006231

CERTIFICATION REPORT FOR AREA 4B - PART TWO AND MAIN DRAINAGE CORRIDOR AREA - 1st STREET

FERNALD CLOSURE PROJECT
FERNALD, OHIO

OCTOBER 2006

U.S. DEPARTMENT OF ENERGY

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LIST OF ACRONYMS AND ABBREVIATIONS

ASCOC	area-specific constituent of concern
ASL	analytical support level
BTV	benchmark toxicity value
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituent of concern
CRDL	Contract Required Detection Limit
CU	certification unit
D&D	Decontamination and Demolition
DHWM	Division of Hazardous Waste Management
DOE	U.S. Department of Energy
ECOC	ecological constituent of concern
EPA	U.S. Environmental Protection Agency
FCP	Fernald Closure Project
FPA	Former Production Area
FRL	final remediation level
FTF	Fire Training Facility
GCN	General Cleanup Numbers
HAMDC	highest allowable minimum detectable concentration
HWMU	hazardous waste management unit
ICP-AES	inductively coupled plasma-atomic emission spectroscopy
ICP-MS	inductively coupled plasma-mass spectrometry
MDC	Main Drainage Corridor
µg/g	micrograms per gram
MDL	minimum detection level
mg/kg	milligrams per kilogram
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	Operable Unit
PCB	polychlorinated biphenyl
pCi/g	picoCuries per gram
ppm	parts per million
PSP	Project Specific Plan
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
STP	Sewage Treatment Plant
SVOC	semi-volatile organic compound
TAL	Target Analyte List

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

TPU	total propagated uncertainty
UCL	upper confidence limit
UST	underground storage tank
V/FCN	Variance/Field Change Notice
V&V	verification and validation
VOC	volatile organic compound
WAC	waste acceptance criteria
yd^3	cubic yards

EXECUTIVE SUMMARY

This Certification Report presents the information and data used by the U.S. Department of Energy (DOE) to determine that soils in Area 4B - Part Two, Main Drainage Corridor (MDC) Area - 1st Street, Lime Sludge Pond (LSP), and the portion of the haul road that extended from the northern end of the LSP to the eastern end of 1st Street meet established final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). It includes details of the certification sampling, analysis, and validation that took place in Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road.

Area 4B - Part Two is located to the west and south of certified Area 4B - Part One. It includes the footprint of the former Pilot Plant and the Lab Building. MDC - 1st Street is located in the southern side of the Former Production Area. It is bounded to the north by MDC - South and Area 4A, to the south by Area 5, to the west by Area 4B (Parts One and Two), and to the east by Area 6E. It includes the footprint of 1st Street. Area 4B - Part Two also includes a high-leachability zone where the total uranium FRL is 20 milligrams per kilogram (mg/kg), Hazardous Waste Management Unit (HWMU) 22 (Pilot Plant Sump), and HWMU 5 (Drum Storage Area South of W-26). Only those certification units (CU) that are either entirely or partially within a high leachability zone were evaluated against the lower FRL of 20 mg/kg.

The haul road was reconstructed by blading and compacting existing precertified soils following remediation of Area 4B – Part Two, MDC – 1st Street Area, and the LSP. The haul road was built with proper run on/run-off controls to enable impacted material to be transported from the Silos Area to Area 6E stockpiles. The haul road CUs were overlaid on the area wide CUs.

The area covered under this certification effort is approximately 34.4 acres. Figure 1-1 depicts the original layout of Area 4B and Figure 1-2 depicts the area (Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road) that is to be certified.

Consistent with the Sitewide Excavation Plan (DOE 1998), these areas underwent predesign, excavation, and precertification activities, including the use of real-time instrumentation as well as physical sampling and analysis. As a result of these activities, it was determined that no further remediation was necessary prior to certification.

All CUs were sampled and statistical analysis was conducted where necessary to ensure the certification criteria was met. As discussed in the Certification Design Letter and Certification Sampling Project Specific Plan for Area 4B - Part Two and Main Drainage Corridor Area – 1st Street (DOE 2006) the certification criteria are that the average primary area-specific constituent of concern (ASCOC) concentrations within a CU are below-FRL at a 95 percent upper confidence level (UCL, 90 percent UCL

for secondary ASCOCs), and that no certification result is greater than twice the FRL (the hotspot criterion).

There was one reported result greater than two times the FRL in Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road. CU A4B2-C04 failed the hot spot criteria (i.e. greater than two-times the FRL) for the primary ASCOC total uranium at location A4B2-C04-6. This hotspot was delineated, excavated, and re-sampled as a conservative approach to reduce the residual uranium levels. The new sample result was below the total uranium FRL with a result of 14.4 mg/kg (A4B2-C04-6B-N). Following excavation and re-sampling, A4B2-C04 passed all certification requirements.

In order to demonstrate that no above-FRL conditions existed in trenches created by utility removal, samples were collected from the trench bottoms. These utilities were removed after precertification of the overburden had been completed. The data from this sampling effort along with a statistical evaluation (where necessary) are presented in this document.

Upon completion of final certification statistics, all of the Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road CUs pass the certification criteria. Additionally, following the protocols of the Closure Plan Review Guidance for Resource Conservation and Recovery Act Facilities (OEPA 2004), written by the Ohio Environmental Protection Agency Division of Hazardous Waste Management all Hazardous Waste Management Units within this area are closed. On the basis of this reported information and supporting project files, DOE has determined that no additional remedial actions are required in this portion of the site. The area will be considered certified when the U.S. Environmental Protection Agency and the Ohio Environmental Protection Agency concur that certification criteria have been met. DOE intends to proceed with final land use activities as outlined in the Natural Resource Restoration Plan (DOE 2002a).

1.0 INTRODUCTION

1.1 PURPOSE

This Certification Report presents the information and data used by the U.S. Department of Energy (DOE) to determine that soils in Area 4B - Part Two, Main Drainage Corridor (MDC) Area - 1st Street, Lime Sludge Pond (LSP), and the portion of the haul road that extended from the northern end of the LSP to the eastern end of 1st Street meet established final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs).

It should be noted that the scope of Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road was originally included in Area 4A, Area 4B, Area 7, and the LSP. Figure 1-1 depicts the original layout of Area 4A, Area 4B, Area 7, and the LSP.

On the basis of this reported information and supporting project files, DOE has determined that no additional remedial actions are required in this portion of the site.

1.2 BACKGROUND

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

In the OU5 Remedial Action Work Plan (RAWP, DOE 1996b), DOE agreed to prepare a Sitewide Excavation Plan (SEP, DOE 1998) that defined the overall approach to cleaning up soil and at- and below-grade debris in accordance with the OU2 ROD (DOE 1995b), OU3 ROD (DOE 1996c), and OU5 ROD.

In the SEP, the FCP was divided into distinct remedial areas and phases for soil remediation, based on the operable units' remediation schedule. After all necessary remediation is completed within each area/phase, the soil is certified as having attained all clean up goals (i.e., FRLs). The general approach for the removal of contaminated soil and debris in Area 4B - Part Two followed "Excavation Approach D - Excavation Following D&D in the Former Production Area, STP and FTF," as described in Section 4.4 of the SEP.

1.3 SCOPE AND AREA DESCRIPTION

The scope of this Certification Report includes details of certification sampling, analysis and validation that took place in Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road. The Area 4B – Part Two certification area has been reduced from the original boundary of Area 4B due to the location of the Main Drainage Corridor (MDC) and the field location of the run-on/run-off control ditches, which were based on the current area topography. Figure 1-1 depicts the original layout of Area 4B and Figure 1-2 depicts the area in 4B (i.e., Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road) that is to be certified under this Certification Report.

Area 4B - Part Two is located to the west and south of certified Area 4B - Part One. It includes the footprint of the former Pilot Plant and the Lab Building. MDC - 1st Street is located in the southern side of the Former Production Area. It is bounded to the north by MDC - South and Area 4A, to the south by Area 5, to the west by Area 4B (Parts One and Two), and to the east by Area 6E. It includes the footprint of 1st Street.

Area 4B - Part Two also includes a high-leachability zone where the total uranium FRL is 20 milligrams per kilogram (mg/kg), Hazardous Waste Management Unit (HWMU) 22 (Pilot Plant Sump), and HWMU 5 (Drum Storage Area South of W-26). The area covered under this certification effort is approximately 34.4 acres.

The haul road was reconstructed by blading and compacting existing precertified soils following remediation of Area 4B – Part Two, MDC – 1st Street Area, and the LSP. The haul road was built with proper run-on/run-off controls to enable impacted material to be transported from the Silos Area to Area 6E stockpiles.

1.4 OBJECTIVES

The objectives of this Certification Report are:

- Summarize the precertification and remedial activities,
- Describe the analytical methods, data validation processes, data reduction and statistical processes used to support the certification process,
- Present certification sampling results for all certification units (CUs),
- Present the statistical analysis showing that all CUs have passed the certification criteria, including FRL attainment and hotspot criteria, and
- Describe access controls implemented to prevent recontamination.

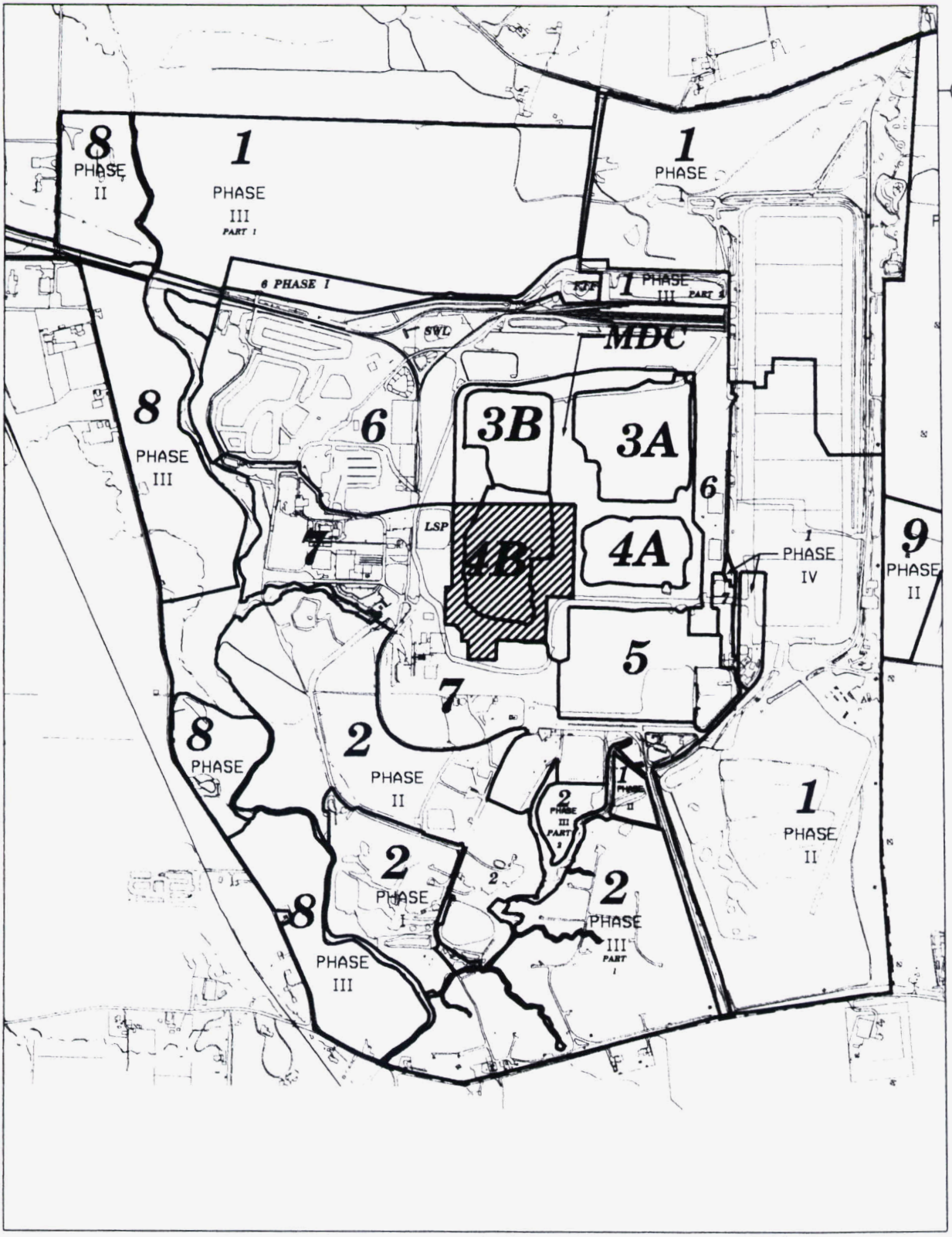
1.5 REPORT FORMAT

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

Section 1.0	Introduction: Purpose, background, area description, scope, and objectives of the report
Section 2.0	Certification Approach: The approach for certification sampling and analysis
Section 3.0	Overview of Field Activities: Historical data evaluation, precertification, area preparation, excavation and changes to work scope
Section 4.0	Analytical Methodologies, Data Validation Processes and Data Reduction
Section 5.0	Certification Evaluation and Conclusions
Appendix A	Certification Samples, Analytical Results and Final Statistics Tables
Appendix B	HWMUs 05 and 22 RCRA Calculations
Appendix C	Variances/Field Change Notices for the Area 4B - Part Two and MDC Area - 1st Street for the Certification Design Letter and Certification Sampling PSP
Appendix D	Correction of 7-day Radium-226 Results

1.6 FCP MASTER CERTIFICATION MAP

In order to track certification and characterization for reuse areas at the FCP, DOE updates a controlled map (Figure 1-3) showing the status of the soil remediation areas and phased areas with all Certification Reports. This map has been updated to include certification of Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road.



LEGEND:

—·—·— FCP BOUNDARY

SCALE

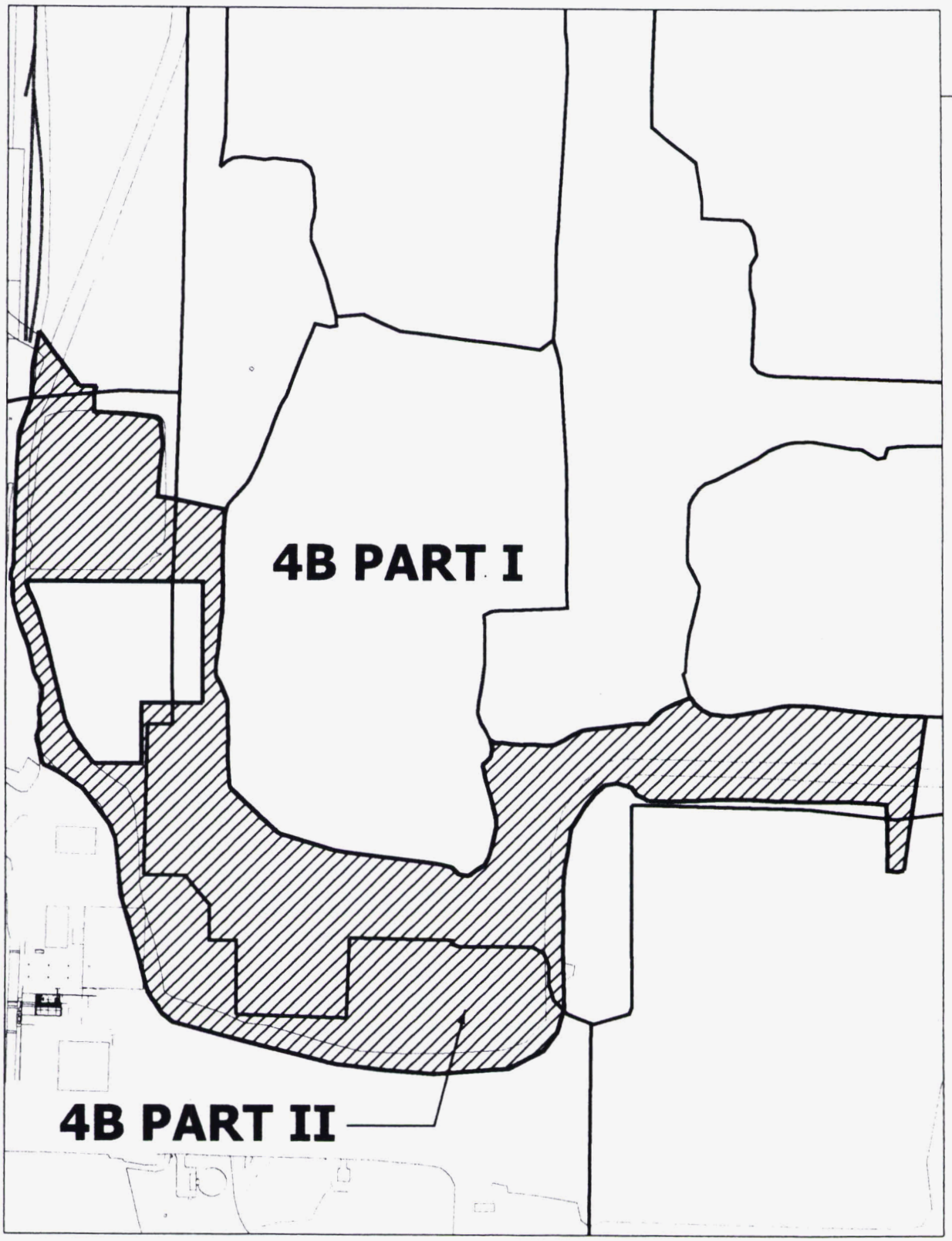
1200 600 0 1200 FEET

FIGURE 1-1. AREA 4B LOCATION MAP

v:\2fm12\dgn\ab_012.dgn

STATE PLANAR COORDINATE SYSTEM 1983

23-OCT-2006



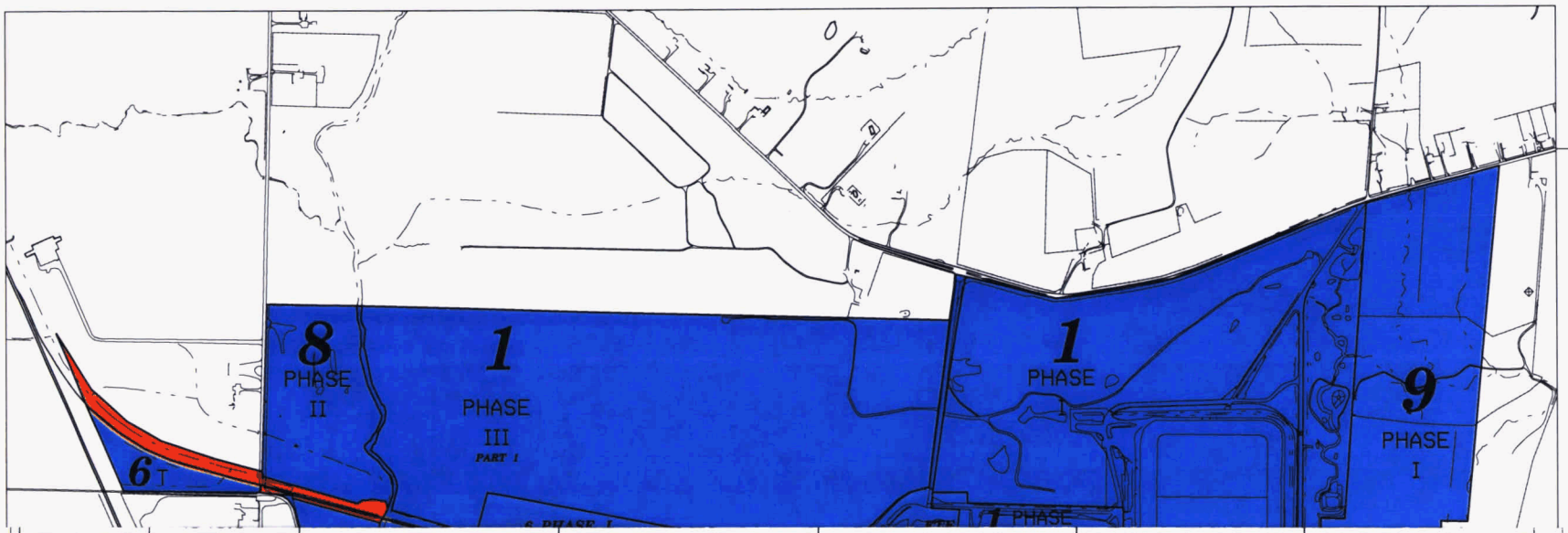
LEGEND:

4B PART II
CERTIFICATION AREA

SCALE
300 150 0 300 FEET

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

v:\62fm12\dgn\4b_013.dgn
STATE PLANAR COORDINATE SYSTEM 1983
23-OCT-2006



AREA 9	85.6	85.6	0	0	0	0
TOTAL OFF SITE	85.6	85.6	0	0	0	0

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

SCALE

1100 550 0 1100 FEET

FIGURE 1-3. FCP CONTROLLED CERTIFICATION MAP

v:\5cj31\dgn\bmp\certmap5.dgn

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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 specific strategy for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road is described in the Certification Design Letter (CDL) and Certification Sampling Project Specific Plan (PSP) for Area 4B - Part Two and Main Drainage Corridor Area – 1st Street.

