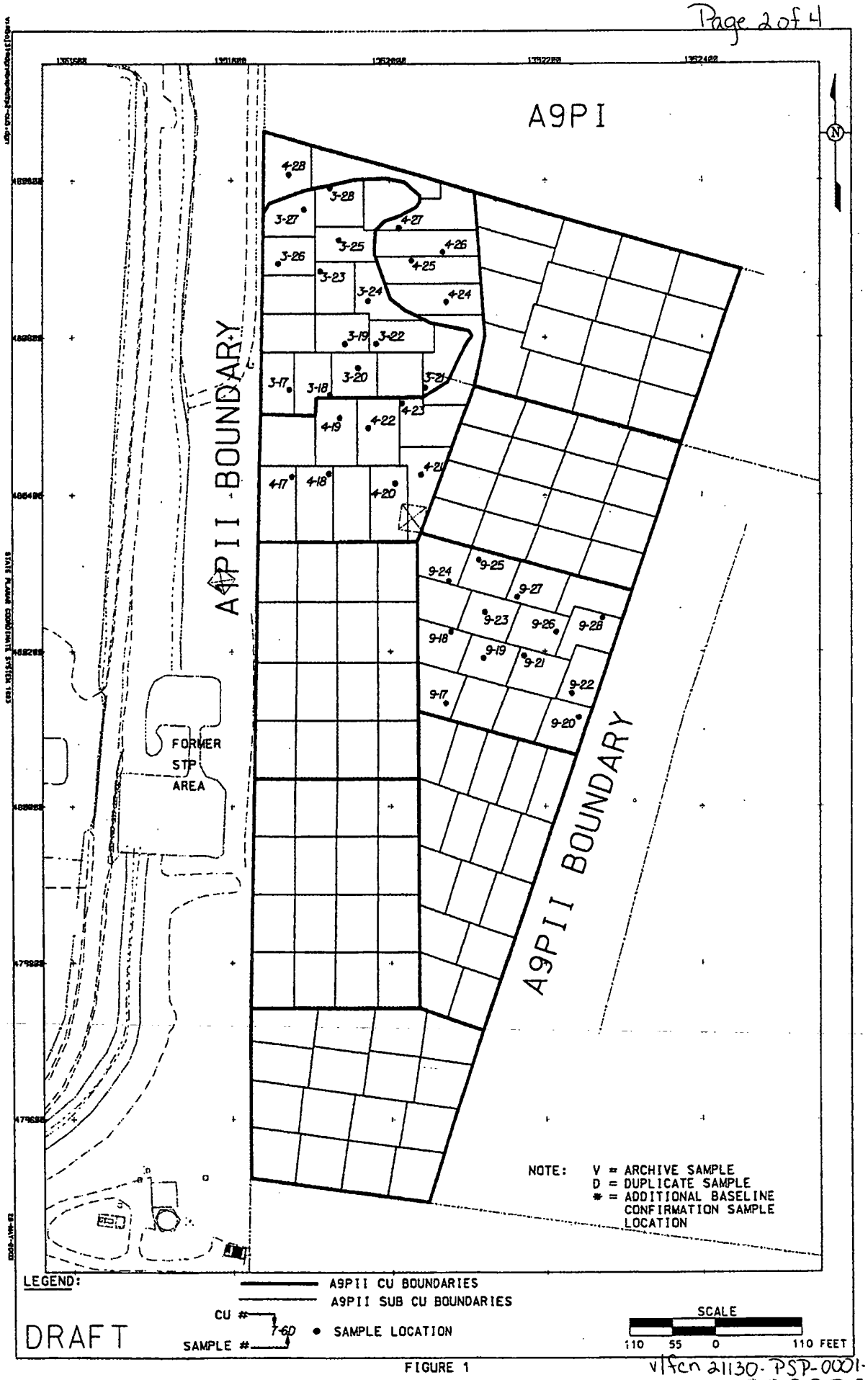
A9PI
A9PII BOUNDARY
A9PII BOUNDARY
FORMER STP AREA
4-28
3-28
3-27
4-27
3-25
4-26
3-26
4-25
3-23
3-24
4-24
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9-24
9-25
9-27
9-23
9-26
9-28
9-18
9-19
9-21
9-22
9-17
9-20
NOTE: V = ARCHIVE SAMPLE
D = DUPLICATE SAMPLE
* = ADDITIONAL BASELINE CONFIRMATION SAMPLE LOCATION
LEGEND:
A9PII CU BOUNDARIES
A9PII SUB CU BOUNDARIES
CU #
7-60
SAMPLE #
SAMPLE LOCATION
SCALE
110 55 0 110 FEET
DRAFT

FIGURE 1