2.1.1 Area-Specific Constituents of Concern

Total uranium, radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary constituents of concern (COCs) and were retained as ASCOCs for this remediation effort. Secondary ASCOCs for Area 4, Area 7, and the LSP are listed in the SEP; however, some COCs were not retained for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road based on the area investigations.

2.1.2 ASCOC Selection Criteria

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

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

Table 2-1 lists the secondary ASCOCs identified in Table 2-1 of the SEP. Using the above process, the ASCOCs were refined to those listed in Table 2-2, which presents all of the ASCOCs listed in Table 2-1 as well as the applicable HWMU COCs identified in Table 2-1 of the SEP. Additionally, Table 2-2 lists the

justification for retaining or not retaining the ASCOCs and the ecological COCs for each CU in Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road.

2.1.3 ASCOC Selection Process

Each COC listed in Table 2-1 was evaluated for their relevance to Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road. Table 2-2 presents the reasoning for either retaining or eliminating the ASCOC. Table 2-3 lists the ASCOCs for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road.

2.2 CERTIFICATION APPROACH

The certification design for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road followed the general approach outlined in Section 3.4 of the SEP. The design for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road is depicted on Figure 2-1 and the sample locations are depicted in Figures 2-2 through 2-10. The five primary ASCOCs (total uranium, radium-226, radium-228, thorium-228, and thorium-232) were retained in each CU. Additional COCs are identified for specific CUs within the certification area as well as unique COCs for the two HWMUs.

Many factors were taken into consideration when determining the boundaries for each CU within Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road. These factors included: areas defined as high leachability zones, historical land use, proximity to other areas of the site, residual COC data, and previous existence of HWMUs. Additionally, since Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road falls within the FPA, it is considered to be an impacted area, and was therefore comprised of Group 1 CUs to allow for more concentrated sampling and ensure excavation activities had no effect on the soil.

2.2.1 Area 4B - Part Two Certification Unit Design

Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road consists of 19 CUs, 14 of which are Group 1 CUs that cover the entire area under this certification effort. There are three haul road CUs (Group 1) that overlap the area wide CUs. The two remaining CUs are HWMUs, which also overlap the area wide Group 1 CUs. The 19 CUs are shown in Figure 2-1. Additionally, six utility CUs were added after the utility pipes were excavated and removed from the area. These utilities are discussed further in Section 3.0. A significant portion of the area falls within the high leachability zone; therefore, all CUs that were either entirely or partially within the zone were evaluated against the high leachability zone FRL (20 mg/kg).

Due to the presence of two HWMUs (5 and 22) in Area 4B – Part Two, this certification effort includes the demonstration of soil FRL attainment and HWMU closure. Per Section 2.2.5 of the SEP:

- Each HWMU footprint will form a distinct CU
- At least eight samples will be collected from the excavated base and sidewalls for each HWMU/CU
- Samples will be analyzed for the COCs identified for each particular HWMU in Table 2-1 of the SEP. If the HWMU was discovered during remediation, the samples will be analyzed for the COCs that were defined following discovery.

2.2.2 Sample Selection Process

For the 17 Group 1 CUs, the selection of certification sampling locations was conducted according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were then generated by randomly selecting an easting and northing coordinate within the boundaries of each sub-CU, then testing those locations against the minimum distance criteria for the CU. If the minimum distance criteria were not met, an alternative random location was selected for that sub-CU, and all the locations were re-tested. This process continued, until all 16 random locations met the minimum distance criteria. The sub-CUs and planned certification sampling locations are shown on Figures 2-2 through 2-10. Four of the 16 sample locations (one location from each quadrant of the CU) were designated with a "V," indicating archive sample locations. One sample location in the CU was designated with a "D," indicating a field duplicate sample collection location. Samples were collected for analysis from the 0 to 6-inch interval in each CU. The four samples designated as "archive" were not planned to be collected unless they were needed for additional analysis.

The selection of sampling locations for the two HWMUs was also conducted according to Section 3.4.2 of the SEP however, there were only eight sample locations, and no archive sample locations were designated. Samples were collected for analysis from the 0 to 6-inch interval at all locations.

Prior to commencement of certification sampling field activities, all certification sample locations were surveyed and field verified to make sure no surface obstacles would prevent collection at the planned location. It was not necessary to move any planned certification sample locations.

2.2.3 Certification Sampling

Samples were collected for analysis from 0 to 6 inches in each Group 1 CU and all sampling locations within the HWMU CUs. The four samples designated as "archive" were not collected because they were not needed for additional analysis.

2.2.4 Statistical Analysis

Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal, the first criterion compares the 95 percent upper confidence limit (UCL) on the mean of each primary 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 first 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 hotspot 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 that 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.

TABLE 2-1
AREA 4 ASCOC LIST

ASCOC	FRL/(*BTV*)[a]
Radionuclides	
Total Uranium[b]	20 mg/kg[b]
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
Cesium-137	1.4 pCi/g
Plutonium-238	78 pCi/g
Strontium-90	14 pCi/g
Technetium-99	30.0 pCi/g
Thorium-230	280 pCi/g
Organic	
Aroclor-1254	0.13 mg/kg
Aroclor-1260	0.13 mg/kg
Benzene	850 mg/kg
Benzo(a)pyrene	2.0 mg/kg/(*1.0 mg/kg*)
Bromodichloromethane	4.0 mg/kg
Dieldrin	0.015 mg/kg
Fluoride	78,000 mg/kg
Tetrachloroethene	3.6 mg/kg
Metals	
Arsenic	12.0 mg/kg
Barium	68,000 mg/kg
Beryllium	1.5 mg/kg
Chromium	300 mg/kg /(*0.05 mg/kg*)
Lead	400 mg/kg
Manganese	4600 mg/kg
Mercury	7.5 mg/kg /(*5.0 mg/kg*)
Selenium	5400 mg/kg /(*3.0 mg/kg*)
Ecological	
Antimony	96 mg/kg /(*10 mg/kg*)
Cadmium	82 mg/kg/(5 mg/kg)
Molybdenum	2900 mg/kg /(*10 mg/kg*)
Silver	29,000 mg/kg /(*10 mg/kg*)
Benzo(a)anthracene	20 mg/kg /(*1.0 mg/kg*)
Benzo(b)fluoranthene	20 mg/kg /(*1.0 mg/kg*)
Benzo(g,h,i)perylene	(*1.0 mg/kg*)
Benzo(k)fluoranthene	200 mg/kg /(*1.0 mg/kg*)
Chrysene	2000 mg/kg /(*1.0 mg/kg*)
Dibenzo(a,h)anthracene	2.0 mg/kg /(*0.088 mg/kg*)
Fluoranthene	(*10 mg/kg*)
Indeno(1,2,3-cd)pyrene	20 mg/kg /(*1.0 mg/kg*)
Phenanthrene	(*5 mg/kg*)
Pyrene	(*10 mg/kg*)

[a] As listed in Table 2-7 of the SEP.
[b] The total uranium FRL is lower in the defined high leachability zones.
pCi/g - picoCuries per gram

TABLE 2-2
ASCOC LIST FOR AREA 4B - PART TWO, MDC - 1ST STREET, LSP, AND HAUL ROAD AREA

ASCOC	Retained as ASCOC?	Justification	CU(s)
Radionuclides			
Total Uranium	Yes	Primary Radionuclide	All
Radium-226	Yes	Primary Radionuclide	All
Radium-228	Yes	Primary Radionuclide	All
Thorium-228	Yes	Primary Radionuclide	All
Thorium-232	Yes	Primary Radionuclide	All
Thorium-230	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Cesium-137	Yes	Above-FRL concentrations detected within Area 4B – Part Two, MDC - 1st Street, and the LSP. Potential contaminant from Waste Pits and Silos material hauling operations.	1, 2, 4, 8, 16, 17, 18
Lead-210	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Plutonium-238	Yes	Above-FRL concentrations detected within Area 4B – Part Two.	8
Strontium-90	No	Not detected at concentrations above the FRL.	None
Technetium-99	Yes	Above-FRL concentrations detected within Area 4B – Part Two and MDC - 1st Street. Potential contaminant from Waste Pits and Silos material hauling operations.	4 – 18, trench
Organic			
1,1-dichloroethene	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
1,1,1-trichloroethane	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
1,2-dichloroethene	Yes	Above-FRL concentrations detected within Area 4B – Part Two. Potential contaminant from Waste Pits and Silos material hauling operations.	14-H22, 16, 17, 18
Aroclor-1254	Yes	Above-FRL concentrations detected within Area 4B – Part Two and MDC - 1st Street. Potential contaminant from Waste Pits and Silos material hauling operations.	6, 8, 9, 14-H22, 16, 17, 18, 19, trench
Aroclor-1260	Yes	Above-FRL concentrations detected within Area 4B – Part Two and MDC - 1st Street. Potential contaminant from Waste Pits and Silos material hauling operations.	6, 14-H22, 16, 17, 18, trench
Benzene	Yes	HWMU 22 specific COC.	14-H22
Benzo(a)pyrene	Yes	Above-FRL concentrations detected within Area 4B – Part Two and MDC - 1st Street. Potential contaminant from Waste Pits and Silos material hauling operations.	6, 14-H22, 16, 17, 18
Benzo(b)fluoranthene	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Bromodichloromethane	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Dieldrin	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Dibenzo(a,h)anthracene	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18

TABLE 2-2 (Continued)			
ASCOC	**Retained as ASCOC?**	**Justification**	**CU(s)**
Organic (Cont)			
Indeno(1,2,3-cd)pyrene	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Tetrachloroethene	Yes	HWMU 22 specific COC. Potential contaminant from Waste Pits and Silos material hauling operations.	4, 14-H22, 16, 17, 18
Trichloroethene	Yes	Above-FRL concentrations detected within Area 4B – Part Two. Potential contaminant from Waste Pits and Silos material hauling operations.	14-H22, 16, 17, 18
Metals			
Arsenic	Yes	Above-FRL concentrations detected within Area 4B – Part Two, MDC - 1st Street, and the LSP. Potential contaminant from Waste Pits and Silos material hauling operations.	1, 2, 4 – 8, 16, 17, 18
Barium	Yes	HWMU 22 specific COC.	14-H22
Beryllium	Yes	Above-FRL concentrations detected within Area 4B – Part Two, MDC - 1st Street, and the LSP. Potential contaminant from Waste Pits and Silos material hauling operations.	1, 2, 6, 8, 16, 17, 18, trench
Chromium	Yes	HWMU 22 specific COC. Potential contaminant from Waste Pits and Silos material hauling operations.	14-H22, 16, 17, 18
Lead	Yes	HWMUs 5 and 22 specific COC.	14-H22 and 15-H05
Manganese	No	Not detected at concentrations above the FRL.	None
Mercury	Yes	HWMUs 5 and 22 specific COC.	14-H22 and 15-H05
Selenium	No	Not detected at concentrations above the FRL.	None
General chemistry			
Fluoride	Yes	Potential contaminant from Waste Pits and Silos material hauling operations.	16, 17, 18
Ecological			
Antimony	Yes	**Ecological ASCOC.**	1, 2
Cadmium	No	Not detected at concentrations above the BTV	None
Molybdenum	No	Not detected at concentrations above the BTV	None
Silver	No	Not detected at concentrations above the BTV	None
Benzo(a)anthracene	No	Not detected at concentrations above the BTV	None
Benzo(a)pyrene	No	Not detected at concentrations above the BTV	None
Benzo(b)fluoranthene	No	Not detected at concentrations above the BTV	None
Benzo(g,h,i)perylene	No	Not detected at concentrations above the BTV	None
Benzo(k)fluoranthene	No	Not detected at concentrations above the BTV	None
Chrysene	No	Not detected at concentrations above the BTV	None
Dibenzo(a,h)anthracene	No	Not detected at concentrations above the BTV	None
Fluoranthene	No	Not detected at concentrations above the BTV	None
Indeno(1,2,3-cd)pyrene	No	Not detected at concentrations above the BTV	None
Phenanthrene	No	Not detected at concentrations above the BTV	None

TABLE 2-3
AREA 4B - PART TWO, MDC - 1ST STREET, LSP, AND HAUL ROAD AREA ASCOC LIST

ASCOC	FRL/*BTV*[a]
Radionuclides	
Total Uranium [b]	82 mg/kg (20 mg/kg high leachate)
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
Cesium-137	1.4 pCi/g
Lead-210	38 pCi/g
Plutonium-238	78 pCi/g
Technetium-99	30 pCi/g [c]
Thorium-230	280 pCi/g
Organic	
1,1-dichloroethene	0.41 mg/kg
1,1,1-trichloroethane	4.3 mg/kg [c]
1,2-dichloroethene	0.16 mg/kg
Aroclor-1254	0.13 mg/kg
Aroclor-1260	0.13 mg/kg
Benzene	850 mg/kg
Benzo(a)pyrene	2.0 mg/kg (*1.0 mg/kg*)
Benzo(b)fluoranthene	20 mg/kg
Bromodichloromethane	4.0 mg/kg
Dibenzo(a,h)anthracene	2.0 mg/kg
Dieldrin	0.015 mg/kg
Indeno(1,2,3-cd)pyrene	20 mg/kg
Tetrachloroethene	3.6 mg/kg
Trichloroethene	25 mg/kg
General chemistry	
Fluoride	78,000 mg/kg
Metals	
Antimony	96 mg/kg /(*10 mg/kg*)
Arsenic	12.0 mg/kg
Barium	68,000 mg/kg
Beryllium	1.5 mg/kg
Chromium	300 mg/kg [d]
Lead	400 mg/kg
Mercury	7.5 mg/kg

[a]BTV applies to Ecological COCs.
[b]The total uranium FRL is lower in the defined high leachability zones.
[c]The FRL is actually for 1,1,2-trichloroethane because 1,1,1-trichloroethane does not have a FRL. This value will be used for statistical comparison for certification criteria.
[d]The FRL is actually for hexavalent chromium because total chromium does not have a FRL.

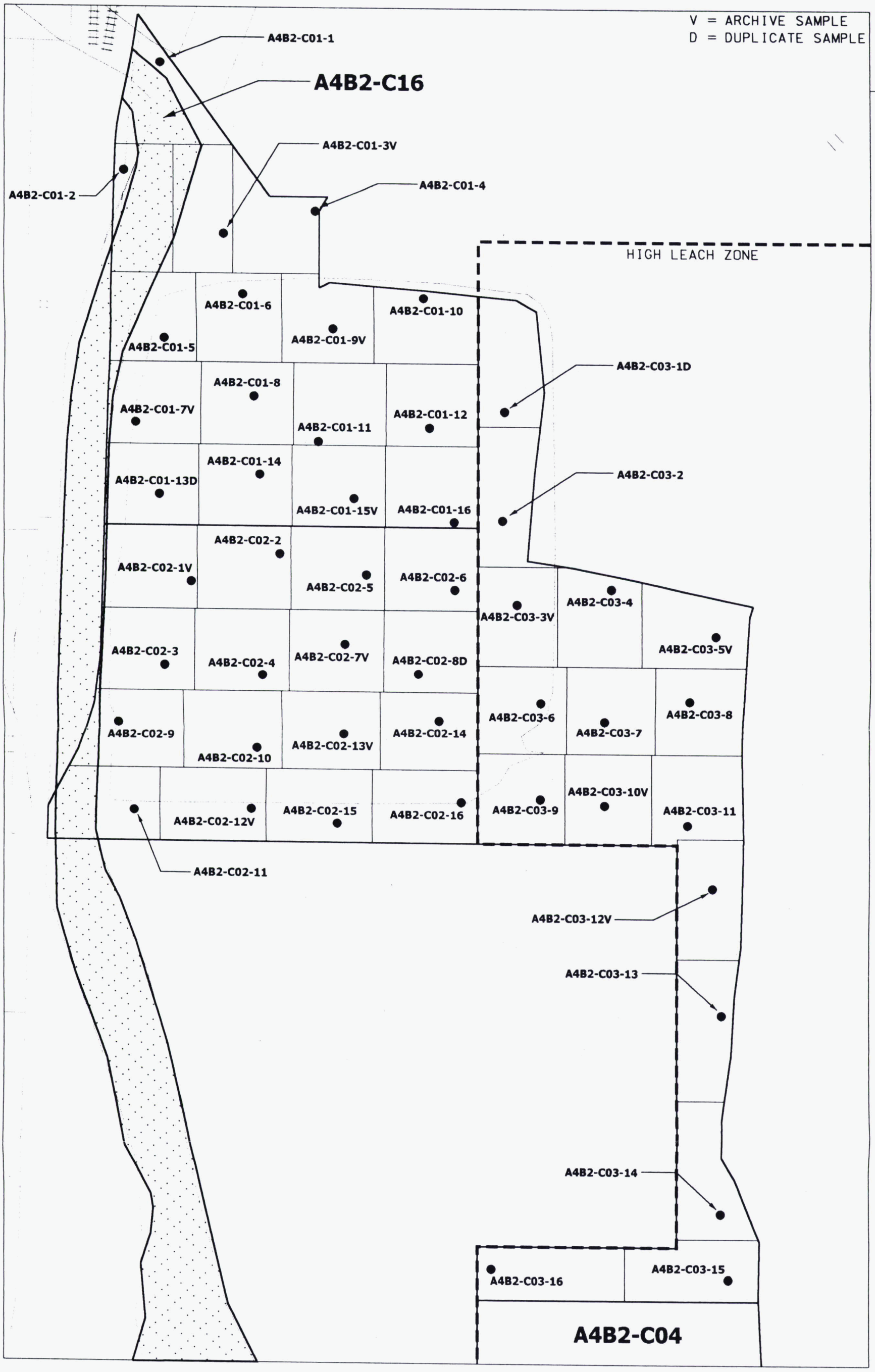


FIGURE 2-2. CERTIFICATION SAMPLING LOCATIONS FOR CU01 THROUGH CU03

v:\2fml2\dgn\4bp2_202.dgn
STATE PLANAR COORDINATE SYSTEM 1983
23-OCT-2006
006231

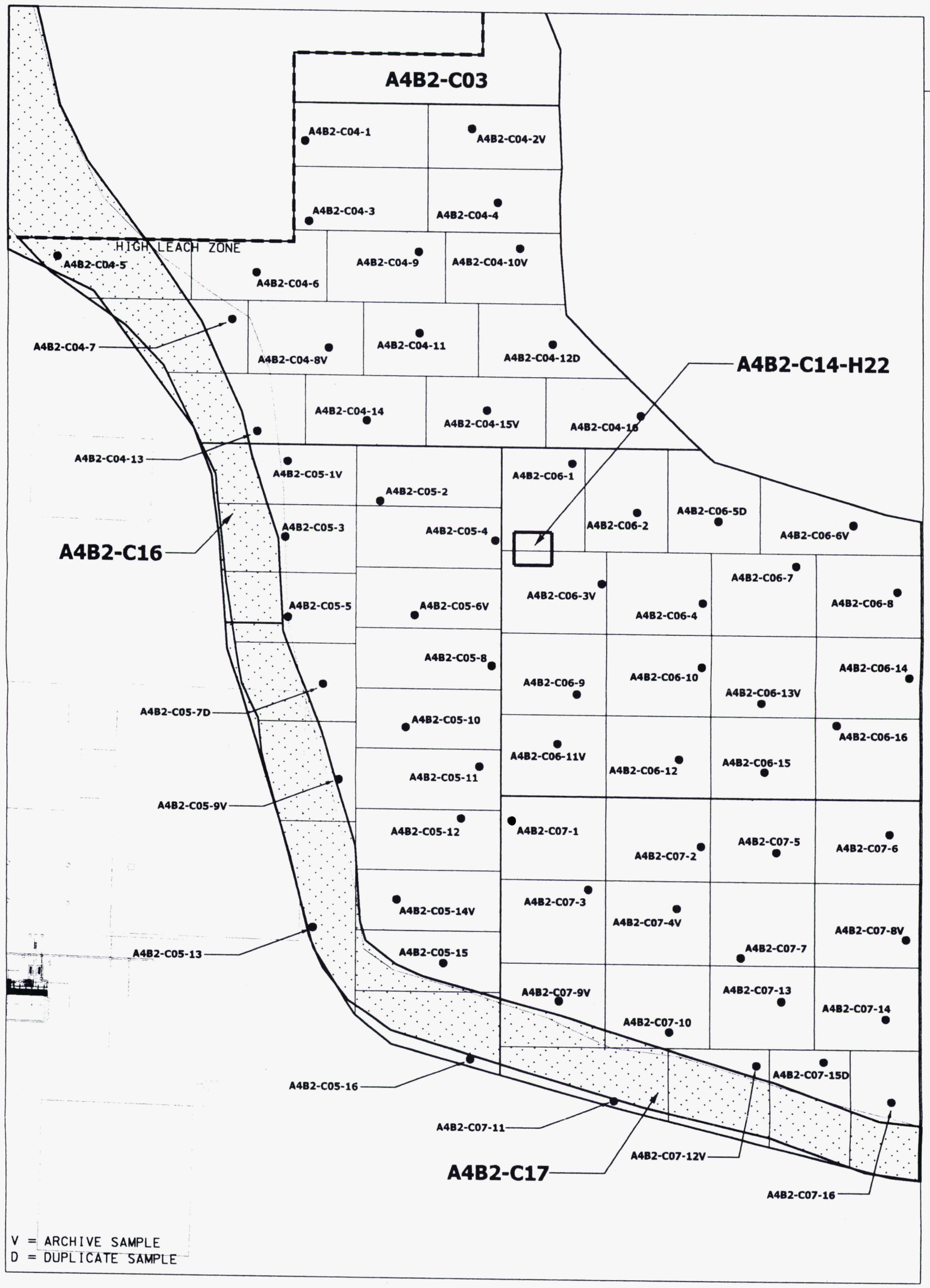


FIGURE 2-3. CERTIFICATION SAMPLING LOCATIONS FOR CU04 THROUGH CU07

006231

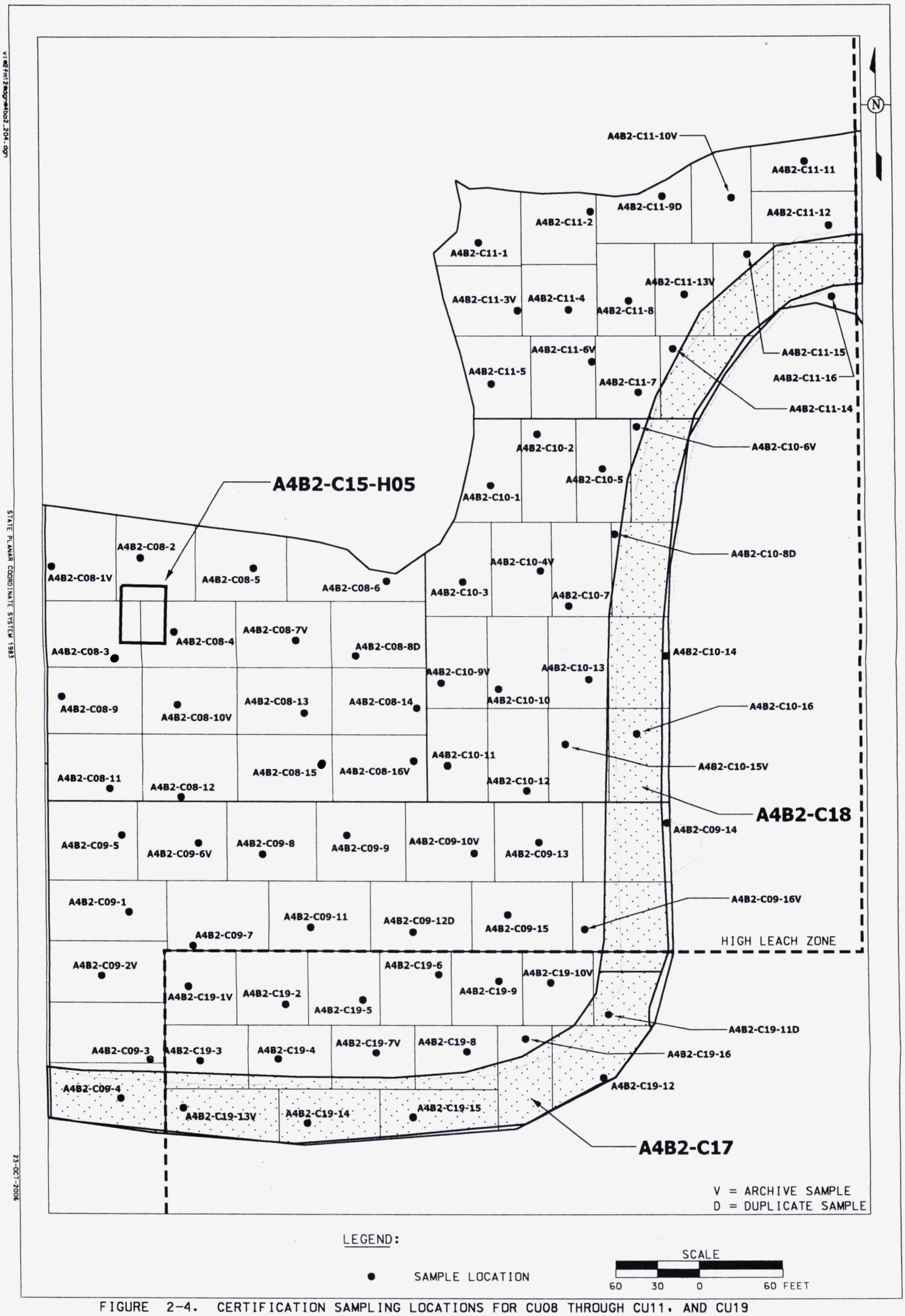
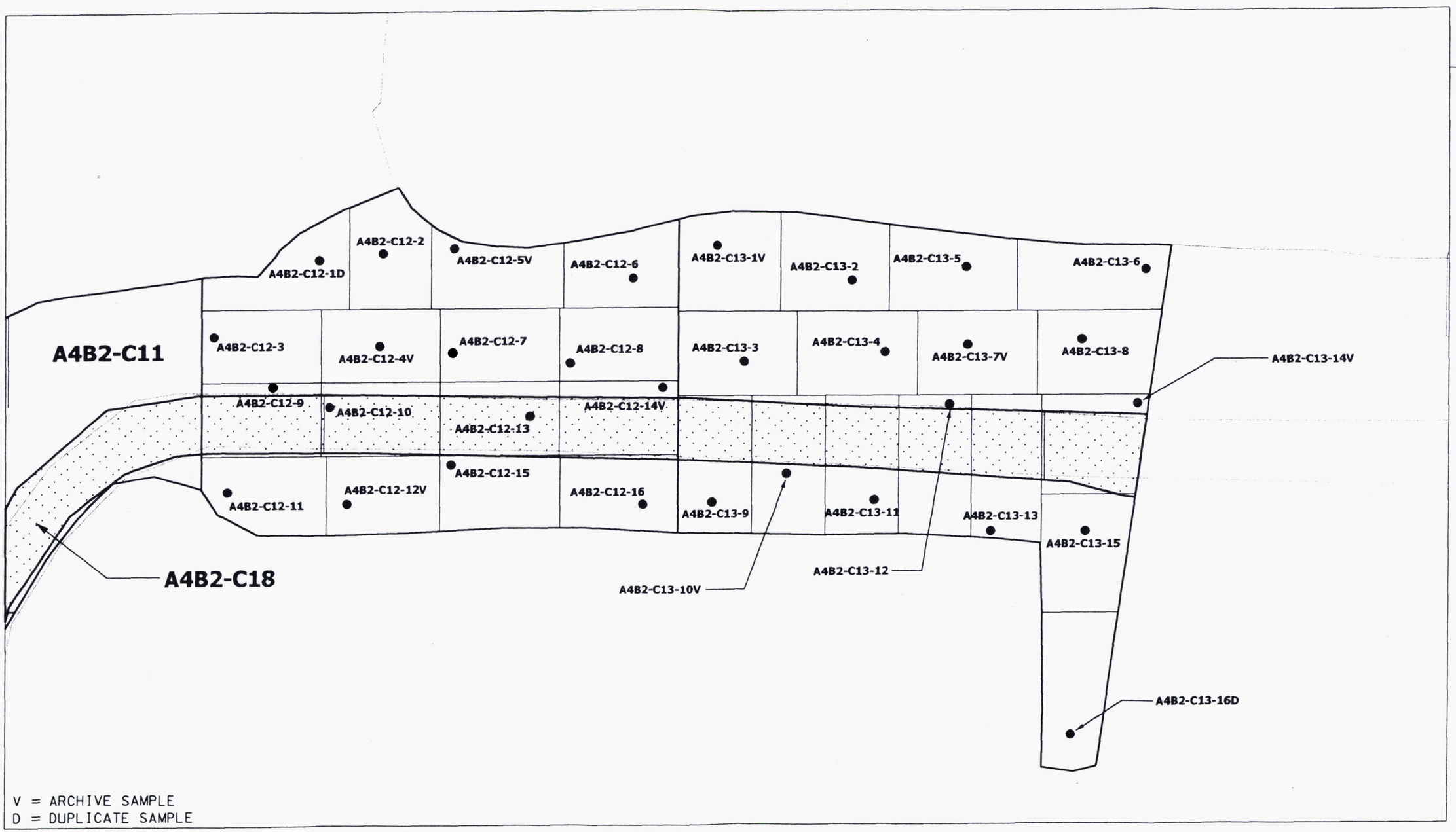


FIGURE 2-4. CERTIFICATION SAMPLING LOCATIONS FOR CU08 THROUGH CU11, AND CU19

006231



LEGEND:

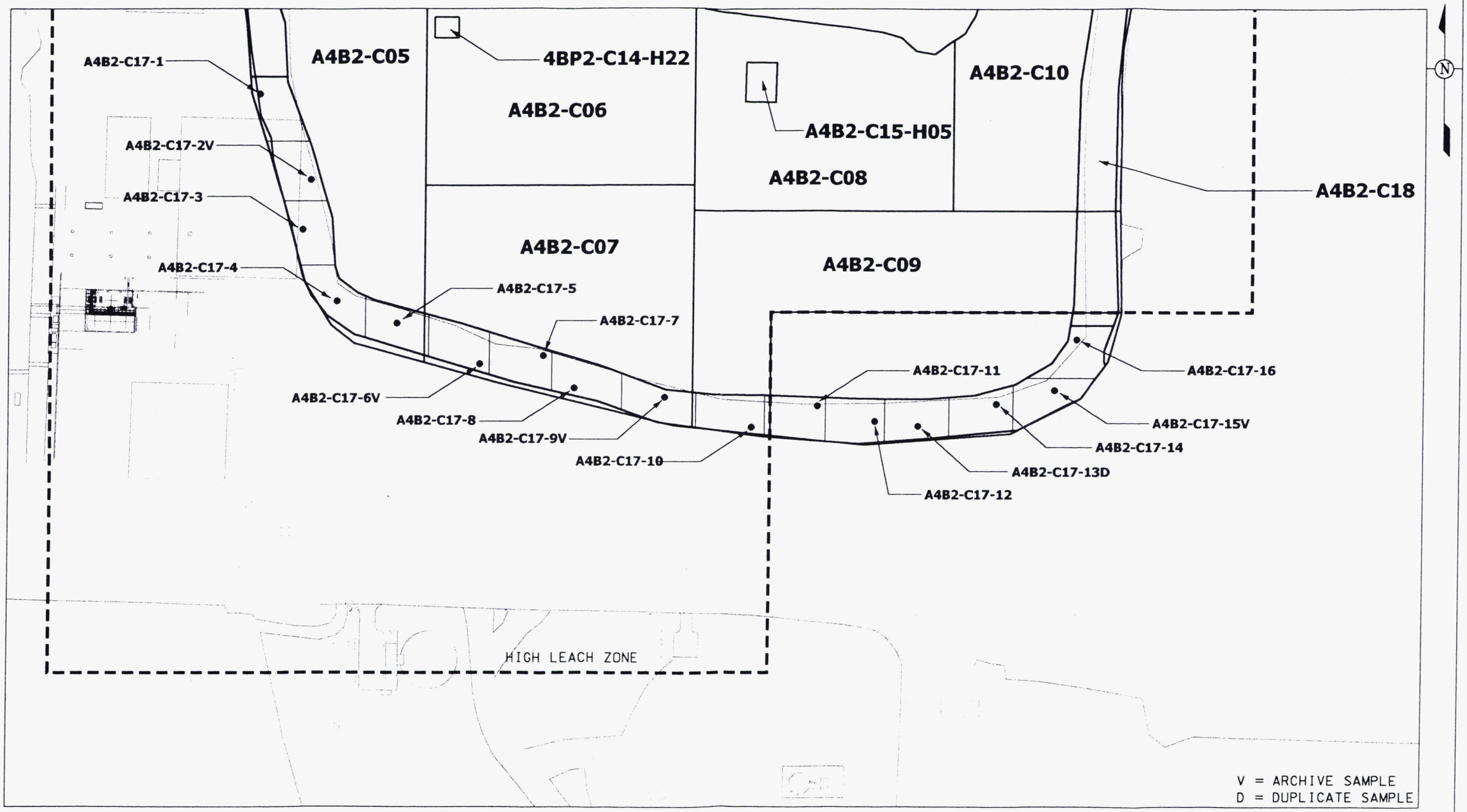
● SAMPLE LOCATION

SCALE

60 30 0 60 FEET

v:\2fm12\dgn\4bp2_205.dgn STATE PLANAR COORDINATE SYSTEM 1983 23-OCT-2006

FIGURE 2-5. CERTIFICATION SAMPLING LOCATIONS FOR CU12 AND CU13



LEGEND:

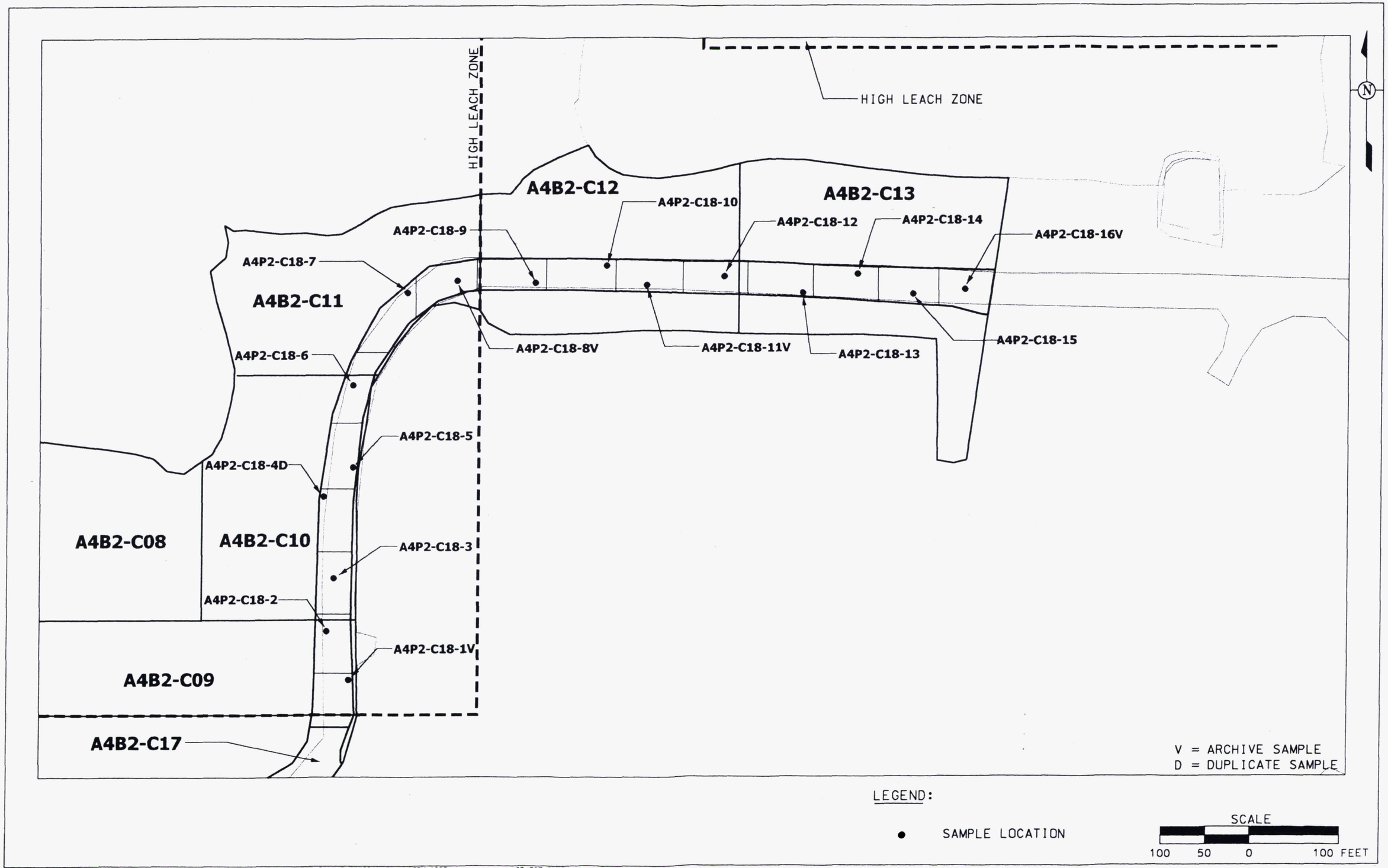
• SAMPLE LOCATION

SCALE

100 50 0 100 FEET

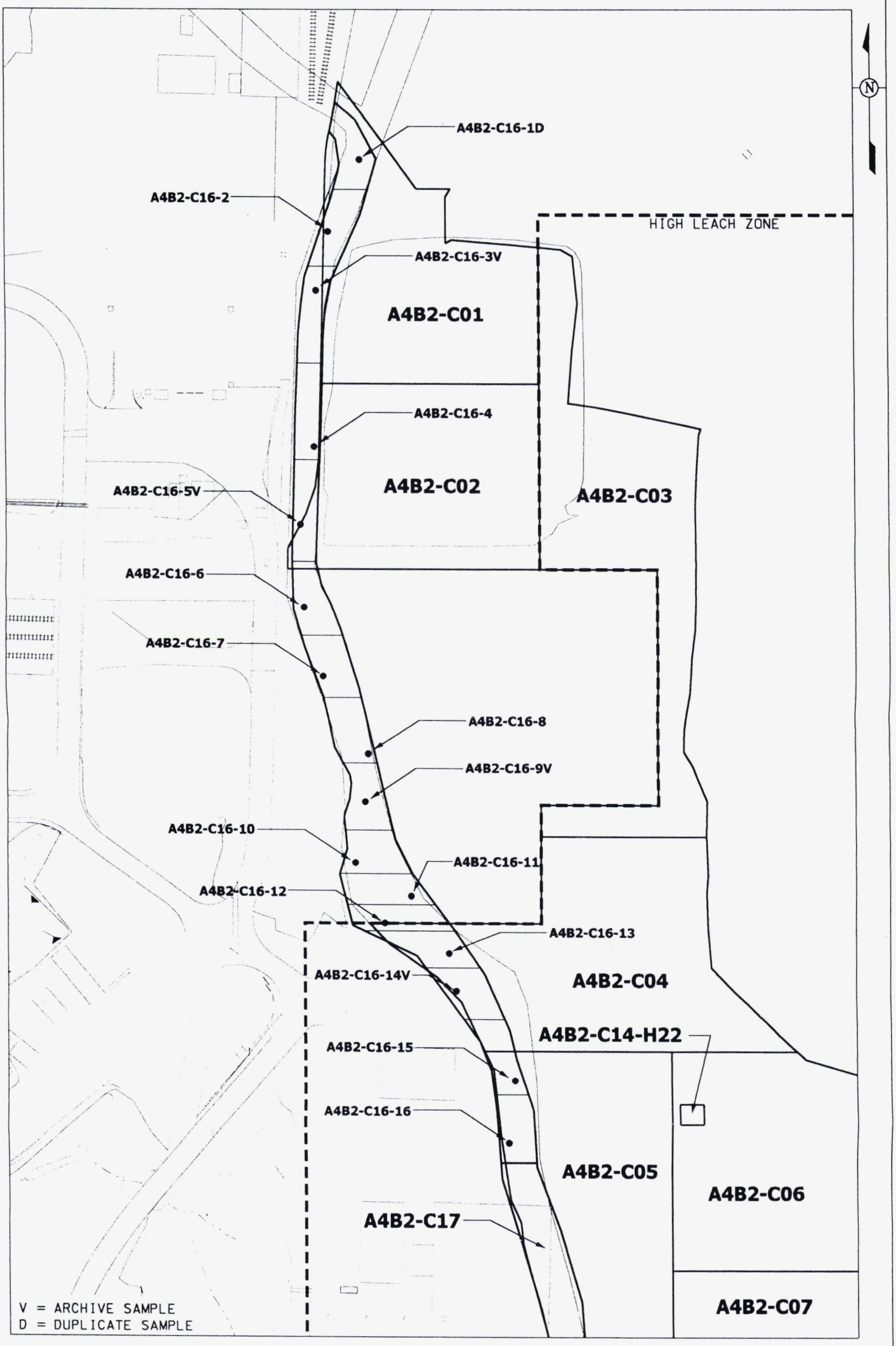
v:\2fm12\dgn\4bp2_haul_101.dgn STATE PLANAR COORDINATE SYSTEM 1983 23-OCT-2006

FIGURE 2-7. CERTIFICATION SAMPLING LOCATIONS FOR CU17



v:\2fm12\dgn\4bp2_haul_102.dgn STATE PLANAR COORDINATE SYSTEM 1983 23-OCT-2006

FIGURE 2-8. CERTIFICATION SAMPLING LOCATIONS FOR CU18



LEGEND:

• SAMPLE LOCATION

SCALE

100 50 0 100 FEET

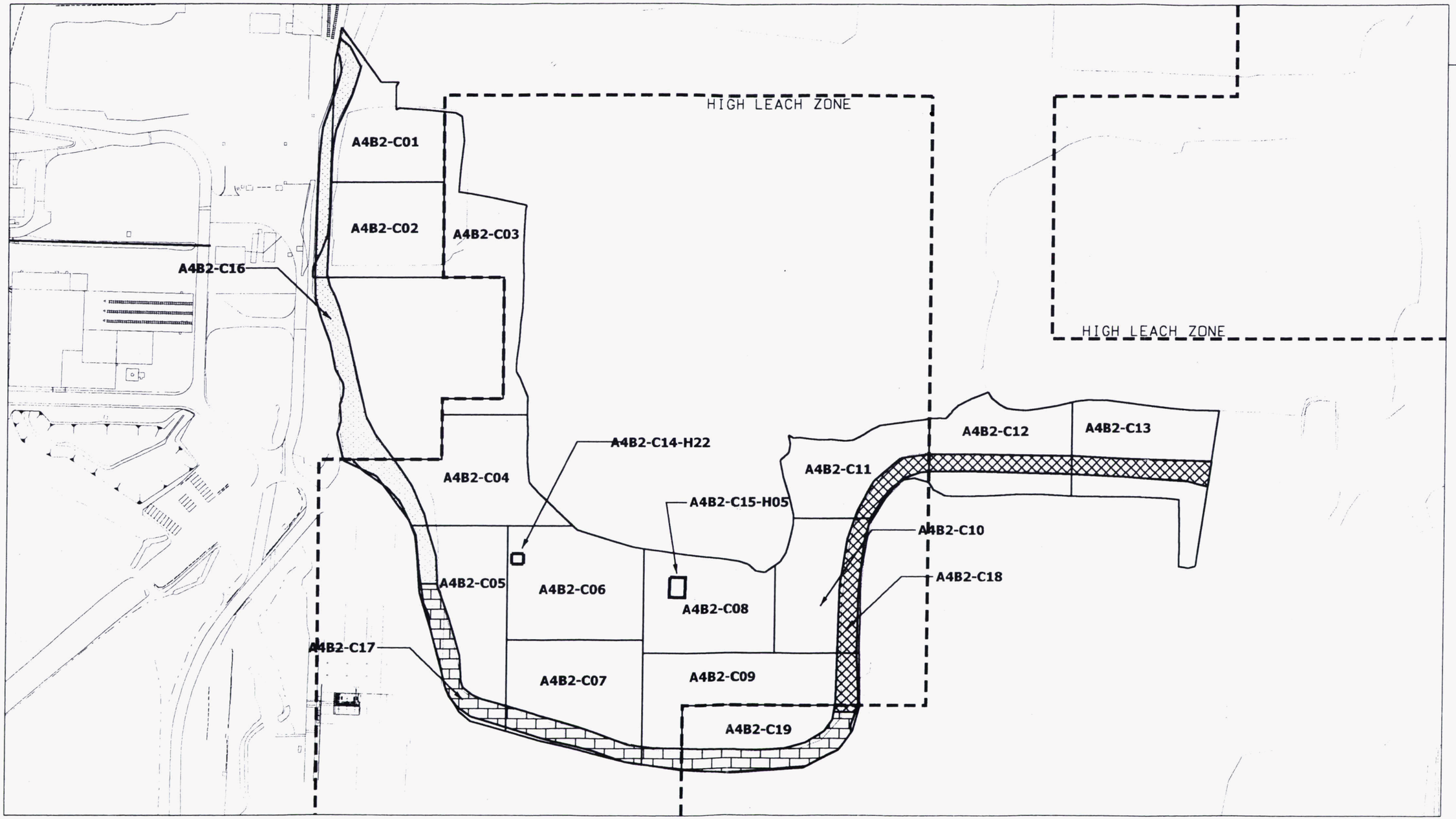
FIGURE 2-6. CERTIFICATION SAMPLING LOCATIONS FOR CU16

v:\e2-fml2\dgn\a4bp2_haul_100.dgn

STATE PLANAR COORDINATE SYSTEM 1983

23-OCT-2006

006231



LEGEND:

SCALE

200 100 0 200 FEET

v:\2fm12\dgn\4bp2_206.dgn STATE PLANAR COORDINATE SYSTEM 1983 23-OCT-2006

FIGURE 2-1. AREA 4B - PART TWO CERTIFICATION AREA BOUNDARIES

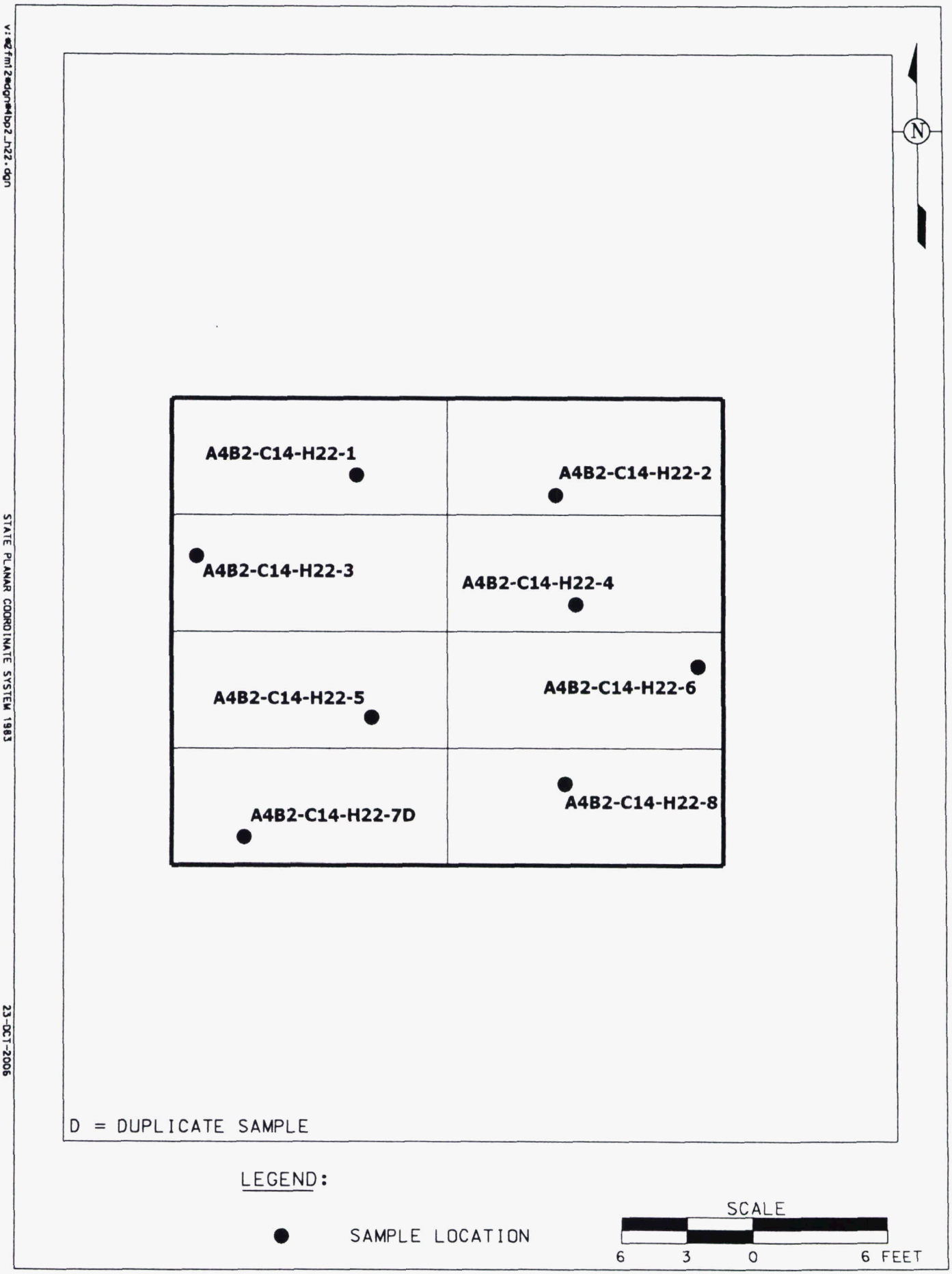


FIGURE 2-9. CERTIFICATION SAMPLING LOCATIONS FOR CU14 (HWMU 22)

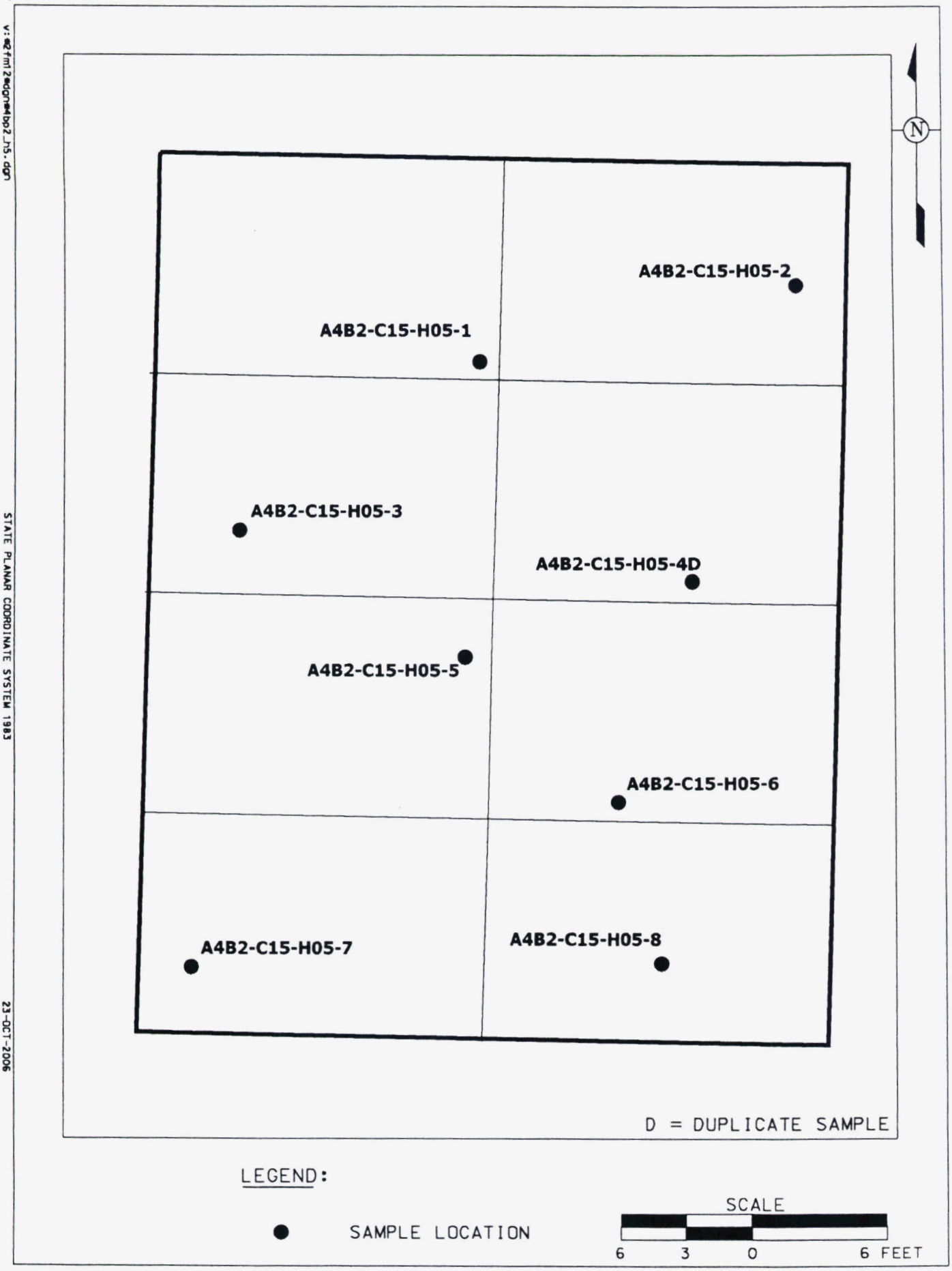


FIGURE 2-10. CERTIFICATION SAMPLING LOCATIONS FOR CU15 (HWMU 5)

3.0 OVERVIEW OF FIELD ACTIVITIES

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

In addition to the Predesign Investigations, the OU3 and OU5 RI Reports (DOE 1995c and 1995a) and Feasibility Study Reports (FS, DOE 1995d and 1995e) were used for remedial design of Area 4B – Part Two, MDC - 1st Street, and the LSP. Final grade excavation monitoring/sampling and real-time scanning/sampling data have been collected pursuant to the RI/FS and remedial activities.

Before initiating the certification process, all historical soil data within the Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification area was pulled from the Sitewide Environmental Database (SED). Based on the results of sampling and scanning activities summarized below, it was determined that no further remedial actions were necessary to remove above-FRL or above-WAC soil.

Those utilities removed as part of the remediation process were taken out after all excavation was completed to design grade and precertification of the overburden had been completed. Once the utility had been removed as required by the technical specifications, precertification was performed on the trench bottom created by the removal of these utilities and then back-filled with the precertified overburden soil. These sampling events are described in V/FCNs 20810-PSP-0006-137 and 20810-PSP-0006-142 (Appendix B) written to the PSP for the Excavation Control and Precertification of Areas 3B, 4B, and 5 (Supplement to 20300-PSP-0001) (DOE 2004a). The sample locations are shown on Figures 3-1 through 3-5 and the data as well as any necessary statistical evaluation is included in Appendix A.

3.1 AREA PREPARATION AND PRECERTIFICATION

All historical data for the area to be certified are presented in the Implementation Plan for Area 3B/4B/5 (DOE 2004b) and the Excavation Plan for Area 7 Silos and General Area (DOE 2005a). This includes data collected during the RI/FS and during three separate predesign investigations; PSP for Area 4B Potentially Characteristic Area and West of Pilot Plant Predesign Investigation (DOE 2001), PSP for Delineating Known Exceedances of the On-Site Disposal Facility WAC in Areas 3B/4B/5 (DOE 2002b), and PSP for Predesign Investigation in Area 7 (Supplement to 20300-PSP-0011) (DOE 2005b). Data were also collected during the remediation/excavation activities for excavation control and following the remediation/excavation activities for precertification per the PSP for Excavation Control of Areas 3B, 4B, and 5 (Supplement to 20300-PSP-0011) (DOE 2004a), and PSP for the Excavation Control and Precertification of Area 7 Silos and General Area (Supplement to 20300-PSP-0011) (DOE 2005c).

There are four designed above-WAC areas in the area to be certified all of which are located within Area 4B - Part Two. They include three in the Pilot Plant Area (northwest central, southwest, and south), and one in the Laboratory (southwest). The Pilot Plant northwest area was above-WAC for technetium-99 and uranium, the Pilot Plant southwest area was above-WAC for uranium, and the Pilot Plant south area was above-WAC for technetium-99 and uranium. The Laboratory southwest area was above-WAC for technetium-99 and uranium. All above-WAC material was removed during the remediation/excavation activities in the area to be certified. Once all of the above-WAC material was removed from these areas, the excavation proceeded to remove the remaining above-FRL material.

There are two HWMUs located in the area to be certified both of which are located in Area 4B - Part Two. They are HWMU 22 (Pilot Plant Sump) and HWMU 5 (Drum Storage Area south of W-26). These HWMUs will be closed during certification.

Following the excavation activities in Area 4B, precertification activities were conducted according to the guidelines established in Section 3.3.3 of the SEP to evaluate residual radiological contamination patterns as specified in the PSP for Excavation Control of Areas 3B, 4B, 5 (Supplement to 20300-PSP-0011). Prior to conducting a precertification real-time scan, Area 4B - Part Two was scanned with a magnetometer to determine if residual debris remained following excavation activities. Minor occurrences of metallic objects were located and were either excavated or hand picked from the area.

Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road passed the requirements of precertification, and it was determined that certification of the soil in these areas could be completed.

3.2 CHANGES TO SCOPE OF WORK

The scope of work for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification sampling required one change, which was documented with one V/FCN (see Appendix C) and discussed in the following paragraph.

Variance 20810-PSP-0012-1 documents the collection of five total uranium (TAL T) samples in sub-CU A4B2-C04-6, where a result greater than 2 times the FRL was detected. The hotspot area was delineated by Real-Time and excavated by Construction. Four locations were sampled at the edge of the excavation (sidewall), one in each of the four cardinal directions. The fifth location was taken in the floor of the excavation.

4.0 ANALYTICAL METHODOLOGIES, DATA VALIDATION PROCESSES, AND DATA REDUCTION

4.1 ANALYTICAL METHODOLOGIES

All samples collected were sent off-site for analysis. The laboratories complied with Sitewide Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Quality Assurance Project Plant (SCQ) requirements (DOE 2003). The SCQ is the source for analytical methodologies (Appendix G), data verification and validation, and analytical quality assurance/quality control 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 and 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. ASL D data packages were provided for all of the analytical data. All data were validated. Once data were validated as required, results were entered into the FCP SED. Final certification results are provided in Appendix B, and a summary of the analytical methods follows:

4.1.1 Chemical Methods

Metals

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

Samples submitted for antimony, barium, beryllium, chromium, and lead were analyzed by inductively coupled plasma-atomic emission spectroscopy (ICP-AES).

Samples submitted for mercury analysis were analyzed by cold vapor atomic absorption.

Polychlorinated Biphenyl (PCBs)

Samples submitted for PCB analyses were analyzed by gas chromatography.

Semi-Volatile Organic Compounds (SVOCs)

Samples submitted for SVOC analyses were analyzed by gas chromatography/mass spectrometry.

Volatile Organic Compounds (VOCs)

Samples submitted for VOC analyses were analyzed by gas chromatography/mass spectrometry.

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 ratio for duplicate samples for each analyte. The on-site laboratory was required to meet these specifications using the methodologies described below.

Total Uranium

Samples were analyzed for unaium-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 spectrometry, and radium-226 was quantified by measuring gamma rays emitted by members of its decay chain. This method does not require chemical separation, but the samples must be allowed a 7-day progeny in-growth period before counting (Appendix C). The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all of the Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Radium-228

Following gamma spectrometry 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 Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Isotopic Thorium

Isotopic thorium (thorium-228 and thorium-232) was also quantified by measuring gamma rays emitted by members of its decay chain by gamma spectrometry. The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Cesium-137

Cesium-137 was quantified by measuring its emitted gamma rays. The off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate all of the Area 4B – Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Lead-210

Lead-210 was 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 of the Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Plutonium-238

Plutonium-238 was 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 of the Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road certification results.

Thorium-230

Samples were analyzed by alpha spectrometry to quantify thorium-230 by measuring its characteristic alpha rays at 4621-kiloelectron volt (keV) and 4687 keV. The off-site laboratory used the combination of these two alpha lines, with the yield indicator thorium-229, to quantify the thorium-230 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 following Section 11.2 and Appendix D of the SCQ.

Specific parameters associated with the data were evaluated during V&V to determine whether or not the data quality objectives were met. Five principal Quality Assurance 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 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.

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 limits are also qualified in this manner

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

U Undetected result at the stated limit of detection

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

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

NJ The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration. This qualifier indicates the presumptive presence of the analyte, but the result can only be considered estimated. This qualifier is not used in typical inorganic analyses, but could be used to qualify organic or radiochemistry data due to spectral interpretation problems.

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.

4.3 DATA REDUCTION

Each sample used to support the Area 4B - Part Two 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
- 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 of the data for each CU were queried from SED. All of 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 on 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 minimum detectable concentration, the validation result becomes the minimum detectable concentration 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 AND EVALUATION

Below is a summary of the analytical results and statistical analyses of the data for each CU in Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road. The majority of the area is in a high leachability zone. All CUs that were either entirely or partially within the zone were evaluated against the lower total uranium FRL of 20 mg/kg.

All of the CUs passed all of the certification criteria as discussed in Section 2.2.4 after the first round of sampling with the exception of CU A4B2-C04. A4B2-C04 failed the hot spot criteria (i.e. greater than two-times the FRL) for the primary ASCOC total uranium at location A4B2-C04-6. This hotspot was delineated, excavated, and re-sampled as a conservative approach to reduce the residual uranium levels. The new sample result was below the total uranium FRL with a result of 14.4 mg/kg (A4B2-C04-6B-N). Following excavation and re-sampling, A4B2-C04 passed all certification requirements. All final certification data are presented in Appendix A.

5.2 HWMU CLOSURES (HWMUs 5 AND 22)

As discussed in Section 4.1.1 of the CDL, there are two HWMUs (5 and 22) in Area 4B – Part Two that are being closed under the scope of this certification effort.

Based on Section 2.2.5 of the SEP, a unique CU should be established with a minimum of eight sample locations collected and analyzed for the HWMU COCs. As an added measure, the calculations described in the Closure Plan Review Guidance for RCRA Facilities (OEPA 2004) by the OEPA DHWM, were performed. Specifically, Appendix N, Section entitled "Using GCNs to Determine that No Further Action is Necessary at a Unit" was used.

In short, this OEPA guidance describes the application of General Cleanup Numbers (GCNs) to a specific RCRA site. According to this guidance, elimination of a COC from assessment can be done based on two conditions: 1) if the frequency of detection is less than 5 percent, and 2) the 95 percent UCL or maximum concentration of the compound is below the site-specific background for the compound (for inorganic metals only). In each HWMU within 4B – Part Two, one or more of the HWMU constituents were eliminated based on the two conditions above.

Once the list of COCs to be assessed was defined, the appropriate adjusted GCN used in the calculations was defined using the 20 DAF (dilution attenuation factor) from Table O-1 of the Closure Plan Review Guidance for RCRA Facilities (OEPA 2004), as the source area is less then 30 acres. Appendix D contains tables for the statistical calculations that were performed to demonstrate HWMU closure. These tables also describe the constituents that were eliminated and which ones were retained for statistical analysis.

The results of these calculations demonstrate that the cancer risk for each applicable HWMU is below the acceptable cancer risk level of 1.00 E-05. Additionally, the non-cancer risk is less than the acceptable non-cancer risk level of 1.00.

Taking both approaches (SEP protocols and OEPA DHWM guidance) into consideration; HWMUs 5 and 22 pass all relevant criteria and therefore are considered closed.

Utility Trenches

Data and a statistical evaluation, if needed, are presented in Appendix A. Statistical evaluation was done for this data only if any of the analytical results exceeded the FRL. When this occurred, this information was included in Appendix A as well. Upon review, the utility trenches passed certification.

5.3 AREA 4B - PART TWO, MDC - 1ST STREET, LSP, AND THE HAUL ROAD CERTIFICATION CONCLUSIONS

Based on the certification analytical results, precertification data, and statistical analysis, DOE has determined that the remedial objectives in the OU5 ROD have been achieved for Area 4B - Part Two, MDC - 1st Street, LSP, and the haul road including HWMUs 5 and 22 described in this report. No further remedial actions are required.

REFERENCES

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

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

U.S. Department of Energy, 1995b, "Record of Decision for Remedial Actions at Operable Unit 2," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

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

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

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

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

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

U.S. Department of Energy, 1996c, "Record of Decision for Final Remedial Action for Operable Unit 3," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

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

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

U.S. Department of Energy, 2002a, "Project Specific Plan for Delineating Known Exceedances of the On-Site Disposal Facility Waste Acceptance Criteria in Areas 3B/4B/5," Revision 1, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2002b, "Natural Resources Restoration Plan," Final, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2003, "Sitewide CERCLA Quality Assurance Project Plan (SCQ)," Revision 3, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

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

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

U.S. Department of Energy, 2005a, "Excavation Plan for Area 7 Silos General Area," Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2005b, "Predesign Investigation in Area 7," Final, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2005c, "Project Specific Plan for Excavation Control and Precertification of Area 7 Silos and General Area," U.S. Department of Energy, 2005b, "Predesign Investigation in Area 7," Final, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2006, "Certification Design Letter and Certification Project Specific Plan for Area 4B - Part One," Revision 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

APPENDIX A

CERTIFICATION SAMPLES, ANALYTICAL RESULTS AND FINAL 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.

ATTACHMENT A.1

SAMPLING RESULTS AND STATISTICS

INITIAL SAMPLING

Certification Unit 1

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Antimony	Arsenic	Beryllium
A4B2-C01-1	1.08 -	0.757 J	0.799 J	0.757 J	8.67 J	0.096 U	0.466 U	6.65 -	0.387 J
A4B2-C01-2	1.63 -	0.891 J	0.859 J	0.891 J	7.65 J	0.092 U	0.553 U	8.05 -	0.71 J
A4B2-C01-4	1.33 -	0.831 J	0.843 J	0.831 J	8.52 J	0.092 U	0.488 U	11 -	0.56 J
A4B2-C01-5	1.34 -	0.927 J	0.931 J	0.927 J	11.9 -	0.081 U	0.385 U	8.62 -	0.561 J
A4B2-C01-6	1.36 -	1.05 J	1.01 J	1.05 J	7.49 -	0.043 U	0.515 U	5.92 -	0.941 J
A4B2-C01-8	1.28 -	0.949 J	0.876 J	0.949 J	10.2 -	0.05 U	0.47 U	7.01 -	0.461 J
A4B2-C01-10	1.49 -	1.1 J	1.05 J	1.1 J	8.00 -	0.043 U	0.507 U	7.78 -	1.14 J
A4B2-C01-11	1.22 -	1.11 J	1.1 J	1.11 J	7.94 -	0.085 U	0.471 U	7.39 -	0.425 J
A4B2-C01-12	1.15 -	0.894 J	0.833 J	0.894 J	5.45 -	0.047 U	0.45 U	6.51 -	0.389 J
A4B2-C01-13	1.20 -	0.847 J	0.76 J	0.847 J	8.55 -	0.053 U	0.499 U	9.23 -	0.602 J
A4B2-C01-13-D	1.22 -	1.07 J	1.13 J	1.07 J	10.8 -	0.086 U	0.473 U	9.59 -	0.419 J
A4B2-C01-14	1.08 -	0.821 J	0.79 J	0.821 J	9.57 -	0.046 U	0.489 U	5.12 -	0.326 J
A4B2-C01-16	1.26 -	0.893 J	0.842 J	0.893 J	8.63 -	0.063 U	0.489 U	6.27 -	0.42 J
Limit	1.7	1.8	1.7	1.5	82	1.4	96	12	1.5
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.63	1.11	1.13	1.11	11.9	0.096 U	0.553 U	11	1.14
Max. >= Limit	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	12	0	0
% Nondetects	0%	0%	0%	0%	0%	100%	100%	0%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -

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

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

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Certification Unit 2

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Antimony	Arsenic	Beryllium
A4B2-C02-2	1.14 J	0.923 -	0.945 -	0.923 -	4.49 UJ	0.082 U	0.476 U	4.4 J	0.512 -
A4B2-C02-3	1.43 J	0.951 -	1 -	0.951 -	4.88 J	0.076 U	0.671 U	8.54 J	0.564 -
A4B2-C02-4	1.20 J	1.05 -	1.07 -	1.05 -	4.3 J	0.087 U	0.545 U	8.03 J	0.661 -
A4B2-C02-5	1.18 J	0.889 -	0.926 -	0.889 -	4.45 UJ	0.08 U	0.437 U	6.06 J	0.509 -
A4B2-C02-6	0.961 J	0.701 -	0.709 -	0.701 -	6.53 J	0.238 -	0.571 U	6.01 J	0.478 -
A4B2-C02-8	1.09 J	0.923 -	0.93 -	0.923 -	4.1 J	0.078 U	0.481 U	6.94 J	0.519 -
A4B2-C02-8-D	1.29 J	1.03 -	1.03 -	1.03 -	6.82 -	0.083 U	0.479 U	8.73 J	0.564 -
A4B2-C02-9	1.21 J	1.04 -	0.998 -	1.04 -	4.93 UJ	0.085 U	0.577 U	7.65 J	0.64 -
A4B2-C02-10	1.43 J	0.889 -	0.831 -	0.889 -	6.55 -	0.079 U	0.678 U	10.7 J	0.817 -
A4B2-C02-11	0.976 J	0.747 -	0.758 -	0.747 -	7.35 -	0.07 U	0.415 U	6.46 J	0.431 -
A4B2-C02-14	1.33 J	0.997 -	1.01 -	0.997 -	4.96 UJ	0.086 U	0.597 U	6.03 J	0.595 -
A4B2-C02-15	1.08 -	0.826 J	0.878 -	0.826 J	2.77 U	0.05 U	0.446 U	7.94 -	0.482 -
A4B2-C02-16	1.15 -	0.947 J	0.973 -	0.947 J	2.85 U	0.05 U	0.478 U	8.09 -	0.52 -
Limit	1.7	1.8	1.7	1.5	82	1.4	96	12	1.5
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.43	1.05	1.07	1.05	7.35	0 .238	0.678 U	10.7	0 .817
Max. >= Limit	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	6	11	12	0	0
% Nondetects	0%	0%	0%	0%	50%	92%	100%	0%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 3

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
A4B2-C03-1	1.48 -	1.07 J	1.1 -	1.07 J	8.65 -
A4B2-C03-1-D	1.41 -	1.15 J	1.19 -	1.15 J	10.6 -
A4B2-C03-2	1.15 -	0.781 J	0.81 -	0.781 J	2.69 U
A4B2-C03-4	1.45 -	1.05 J	1.06 -	1.05 J	7.78 -
A4B2-C03-6	1.26 -	0.97 J	0.975 -	0.97 J	6.5 -
A4B2-C03-7	1.97 -	1.01 J	1.05 -	1.01 J	7.71 -
A4B2-C03-8	1.35 -	0.742 J	0.837 -	0.742 J	3.82 J
A4B2-C03-9	1.56 -	0.919 J	0.922 -	0.919 J	4.26 -
A4B2-C03-11	1.22 -	0.916 J	0.959 -	0.916 J	6.65 -
A4B2-C03-13	1.2 -	0.76 J	0.758 -	0.76 J	2.55 U
A4B2-C03-14	1.37 -	1.41 J	1.46 -	1.41 J	5.02 -
A4B2-C03-15	1.31 -	1.25 J	1.36 -	1.25 J	2.95 U
A4B2-C03-16	1.83 -	0.865 J	0.871 -	0.865 J	5.15 J
Limit	1.7	1.8	1.7	1.5	20
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.97	1.41	1.46	1.41	10.6
Max. >= Limit	Yes	No	No	No	No
W-statistic Prob. #	29.5% (LN)	- -	- -	- -	- -
Test Procedure	Lognormal	- -	- -	- -	- -
Sample Size	12	12	12	12	12
Nondetects	0	0	0	0	3
% Nondetects	0%	0%	0%	0%	25%
Est. Mean*	1.39	- -	- -	- -	- -
UCL	1.52	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -
Pass / Fail	pass	- -	- -	- -	- -

a posteriori Sample	5	- -	- -	- -	- -
Size calculation	Pass	- -	- -	- -	- -

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

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Certification Unit 4

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Technetium-99	Arsenic	Tetrachloroethene
A4B2-C04-1	0.769 -	0.918 -	0.939 -	0.918 -	9.92 -	0.047 U	1.82 U	5.5 -	1.2 U
A4B2-C04-3	0.799 -	0.928 -	0.837 -	0.928 -	9.12 -	0.063 U	1.82 U	5.9 -	1 U
A4B2-C04-4	0.932 -	0.69 -	0.699 -	0.69 -	4.86 -	0.062 U	1.75 U	5.3 -	1 U
A4B2-C04-5	1.21 -	0.872 -	0.904 -	0.872 -	21.6 -	0.0848 -	0.831 U	4.35 -	0.9 U
A4B2-C04-6	1.09 -	1.09 -	1.08 -	1.09 -	**41.7 -**	0.419 -	1.83 J	4.9 -	1 U
A4B2-C04-7	1.20 -	1.04 -	1.03 -	1.04 -	29.3 -	0.237 -	1.99 J	5.8 -	1.1 U
A4B2-C04-9	1.30 -	1.04 -	1.03 -	1.04 -	4.9 -	0.065 U	1.81 U	3.6 -	1 U
A4B2-C04-11	1.05 -	0.737 -	0.759 -	0.737 -	5.82 -	0.067 U	1.72 U	5.2 -	0.9 U
A4B2-C04-12	0.860 -	0.73 -	0.763 -	0.73 -	4.53 J	0.044 U	0.802 U	4.4 -	0.9 U
A4B2-C04-12-D	0.815 -	0.715 -	0.747 -	0.715 -	2.64 U	0.042 U	0.844 U	4.84 -	0.9 U
A4B2-C04-13	1.28 -	1.09 -	1.1 -	1.09 -	13.6 -	0.066 U	2.02 U	6.8 -	1.3 U
A4B2-C04-14	0.731 -	0.51 -	0.536 -	0.51 -	2.25 J	0.038 U	0.806 U	4.35 -	0.9 U
A4B2-C04-16	0.836 -	0.678 -	0.646 -	0.678 -	3.83 -	0.027 U	0.844 U	2.59 -	1 U
Limit	1.7	1.8	1.7	1.5	20	1.4	30	12	3600
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	µg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.3	1.09	1.1	1.09	**41.7**	0 .419	1.99	6.8	1.3 U
Max. >= Limit	No	No	No	No	**Yes**	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	61.9% (LN)	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	Lognormal	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	9	10	0	12
% Nondetects	0%	0%	0%	0%	0%	75%	83%	0%	100%
Est. Mean*	- -	- -	- -	- -	12.9	- -	- -	- -	- -
UCL	- -	- -	- -	- -	26.7	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	**FAIL**	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	9	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	Pass	- -	- -	- -	- -

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

Certification Unit 5

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Arsenic
A4B2-C05-2	0.773 -	0.637 -	0.639 -	0.637 -	3.61 -	0.799 U	5.07 -
A4B2-C05-3	1.21 -	0.81 -	0.811 -	0.81 -	10.6 -	0.97 U	6.98 -
A4B2-C05-4	1 -	0.88 -	0.897 -	0.88 -	6.47 -	0.804 U	6.68 -
A4B2-C05-5	1.29 -	0.908 -	0.948 -	0.908 -	10.5 -	0.91 U	6.16 -
A4B2-C05-7	0.635 -	0.402 -	0.393 -	0.402 -	4.5 J	0.831 U	6.43 -
A4B2-C05-7-D	0.574 -	0.398 -	0.392 -	0.398 -	6.12 J	0.859 U	6.56 -
A4B2-C05-8	0.954 -	0.789 -	0.827 -	0.789 -	4.84 J	0.805 U	5.66 -
A4B2-C05-10	0.763 -	0.668 -	0.711 -	0.668 -	17.2 -	0.82 U	3.63 -
A4B2-C05-11	0.881 -	0.663 -	0.679 -	0.663 -	21.6 -	0.849 U	4.72 -
A4B2-C05-12	0.867 -	0.671 -	0.671 -	0.671 -	5.04 J	0.896 U	2.13 -
A4B2-C05-13	1.22 -	0.93 -	0.929 -	0.93 -	10.4 -	0.829 U	6.58 -
A4B2-C05-15	1.12 -	0.905 -	0.903 -	0.905 -	9.02 J	0.918 U	5.36 -
A4B2-C05-16	1.37 -	0.835 -	0.779 -	0.835 -	10.7 -	0.787 U	6.44 -
Limit	1.7	1.8	1.7	1.5	20	30	12
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.37	0 .93	0 .948	0 .93	21.6	0.97 U	6.98
Max. >= Limit	No	No	No	No	Yes	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0
% Nondetects	0%	0%	0%	0%	0%	100%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

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Certification Unit 6

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Arsenic
A4B2-C06-1	1.05 -	1.04 -	1.00 -	1.04 -	10.9 -	0.803 U	7.91 -
A4B2-C06-2	0.780 -	0.822 -	0.812 -	0.822 -	5.08 J	0.828 U	5.64 -
A4B2-C06-4	0.722 -	0.628 J	0.663 J	0.628 J	6.6 -	0.899 U	3.54 J
A4B2-C06-5	1.25 -	1.03 J	1.10 J	1.03 J	7.25 -	0.828 U	2.43 J
A4B2-C06-5-D	1.17 -	0.872 J	0.823 J	0.872 J	6.33 -	0.809 U	4.43 J
A4B2-C06-7	1.06 -	0.877 J	0.816 J	0.877 J	4.81 -	0.849 U	1.83 J
A4B2-C06-8	0.794 -	0.62 J	0.624 J	0.62 J	3.64 -	0.757 U	4.36 J
A4B2-C06-9	0.890 -	0.755 -	0.761 -	0.755 -	3.04 UJ	0.793 U	5.16 -
A4B2-C06-10	0.884 -	0.571 J	0.554 J	0.571 J	9.13 -	0.787 U	6.1 J
A4B2-C06-12	1.12 -	0.816 J	0.838 J	0.816 J	9.35 -	0.92 U	5.49 J
A4B2-C06-14	0.993 -	1.02 -	0.985 -	1.02 -	8.33 -	1.95 U	5.8 -
A4B2-C06-15	0.838 -	0.485 -	0.470 -	0.485 -	2.68 J	1.00 U	2.69 -
A4B2-C06-16	1.01 -	0.804 J	0.869 J	0.804 J	2.66 U	0.892 U	5.88 J
Limit	1.7	1.8	1.7	1.5	20	30	12
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.25	1.04	1.1	1.04	10.9	1.95 U	7.91
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	2	12	0
% Nondetects	0%	0%	0%	0%	17%	100%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 7

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Arsenic
A4B2-C07-1	0.901 J	0.681 -	0.662 J	0.681 -	3.35 J	0.954 U	4.68 -
A4B2-C07-2	0.903 J	0.677 -	0.67 J	0.677 -	5.7 J	0.908 U	4.22 -
A4B2-C07-3	1.06 J	0.934 -	0.975 J	0.934 -	10.2 J	0.872 U	5.87 -
A4B2-C07-5	0.904 J	0.808 -	0.805 J	0.808 -	8.91 J	0.89 U	5.78 -
A4B2-C07-6	0.938 J	0.73 -	0.74 J	0.73 -	3.18 J	0.949 U	4.3 -
A4B2-C07-7	1.44 J	0.985 -	0.986 J	0.985 -	7.26 J	0.918 U	9.26 -
A4B2-C07-10	1.12 J	0.76 -	0.743 J	0.76 -	7.29 J	0.969 U	5.81 -
A4B2-C07-11	1.02 -	0.744 -	0.803 -	0.744 -	7.2 -	0.84 U	5.61 -
A4B2-C07-13	1.16 J	0.871 -	0.793 J	0.871 -	17.3 -	0.95 U	6.04 -
A4B2-C07-14	1.27 J	1.03 -	1.04 J	1.03 -	6.62 J	0.88 U	8.62 -
A4B2-C07-15	1.21 J	0.762 -	0.778 J	0.762 -	9.7 J	0.873 U	6.59 -
A4B2-C07-15-D	0.891 J	0.72 -	0.636 J	0.72 -	8.53 J	0.847 U	6.51 -
A4B2-C07-16	1.12 -	0.893 -	0.956 -	0.893 -	8.49 -	0.818 U	7.34 -
Limit	1.7	1.8	1.7	1.5	20	30	12
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.44	1.03	1.04	1.03	17.3	0.969 U	9.26
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0
% Nondetects	0%	0%	0%	0%	0%	100%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

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Certification Unit 8

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Plutonium-238	Technetium-99	Arsenic	Beryllium	Aroclor-1254
A4B2-C08-2	0.873 -	0.793 -	0.784 -	0.793 -	4.46 -	0.042 U	0.08 U	2.21 U	9.5 -	0.52 -	3.6 U
A4B2-C08-3	1.10 -	0.982 -	0.97 -	0.982 -	7.67 -	0.077 U	0.339 U	1.90 U	3.7 -	0.43 -	14.2 U
A4B2-C08-4	1.02 -	0.988 -	1.00 -	0.988 -	9.43 -	0.068 U	0.167 U	1.90 U	6.5 -	0.76 -	17 U
A4B2-C08-5	0.704 -	0.567 -	0.575 -	0.567 -	4.07 -	0.04 U	0.369 U	2.12 U	4.2 -	0.34 -	3.5 U
A4B2-C08-6	0.938 -	0.648 -	0.632 -	0.648 -	4.01 J	0.078 U	0.094 U	1.74 U	2.8 J	0.43 -	3.8 U
A4B2-C08-8	0.884 -	0.672 -	0.677 -	0.672 -	3.55 -	0.07 U	0.24 U	1.72 U	3.8 J	0.29 -	3.6 U
A4B2-C08-8-D	0.765 -	0.574 -	0.585 -	0.574 -	4.71 -	0.054 U	0.204 U	1.76 U	4.2 J	0.4 -	3.6 U
A4B2-C08-9	1.07 -	0.95 -	0.925 -	0.95 -	6.64 -	0.045 U	0.285 U	2.00 U	6.6 -	0.74 -	18 U
A4B2-C08-11	0.793 -	0.856 -	0.834 -	0.856 -	4.58 -	0.08 U	0.185 U	1.72 U	4.4 J	0.43 -	3.6 U
A4B2-C08-12	0.842 -	0.658 -	0.662 -	0.658 -	4.9 -	0.048 U	0.0814 U	1.76 U	4.4 J	0.39 -	3.8 U
A4B2-C08-13	0.914 -	0.707 -	0.749 -	0.707 -	3.62 J	0.067 U	0.244 U	1.71 U	4 J	0.35 -	3.7 U
A4B2-C08-14	0.828 -	0.664 -	0.662 -	0.664 -	4.99 -	0.057 U	0.187 U	1.74 U	5.7 J	0.4 -	3.8 U
A4B2-C08-15	0.822 -	0.655 -	0.642 -	0.655 -	4.51 -	0.057 U	0.194 U	1.72 U	6.8 J	0.36 -	3.8 U
Limit	1.7	1.8	1.7	1.5	20	1.4	77	30	12	1.5	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	pCi/g	mg/kg	mg/kg	µg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%
Max. Result	1.1	0 .988	1	0 .988	9.43	0.08 U	0.369 U	2.21 U	9.5	0 .76	18 U
Max. >= Limit	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	12	12	0	0	12
% Nondetects	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 9

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Aroclor-1254
A4B2-C09-1	1.08 -	0.903 -	0.918 -	0.903 -	7.12 -	1.75 U	3.8 U
A4B2-C09-3	1.13 -	0.851 -	0.846 -	0.851 -	5.97 -	1.76 U	8.4 J
A4B2-C09-4	0.971 -	0.849 -	0.906 -	0.849 -	8.11 -	0.853 U	3.7 U
A4B2-C09-5	0.955 -	0.886 -	0.871 -	0.886 -	6.81 -	1.68 U	3.7 U
A4B2-C09-7	1.01 -	0.868 -	0.841 -	0.868 -	12.4 -	1.74 U	3.9 U
A4B2-C09-8	1.45 -	1.18 -	1.13 -	1.18 -	6.07 -	1.8 U	4.1 U
A4B2-C09-9	1.10 -	0.912 -	0.914 -	0.912 -	5.66 -	1.74 U	3.8 U
A4B2-C09-11	0.995 -	0.835 -	0.83 -	0.835 -	12.9 -	1.73 U	3.7 U
A4B2-C09-12	1.01 -	0.790 -	0.791 -	0.79 -	9.86 -	1.71 U	4.2 J
A4B2-C09-12-D	1.10 -	0.761 -	0.747 -	0.761 -	9.14 -	1.60 U	6.8 J
A4B2-C09-13	1.14 -	0.902 -	0.901 -	0.902 -	11.3 -	1.64 U	4.6 J
A4B2-C09-14	0.967 -	0.918 -	0.901 -	0.918 -	10.8 -	1.67 U	9.8 J
A4B2-C09-15	1.01 -	0.761 -	0.796 -	0.761 -	9.15 -	1.57 U	9.4 J
Limit	1.7	1.8	1.7	1.5	20	30	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	µg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.6	1.18	1.13	1.18	12.9	1.8 U	9.8
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	7
% Nondetects	0%	0%	0%	0%	0%	100%	58%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

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Certification Unit 10

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99
A4B2-C10-1	0.875 J	0.57 -	0.557 -	0.57 -	5.88 J	0.780 U
A4B2-C10-2	0.971 J	0.863 -	0.875 -	0.863 -	8.68 J	0.820 U
A4B2-C10-3	0.974 J	0.692 -	0.649 -	0.692 -	3.59 J	0.833 U
A4B2-C10-5	1.15 J	0.955 -	0.893 -	0.955 -	10.2 J	0.897 U
A4B2-C10-7	1.07 J	0.883 -	0.977 -	0.883 -	6.84 J	0.894 U
A4B2-C10-8	1.01 J	0.818 -	0.798 -	0.818 -	16.2 J	0.954 U
A4B2-C10-8-D	1.35 J	0.742 -	0.698 -	0.742 -	14.1 J	0.821 U
A4B2-C10-10	0.882 J	0.754 -	0.822 -	0.754 -	5.66 J	0.841 U
A4B2-C10-11	1.06 J	0.854 -	0.794 -	0.854 -	12.0 J	0.800 U
A4B2-C10-12	1.09 J	0.786 -	0.803 -	0.786 -	12.3 J	0.816 U
A4B2-C10-13	0.970 J	0.774 -	0.854 -	0.774 -	6.08 J	0.836 U
A4B2-C10-14	1.11 J	0.754 -	0.737 -	0.754 -	9.66 J	0.887 U
A4B2-C10-16	1.22 J	0.907 -	0.86 -	0.907 -	9.04 J	0.819 U
Limit	1.7	1.8	1.7	1.5	20	30
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	1.44	0 .955	0 .977	0 .955	16.2	0.954 U
Max. >= Limit	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12
% Nondetects	0%	0%	0%	0%	0%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 11

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99
A4B2-C11-1	1.97 -	0.645 -	0.608 -	0.645 -	8.44 -	0.851 U
A4B2-C11-2	1.05 -	0.691 -	0.685 -	0.691 -	6.27 -	0.891 U
A4B2-C11-4	1.11 -	0.816 -	0.909 -	0.816 -	6.88 -	0.804 U
A4B2-C11-5	1.14 -	0.661 -	0.633 -	0.661 -	3.60 J	0.942 U
A4B2-C11-7	0.896 -	0.841 -	0.887 -	0.841 -	10.1 -	0.937 U
A4B2-C11-8	1.12 -	0.882 -	0.964 -	0.882 -	15.2 -	0.966 U
A4B2-C11-9	1.14 -	0.855 -	0.815 -	0.855 -	10.3 -	0.944 U
A4B2-C11-9-D	1.10 -	0.807 -	0.743 -	0.807 -	6.71 -	0.933 U
A4B2-C11-11	0.899 -	0.591 -	0.569 -	0.591 -	4.39 -	0.936 U
A4B2-C11-12	0.857 -	0.877 -	0.881 -	0.877 -	8.43 -	0.953 U
A4B2-C11-14	1.01 -	0.902 -	0.979 -	0.902 -	10.6 -	0.969 U
A4B2-C11-15	1.04 -	0.8 -	0.739 -	0.8 -	7.07 -	0.913 U
A4B2-C11-16	1.48 -	1.03 -	1.09 -	1.03 -	12.5 -	0.909 U
Limit	1.7	1.8	1.7	1.5	20	30
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	**1.97**	1.03	1.09	1.03	15.2	0.969 U
Max. >= Limit	**Yes**	No	No	No	No	No
W-statistic Prob. #	4.1% (LN)	- -	- -	- -	- -	- -
Test Procedure	Median (Sign)	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12
% Nondetects	0%	0%	0%	0%	0%	100%
Est. Mean*	1.08	- -	- -	- -	- -	- -
UCL	1.14	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	- -	- -	- -	- -	- -

a posteriori Sample	7	- -	- -	- -	- -	- -
Size calculation	Pass	- -	- -	- -	- -	- -

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

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Certification Unit 12

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Aroclor-1254
A4B2-C12-1	0.985 -	0.86 J	0.846 J	0.860 J	9.43 J	1.75 U	3.7 U
A4B2-C12-1-D	1.12 -	1.23 J	1.25 J	1.23 J	4.39 J	1.82 U	3.9 U
A4B2-C12-2	1.06 -	0.921 J	0.914 J	0.921 J	6.00 J	1.70 U	3.8 U
A4B2-C12-3	0.991 -	0.757 J	0.753 J	0.757 J	4.76 J	1.70 U	4.3 J
A4B2-C12-6	1.14 -	1.15 J	1.17 J	1.15 J	4.86 J	1.69 U	3.7 U
A4B2-C12-7	0.963 -	0.959 J	0.964 J	0.959 J	5.96 J	1.79 U	3.9 U
A4B2-C12-8	1.08 -	0.907 J	0.892 J	0.907 J	8.41 J	1.77 U	3.7 U
A4B2-C12-9	1.08 -	0.989 J	1.01 J	0.989 J	8.58 J	1.79 U	3.6 U
A4B2-C12-10	1.12 -	1.04 J	1.02 J	1.04 J	5.18 J	1.84 U	3.7 U
A4B2-C12-11	1.20 -	1.02 J	1.05 J	1.02 J	14.9 J	1.82 U	8.6 J
A4B2-C12-13	1.01 -	0.934 J	0.942 J	0.934 J	7.37 J	1.75 U	3.6 U
A4B2-C12-15	0.952 -	0.792 J	0.785 J	0.792 J	14.9 J	1.71 U	3.7 U
A4B2-C12-16	0.962 -	0.947 J	0.932 J	0.947 J	8.48 J	1.76 U	4.1 U
Limit	1.7	1.8	1.7	1.5	82	30	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	µg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.2	1.23	1.25	1.23	14.9	1.84 U	8.6
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	10
% Nondetects	0%	0%	0%	0%	0%	100%	83%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 13

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99
A4B2-C13-2	0.912 J	0.641 -	0.611 -	0.641 -	2.72 U	0.882 U
A4B2-C13-3	3.31 J	0.924 -	0.998 -	0.924 -	9.32 -	1.19 J
A4B2-C13-4	1.14 J	1.02 -	1.07 -	1.02 -	16.6 -	0.885 U
A4B2-C13-5	1.18 J	0.985 -	0.954 -	0.985 -	32.3 -	0.933 U
A4B2-C13-6	0.905 J	0.638 -	0.616 -	0.638 -	19.8 -	0.811 U
A4B2-C13-8	0.784 J	0.669 -	0.664 -	0.669 -	6.43 -	0.847 U
A4B2-C13-9	1.25 J	0.997 -	0.968 -	0.997 -	9.17 -	0.996 U
A4B2-C13-11	1.15 J	1.11 -	1.11 -	1.11 -	8.75 -	0.866 U
A4B2-C13-12	1.16 J	1.00 -	0.967 -	1.00 -	9.00 -	0.943 U
A4B2-C13-13	1.16 J	1.01 -	0.998 -	1.01 -	16.1 -	0.786 U
A4B2-C13-15	0.916 J	0.707 -	0.743 -	0.707 -	10.7 -	0.809 U
A4B2-C13-16	1.29 J	0.986 -	0.995 -	0.986 -	11.4 -	0.934 U
A4B2-C13-16-D	1.1 J	0.958 -	0.966 -	0.958 -	10.6 -	0.919 U
Limit	1.7	1.8	1.7	1.5	82	30
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	**3.31**	1.11	1.11	1.11	32.3	1.19
Max. >= Limit	Yes	No	No	No	No	No
W-statistic Prob. #	< 0.01% (LN)	- -	- -	- -	- -	- -
Test Procedure	Median (Sign)	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12
Nondetects	0	0	0	0	1	11
% Nondetects	0%	0%	0%	0%	8%	92%
Est. Mean*	1.16	- -	- -	- -	- -	- -
UCL	1.25	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	- -	- -	- -	- -	- -

a posteriori Sample	7	- -	- -	- -	- -	- -
Size calculation	Pass	- -	- -	- -	- -	- -

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

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Certification Unit 14 (HWMU 22)

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Barium	Chromium	Lead
A4B2-C14-H22-1	1.01 -	0.881 -	0.87 -	0.881 -	6.09 -	0.817 U	73.5 -	17.5 J	11.2 J
A4B2-C14-H22-2	1.2 -	0.906 -	0.895 -	0.906 -	11.1 -	0.815 U	86.2 -	19.9 J	13 J
A4B2-C14-H22-3	0.982 -	0.984 -	0.993 -	0.984 -	6.3 -	0.778 U	47.7 J	15.1 J	10.6 J
A4B2-C14-H22-4	1.14 -	0.928 -	0.95 -	0.928 -	7.64 -	0.806 U	82.2 -	19.2 J	12.6 J
A4B2-C14-H22-5	1.1 -	0.849 -	0.79 -	0.849 -	7.49 -	0.809 U	79.9 -	19.1 J	11.9 J
A4B2-C14-H22-6	0.87 -	0.848 -	0.882 -	0.848 -	2.34 U	0.779 U	63.4 -	15.5 J	9.95 J
A4B2-C14-H22-7	1.03 -	0.843 -	0.871 -	0.838 -	3.37 UJ	0.777 U	59.4 -	13.2 J	9.02 J
A4B2-C14-H22-7D	0.987 -	0.838 -	0.871 -	0.838 -	3.37 UJ	0.824 U	106 -	14.1 J	11.1 J
A4B2-C14-H22-8	0.958 -	0.737 -	0.74 -	0.737 -	6.92 -	0.79 U	68.5 -	17.4 J	11.1 J
Limit	1.7	1.8	1.7	1.5	20	30	68000	300	400
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.2	0 .984	0 .993	0 .984	11.1	0.824 U	106	19.9	13
Max. >= Limit	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	8	8	8	8	8	8	8	8	8
Nondetects	0	0	0	0	2	8	0	0	0
% Nondetects	0%	0%	0%	0%	25%	100%	0%	0%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -

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

Certification Unit 14 (HWMU 22)

SAMPLE_ID	Mercury	Benzo(a)pyrene	Aroclor-1254	Aroclor-1260	Benzene	Tetrachloroethene	Trichloroethene
A4B2-C14-H22-1	0.0217 J	44.7 U	6.8 J	4.5 U	0.9 U	0.9 U	0.9 U
A4B2-C14-H22-2	0.0347 J	51.4 U	18.6 -	6.6 J	1.7 U	2 J	1.7 U
A4B2-C14-H22-3	0.0142 J	49.4 U	6.9 J	4.9 U	1.5 U	1.5 U	1.5 U
A4B2-C14-H22-4	0.0307 J	54 U	19.5 -	6.8 J	1.7 U	1.7 U	1.7 U
A4B2-C14-H22-5	0.0279 J	47.2 U	13.7 -	5.1 J	1.3 U	1.3 U	1.3 U
A4B2-C14-H22-6	0.0125 J	45.5 U	4.6 U	4.6 U	1.6 U	1.6 U	1.6 U
A4B2-C14-H22-7	0.0215 J	45.2 U	6.4 J	4.6 J	1 U	1 U	1 U
A4B2-C14-H22-7D	0.0243 J	45.2 U	6.4 J	4.52 U	1.1 U	1.1 U	1.1 U
A4B2-C14-H22-8	0.015 J	41.5 U	4.2 U	4.2 U	1.4 U	1.4 U	1.4 U
Limit	7.5	2000	130	130	850000	3600	25000
Units	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%
Max. Result	0 .0347	54 U	19.5	6.8	1.7 U	2	1.7 U
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	8	8	8	8	8	8	8
Nondetects	0	8	2	4	8	7	8
% Nondetects	0%	100%	25%	50%	100%	88%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -

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

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Certification Unit 15 (HWMU 5)

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Lead	Mercury
A4B2-C15-H05-1	0.976 -	0.791 -	0.736 -	0.791 -	7.95 -	0.802 U	20.4 U	0.012 U
A4B2-C15-H05-2	1.09 -	0.921 -	0.979 -	0.921 -	8.87 -	0.83 U	19.5 J	0.0068 U
A4B2-C15-H05-3	1.20 -	0.937 -	0.978 -	0.937 -	8.84 -	0.828 U	19.4 U	0.0282 U
A4B2-C15-H05-4	1.03 -	0.801 -	0.771 -	0.801 -	4.99 -	0.819 U	25.2 J	0.0208 U
A4B2-C15-H05-4-D	1.08 -	0.784 -	0.741 -	0.784 -	7.64 -	0.811 U	18.5 U	0.0240 U
A4B2-C15-H05-5	1.02 -	0.948 -	0.954 -	0.948 -	5.91 -	0.795 U	19 J	0.0247 U
A4B2-C15-H05-6	1.01 -	0.796 -	0.74 -	0.796 -	5.95 -	0.918 J	18.2 U	0.0204 U
A4B2-C15-H05-7	1.09 -	0.823 -	0.793 -	0.823 -	7.38 -	0.931 U	20.2 U	0.0100 U
A4B2-C15-H05-8	1.10 -	1.08 -	1.15 -	1.08 -	8.84 -	0.838 U	20.7 J	0.0158 U
Limit	1.7	1.8	1.7	1.5	20	30	400	7.5
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
Max. Result	1.20	1.08	1.15	1.08	8.87	0 .918	25.2	0.0282 U
Max. >= Limit	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	8	8	8	8	8	8	8	8
Nondetects	0	0	0	0	0	7	4	8
% Nondetects	0%	0%	0%	0%	0%	88%	50%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 16

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Lead-210	Technetium-99	Thorium-230
A4B2-C16-1	1.02 -	0.822 -	0.824 -	0.822 -	10.9 J	0.083 U	1.42 J	2.05 U	1.83 J
A4B2-C16-1-D	1.22 -	0.951 -	0.934 -	0.951 -	11 J	0.056 U	1.19 J	2.33 U	1.85 J
A4B2-C16-2	1.40 -	0.724 -	0.747 -	0.724 -	11.5 J	0.059 U	1.05 J	2.17 U	1.75 J
A4B2-C16-4	0.914 -	0.43 -	0.444 -	0.43 -	4.63 J	0.065 U	1.17 J	2.31 U	0.88 J
A4B2-C16-6	1.25 -	0.635 -	0.632 -	0.635 -	9.25 J	0.099 U	1.07 U	2.19 U	1.17 J
A4B2-C16-7	0.733 -	0.47 -	0.468 -	0.47 -	3.87 J	0.07 U	0.714 U	2.23 U	1.13 J
A4B2-C16-8	1.12 -	0.891 -	0.92 -	0.891 -	9.28 J	0.062 U	1.19 J	2.2 U	1.99 J
A4B2-C16-10	1.25 -	0.724 -	0.712 -	0.724 -	30 J	0.091 U	0.949 J	2.17 U	2.39 J
A4B2-C16-11	1.45 -	0.799 -	0.808 -	0.799 -	12.8 J	0.102 U	1.56 J	2.2 U	1.61 J
A4B2-C16-12	1.41 -	1.05 -	1.03 -	1.05 -	26.7 J	0.117 U	1.35 J	2.32 U	3.96 J
A4B2-C16-13	0.790 -	0.553 -	0.551 -	0.553 -	8.35 J	0.0287 J	1.73 U	2.1 U	1.00 J
A4B2-C16-15	1.04 -	0.847 -	0.819 -	0.847 -	10.1 J	0.065 U	1.23 J	2.19 U	1.01 J
A4B2-C16-16	1.37 -	0.913 -	0.919 -	0.913 -	11 J	0.078 U	0.833 U	2.12 U	1.07 J
Limit	1.7	1.8	1.7	1.5	20	1.4	38	30	280
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	pCi/g	pCi/g
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.45	1.05	1.03	1.05	30	0 .0287	1.56	2.33 U	3.96
Max. >= Limit	No	No	No	No	**Yes**	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	29.9% (LN)	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	Lognormal	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	11	4	12	0
% Nondetects	0%	0%	0%	0%	0%	92%	33%	100%	0%
Est. Mean*	- -	- -	- -	- -	12.5	- -	- -	- -	- -
UCL	- -	- -	- -	- -	18.6	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	pass	- -	- -	- -	- -

a posteriori Sample	- -	- -	- -	- -	7	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	Pass	- -	- -	- -	- -

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
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Certification Unit 16

SAMPLE_ID	Arsenic	Beryllium	Chromium	Fluoride	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene
A4B2-C16-1	7.7 J	0.65 -	18.3 J	3.58 J	35.7 U	83.2 J	35.7 U
A4B2-C16-1-D	7 J	0.57 -	16.1 J	2.33 J	144 U	147 J	144 U
A4B2-C16-2	8.2 J	0.57 -	18.5 J	2.64 J	177 J	651 J	35.8 U
A4B2-C16-4	6.5 J	0.24 -	8 J	0.279 UJ	290 J	1120 J	34.2 U
A4B2-C16-6	5.9 J	0.42 -	12.5 J	2.01 J	35.4 U	132 J	35.4 U
A4B2-C16-7	5.5 J	0.41 -	13 J	4.99 J	34.8 U	60.9 J	34.8 U
A4B2-C16-8	8 J	0.75 -	17.1 J	5.15 J	43.6 J	55.9 J	38 U
A4B2-C16-10	5.4 J	0.56 -	15 J	5.27 J	37.2 U	44.2 J	37.2 U
A4B2-C16-11	7.3 J	0.6 -	17.8 J	6.29 J	37 U	59.9 J	37 U
A4B2-C16-12	3.7 J	0.46 -	12.1 J	6.36 J	37.4 U	37.4 U	37.4 U
A4B2-C16-13	5.5 J	0.28 -	10 J	1.97 J	34.8 U	34.8 U	34.8 U
A4B2-C16-15	7.1 J	0.58 -	16.3 J	6.87 J	37.7 U	37.7 U	37.7 U
A4B2-C16-16	7.6 J	0.59 -	17.6 J	8.3 J	37 U	37 U	37 U
Limit	12	1.5	300	78000	2000	20000	2000
Units	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%
Max. Result	8.2	0 .75	18.5	8.3	290	1120	144 U
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	1	9	4	12
% Nondetects	0%	0%	0%	8%	75%	33%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

Certification Unit 16

SAMPLE_ID	Indeno(1,2,3-cd)pyrene	Aroclor-1254	Aroclor-1260	Dieldrin	1,1,1-Trichloroethane	1,1-Dichloroethene	1,2-Dichloroethene (Total)
A4B2-C16-1	35.7 U	5 J	3.6 U	1.4 UJ	1 U	1 U	1 U
A4B2-C16-1-D	144 U	8.6 J	5 J	1.4 UJ	1.1 U	1.1 U	1.1 U
A4B2-C16-2	99.3 J	6.3 J	3.6 U	1.4 UJ	1.4 U	1.4 U	1.4 U
A4B2-C16-4	154 J	3.4 U	3.4 U	1.4 UJ	1.2 U	1.2 U	1.2 U
A4B2-C16-6	35.4 U	5.1 J	3.5 U	1.4 UJ	1.1 U	1.1 U	1.1 U
A4B2-C16-7	34.8 U	8.9 J	3.5 U	1.4 UJ	0.9 U	0.9 U	0.9 U
A4B2-C16-8	38 U	6.3 J	3.8 U	1.5 UJ	1.6 U	1.6 U	1.6 U
A4B2-C16-10	37.2 U	10.1 J	4.6 J	1.5 UJ	1.3 U	1.3 U	1.3 U
A4B2-C16-11	37 U	25.8 -	9.2 J	1.5 UJ	1.6 U	1.6 U	1.6 U
A4B2-C16-12	37.4 U	3.7 U	3.7 U	1.5 UJ	1 U	1 U	1 U
A4B2-C16-13	34.8 U	19.1 -	7.3 J	1.4 UJ	1.2 U	1.2 U	1.2 U
A4B2-C16-15	37.7 U	21.5 -	7.7 J	1.5 UJ	0.9 U	0.9 U	0.9 U
A4B2-C16-16	37 U	33.3 -	11.5 J	1.5 UJ	1.2 U	1.2 U	1.2 U
Limit	20000	130	130	15	4300	410	160
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%
Max. Result	154	33.3	11.5	1.5 UJ	1.6 U	1.6 U	1.6 U
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	10	2	6	12	12	12	12
% Nondetects	83%	17%	50%	100%	100%	100%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

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SAMPLE_ID	Bromodichloromethane	Tetrachloroethene	Trichloroethene
A4B2-C16-1	1 U	1 U	1 U
A4B2-C16-1-D	1.1 U	1.1 U	1.1 U
A4B2-C16-2	1.4 U	1.4 U	1.4 U
A4B2-C16-4	1.2 U	1.2 U	1.2 U
A4B2-C16-6	1.1 U	1.1 U	1.1 U
A4B2-C16-7	0.9 U	0.9 U	0.9 U
A4B2-C16-8	1.6 U	1.6 U	1.6 U
A4B2-C16-10	1.3 U	1.3 U	1.3 U
A4B2-C16-11	1.6 U	1.6 U	1.6 U
A4B2-C16-12	1 U	1 U	1 U
A4B2-C16-13	1.2 U	1.2 U	1.2 U
A4B2-C16-15	0.9 U	0.9 U	0.9 U
A4B2-C16-16	1.2 U	1.2 U	1.2 U
Limit	4000	3600	25000
Units	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%
Max. Result	1.6 U	1.6 U	1.6 U
Max. >= Limit	No	No	No
W-statistic Prob. #	- -	- -	- -
Test Procedure	- -	- -	- -
Sample Size	12	12	12
Nondetects	12	12	12
% Nondetects	100%	100%	100%
Est. Mean*	- -	- -	- -
UCL	- -	- -	- -
Prob. > Limit	- -	- -	- -
Pass / Fail	- -	- -	- -

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

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

Certification Unit 17

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Lead-210	Technetium-99	Thorium-230	Arsenic	Beryllium
A4B2-C17-1	1.27 -	0.941 J	0.98 J	0.941 J	13.5 -	0.069 U	1.56 J	2.24 U	1.34 J	6.3 -	0.53 J
A4B2-C17-3	1.35 -	0.783 J	0.74 J	0.783 J	13.1 -	0.092 U	1.3 J	2.29 U	1.32 J	6.7 -	0.53 J
A4B2-C17-4	1.26 -	1.03 J	1.01 J	1.03 J	9.78 -	0.103 U	1.18 J	2.3 U	2.00 -	5.9 -	0.62 J
A4B2-C17-5	1.18 -	0.827 J	0.816 J	0.827 J	9.29 -	0.109 U	1.09 U	2.18 U	1.05 J	6.2 -	0.76 J
A4B2-C17-7	1.15 -	0.891 J	0.904 J	0.891 J	11.2 -	0.077 U	1.13 J	2.08 U	1.67 J	7 -	0.69 J
A4B2-C17-8	1.32 -	0.914 J	0.877 J	0.914 J	9.09 -	0.104 U	1.02 U	2.29 U	1.17 J	7.8 -	0.89 J
A4B2-C17-10	0.929 -	0.770 J	0.756 J	0.77 J	12.1 -	0.081 U	0.891 U	2.19 U	1.76 J	8 -	0.59 J
A4B2-C17-11	1.25 -	0.961 J	0.968 J	0.961 J	10.9 -	0.113 U	1.06 U	2.13 U	1.95 J	6.2 -	0.56 J
A4B2-C17-12	1.29 -	0.901 J	0.91 J	0.901 J	10.5 -	0.081 U	1.37 J	2.2 U	0.87 J	6.2 -	0.58 J
A4B2-C17-13	1.03 -	0.896 J	0.899 J	0.896 J	13.2 -	0.0922 J	1.31 J	2.14 U	0.969 J	6.5 -	0.81 J
A4B2-C17-13-D	1.23 -	0.888 J	0.923 J	0.888 J	12.5 -	0.117 U	1.74 J	2.27 U	1.55 J	6.1 -	0.52 J
A4B2-C17-14	1.27 -	0.782 J	0.765 J	0.782 J	10.8 -	0.125 U	1.1 U	2.3 U	1.39 J	6.5 -	0.7 J
A4B2-C17-16	1.00 -	0.878 J	0.894 J	0.878 J	7.78 -	0.11 U	1.31 J	1.96 U	1.73 J	7.8 -	0.65 J
Limit	1.7	1.8	1.7	1.5	20	1.4	38	30	280	12	1.5
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%
Max. Result	1.35	1.03	1.01	1.03	13.5	0 .0922	1.74	2.3 U	2	8	0 .89
Max. >= Limit	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	11	5	12	0	0	0
% Nondetects	0%	0%	0%	0%	0%	92%	42%	100%	0%	0%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
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SAMPLE_ID	Chromium	Fluoride	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Aroclor-1254	Aroclor-1260
A4B2-C17-1	14.3 J	7.31 J	37 U	48.3 J	37 U	52.5 J	86.7 -	3.7 U
A4B2-C17-3	16 J	7.01 J	36.9 U	36.9 U	36.9 U	36.9 U	20.9 -	3.7 U
A4B2-C17-4	16.5 J	6.31 J	37.3 U	37.3 U	37.3 U	37.3 U	9.2 J	3.7 U
A4B2-C17-5	17.5 J	7.48 J	37.4 U	43.1 J	37.4 U	44.6 J	13.4 -	4.8 J
A4B2-C17-7	18.8 J	6.85 J	37.2 U	37.2 U	37.2 U	45 J	103 -	47.7 -
A4B2-C17-8	58.2 J	7.53 J	43.3 J	46.2 J	36.6 U	51.8 J	10.5 J	5 J
A4B2-C17-10	16.8 J	6.11 J	66.6 J	83.3 J	37.3 U	56.8 J	3.7 U	3.7 U
A4B2-C17-11	15 J	8.18 J	154 J	289 J	54.2 J	94.6 J	9 J	3.7 J
A4B2-C17-12	16.5 J	5.35 J	347 -	600 J	82.3 J	171 J	9.6 J	4.5 J
A4B2-C17-13	16.2 J	5.78 J	375 -	672 J	96.6 J	211 J	9.9 J	4.7 J
A4B2-C17-13-D	14.7 J	6.98 J	439 -	764 J	92.9 J	227 J	11.1 J	5.7 J
A4B2-C17-14	18 J	5.2 J	99.2 J	164 J	38.6 U	79.5 J	5.8 J	3.9 U
A4B2-C17-16	17.8 J	8.34 J	100 J	171 J	48.1 J	73.9 J	5.6 J	3.7 U
Limit	300	78000	2000	20000	2000	20000	130	130
Units	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	58.2	8.34	439	764	96.6	227	103	47.7
Max. >= Limit	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12
Nondetects	0	0	5	3	8	10	1	6
% Nondetects	0%	0%	42%	25%	67%	83%	8%	50%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -

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

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
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SAMPLE_ID	Dieldrin	1,1,1-Trichloroethane	1,1-Dichloroethene	1,2-Dichloroethene (Total)	Bromodichloromethane	Tetrachloroethene	Trichloroethene
A4B2-C17-1	1.5 UJ	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U
A4B2-C17-3	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-4	1.5 UJ	0.9 U	1.2 J	0.9 U	0.9 U	0.9 U	0.9 U
A4B2-C17-5	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-7	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-8	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C17-10	1.5 UJ	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
A4B2-C17-11	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-12	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-13	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-13-D	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C17-14	1.5 UJ	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
A4B2-C17-16	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Limit	15	4300	410	160	4000	3600	25000
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.5 UJ	1.2 U	1.2	1.2 U	1.2 U	1.2 U	1.2 U
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	12	12	11	12	12	12	12
% Nondetects	100%	100%	92%	100%	100%	100%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
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SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cesium-137	Lead-210	Technetium-99	Thorium-230	Arsenic	Beryllium
A4B2-C18-2	1.06 -	0.974 J	0.975 J	0.974 J	9.39 -	0.058 U	1.09 J	1.77 U	1.67 -	5 -	0.47 -
A4B2-C18-3	1.2 -	0.981 J	0.956 J	0.981 J	6.75 -	0.068 U	0.685 U	1.78 U	4.46 -	6 -	0.68 -
A4B2-C18-4	1.29 -	1.16 J	1.17 J	1.16 J	8.53 -	0.031 U	3.15 U	1.53 U	1.44 -	5.5 -	0.56 -
A4B2-C18-4-D	1.3 -	0.973 J	0.974 J	0.973 J	8.2 -	0.022 U	1.67 U	1.74 U	1.47 -	5.4 -	0.55 -
A4B2-C18-5	1.05 -	0.772 J	1.05 J	0.772 J	19.7 -	0.0521 J	3.72 U	1.76 U	1.41 -	5.1 -	0.56 -
A4B2-C18-6	1.04 -	0.938 J	0.963 J	0.938 J	17.9 -	0.0412 J	3.27 U	1.73 U	1.37 -	5 -	0.67 -
A4B2-C18-7	1.01 -	0.869 J	0.892 J	0.869 J	12.9 -	0.025 U	1.98 U	1.66 U	1.43 -	5.3 -	0.56 -
A4B2-C18-9	1.03 -	0.935 J	0.948 J	0.935 J	7.39 -	0.059 U	0.878 J	1.72 U	0.836 -	4.8 -	0.52 -
A4B2-C18-10	0.973 -	0.921 J	0.917 J	0.921 J	5.96 -	0.057 U	1.3 J	1.79 U	1.08 -	5.2 -	0.59 -
A4B2-C18-12	1.26 -	1.04 J	1.05 J	1.04 J	5.1 -	0.028 U	2.67 U	1.64 U	1.32 -	4.1 -	0.49 -
A4B2-C18-13	1.28 -	1.07 J	1.07 J	1.07 J	4.75 -	0.042 U	0.685 J	1.8 U	1.58 -	5.8 -	0.58 -
A4B2-C18-14	1.02 -	0.832 J	0.846 J	0.832 J	13.7 -	0.038 U	0.986 -	1.62 U	1.06 -	4.4 -	0.45 -
A4B2-C18-15	1.1 -	0.843 J	0.847 J	0.843 J	4.08 -	0.027 U	2.71 U	1.66 U	1.1 -	6 -	0.63 -
Limit	1.7	1.8	1.7	1.5	20	1.4	38	30	280	12	1.5
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%
Max. Result	1.28	1.16	1.17	1.16	19.7	0 .0521	1.3	1.8 U	4.46	6	0 .68
Max. >= Limit	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	10	7	12	0	0	0
% Nondetects	0%	0%	0%	0%	0%	83%	58%	100%	0%	0%	0%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
The maximum value of the two duplicates was used in all statistical equations.
#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
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Certification Unit 18

SAMPLE_ID	Chromium	Fluoride	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Aroclor-1254	Aroclor-1260
A4B2-C18-2	12.8 J	3.36 J	115 J	36.4 U	36.4 U	36.4 U	6.2 J	3.6 U
A4B2-C18-3	18.2 J	3.7 J	58.1 J	37.4 U	37.4 U	42.1 J	3.7 U	3.7 U
A4B2-C18-4	15.3 J	2.83 J	108 J	39.2 U	39.2 U	39.2 U	3.9 U	3.9 U
A4B2-C18-4-D	14.6 J	4.58 J	104 J	36.7 U	36.7 U	71.8 J	3.7 U	3.7 U
A4B2-C18-5	15.2 J	3.98 J	350 -	795 J	37.3 U	246 J	3.7 UJ	3.7 UJ
A4B2-C18-6	14.2 J	2.25 J	820 -	1440 J	36.9 U	441 J	4.5 J	4.8 J
A4B2-C18-7	14.8 J	3.88 J	235 -	36.8 U	36.8 U	140 J	3.9 U	3.7 U
A4B2-C18-9	13.4 J	4.26 J	75.1 J	36.7 U	36.7 U	39.6 J	3.7 U	3.7 U
A4B2-C18-10	15.2 J	2.84 J	35.8 U	35.8 U	35.8 U	35.8 U	3.6 U	3.6 U
A4B2-C18-12	14.9 J	2.58 J	40.1 U	40.1 U	40.1 U	40.1 U	4 U	4 U
A4B2-C18-13	16.1 J	3.15 J	37.5 U	37.5 U	37.5 U	37.5 U	3.8 U	3.8 U
A4B2-C18-14	12.2 J	4.75 J	36 U	36 U	36 U	36 U	3.6 U	3.6 U
A4B2-C18-15	16.6 J	4.65 J	37.5 U	37.5 U	37.5 U	37.5 U	9.5 J	7.2 J
Limit	300	78000	2000	20000	2000	20000	130	130
Units	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	18.2	4.75	820	1440	40.1 U	441	9.5	7.2
Max. >= Limit	No	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12	12
Nondetects	0	0	5	10	12	6	9	10
% Nondetects	0%	0%	42%	83%	100%	50%	75%	83%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -	- -

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

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

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Certification Unit 18

SAMPLE_ID	Dieldrin	1,1,1-Trichloroethane	1,1-Dichloroethene	1,2-Dichloroethene (Total)	Bromodichloromethane	Tetrachloroethene	Trichloroethene
A4B2-C18-2	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C18-3	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C18-4	1.6 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C18-4-D	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C18-5	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-6	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-7	1.5 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
A4B2-C18-9	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-10	1.4 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-12	1.6 UJ	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U
A4B2-C18-13	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-14	1.4 UJ	1 U	1 U	1 U	1 U	1 U	1 U
A4B2-C18-15	1.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U
Limit	15	4300	410	160	4000	3600	25000
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.6 UJ	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	12	12	12	12	12	12	12
% Nondetects	100%	100%	100%	100%	100%	100%	100%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -
a posteriori Sample	- -	- -	- -	- -	- -	- -	- -
Size calculation	- -	- -	- -	- -	- -	- -	- -

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

Certification Unit 19

SAMPLE_ID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Aroclor-1254
A4B2-C19-2	1.04 -	0.84 -	0.835 -	0.84 -	11.8 -	0.83 U	3.7 U
A4B2-C19-3	1.36 -	1.05 -	0.96 -	1.05 -	10.1 -	0.865 U	4 U
A4B2-C19-4	1.30 -	0.796 -	0.803 -	0.796 -	9.83 -	0.824 U	4 U
A4B2-C19-5	1.20 -	1.10 -	1.1 -	1.1 -	25.6 -	1.00 J	3.7 U
A4B2-C19-6	0.985 J	0.719 -	0.695 -	0.719 -	9.61 -	0.88 U	7.1 J
A4B2-C19-8	1.21 -	0.878 -	0.846 -	0.878 -	9.68 -	0.909 U	3.8 U
A4B2-C19-9	1.05 J	1.00 -	1.07 -	1.00 -	10.2 -	0.886 U	12 J
A4B2-C19-11	1.12 -	0.746 -	0.752 -	0.746 -	6.89 -	0.852 U	4 U
A4B2-C19-11-D	1.05 -	0.741 -	0.79 -	0.741 -	6.64 -	0.849 U	5 J
A4B2-C19-12	1.14 -	0.779 -	0.81 -	0.779 -	10.8 -	0.847 U	4.4 J
A4B2-C19-14	0.963 -	0.701 -	0.702 -	0.701 -	14.1 -	0.785 U	8.6 J
A4B2-C19-15	1.05 -	0.708 -	0.725 -	0.708 -	13.9 -	0.769 U	3.4 U
A4B2-C19-16	1.05 -	0.763 -	0.78 -	0.763 -	5.57 -	0.835 U	10.4 J
Limit	1.7	1.8	1.7	1.5	82	30	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	µg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.36	1.1	1.1	1.1	25.6	1.00	12
Max. >= Limit	No	No	No	No	No	No	No
W-statistic Prob. #	- -	- -	- -	- -	- -	- -	- -
Test Procedure	- -	- -	- -	- -	- -	- -	- -
Sample Size	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	11	6
% Nondetects	0%	0%	0%	0%	0%	92%	50%
Est. Mean*	- -	- -	- -	- -	- -	- -	- -
UCL	- -	- -	- -	- -	- -	- -	- -
Prob. > Limit	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	- -	- -	- -	- -	- -	- -	- -

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

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

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ATTACHMENT A.2

SAMPLING RESULTS AND STATISTICS
SECONDARY SAMPLINGATTACHMENT

Certification Unit 4 Total Uranium pass

SAMPLE ID	Uranium, Total
A4B2-C04-1	9.92 -
A4B2-C04-3	9.12 -
A4B2-C04-4	4.86 -
A4B2-C04-5	21.6 -
A4B2-C04-6B^R	13.2 -
A4B2-C04-6B-E^R	8.88 -
A4B2-C04-6B-N^R	14.4 -
A4B2-C04-6B-S^R	13.0 -
A4B2-C04-6B-W^R	8.08 -
A4B2-C04-7	29.3 -
A4B2-C04-9	4.9 -
A4B2-C04-11	5.82 -
A4B2-C04-12	4.53 J
A4B2-C04-12-D	2.64 U
A4B2-C04-13	13.6 -
A4B2-C04-14	2.25 J
A4B2-C04-16	3.83 -
Limit	20
Units	mg/kg
Conf. Level	95%
Max. Result	**29.3**
Max. >= Limit	**Yes**
W-statistic Prob. #	82.9% (LN)
Test Procedure	Lognormal
Sample Size	12
Nondetects	0
% Nondetects	0%
Est. Mean*	10.6
UCL	18.9
Prob. > Limit	- -
Pass / Fail	pass

a posteriori Sample Size calculation	6 Pass

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

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ATTACHMENT A.3

UTILITY SAMPLING RESULTS AND STATISTICS

UTILITY SAMPLING RESULTS

PrimaryCOCs		PrimaryCOCs		PrimaryCOCs	
SAMPLE ID CU03	Technetium-99 CU03	SAMPLE ID CU04	Aroclor-1254 CU04	SAMPLE ID CU05	Uranium, Total CU05
4A6-T-18	2.16 U	4A6-T-21	154 J	4A6-T-44	6.18 -
4A6-T-19	0.918 U	4A6-T-31	3.7 U	4A6-T-45	9.36 -
4A6-T-20	0.91 U	4A6-T-32	3.8 U	4A6-T-46	107 -
4A6-T-26	0.788 U	4A6-T-33	3.8 U	4A6-T-47	6.46 -
4A6-T-27	0.801 U	4A6-T-39	7.3 J	4A6-T-64	7.31 -
4A6-T-29	0.84 U	4A6-T-40	3.8 U	4A6-T-65	5.61 -
4A6-T-30	0.811 U	4A6-T-41	3.9 U	4A6-T-66	5.19 -
4A6-T-38	0.803 U	4A6-T-42	3.9 U	4A6-T-67	5.58 -
4A6-T-53	1.66 U	4A6-T-51	3.6 U	4A6-T-75	3.65 -
4A6-T-54	1.7 U	4A6-T-52	3.6 U	4A6-T-76	4.73 -
4A6-T-55	41.7 -			4A6-T-77	4.54 J
4A6-T-57	2.6 -			4A6-T-78	3.16 J
4A6-T-58	1.74 U				
Limit	30	Limit	130	Limit	82
Units	pCi/g	Units	µg/kg	Units	mg/kg
Conf. Level	90%	Conf. Level	90%	Conf. Level	95%
Max. Result	41.7	Max. Result	154	Max. Result	107
Max. >= Limit	Yes	Max. >= Limit	Yes	Max. >= Limit	Yes
W-statistic Prob. #	< 0.01% (LN)	W-statistic Prob. #	< 0.01% (LN)	W-statistic Prob. #	< 0.01% (LN)
Test Procedure	Proportions (Sign)	Test Procedure	Proportions (Sign)	Test Procedure	Median (Sign)
Sample Size	13	Sample Size	10	Sample Size	12
Nondetects	11	Nondetects	8	Nondetects	0
% Nondetects	85%	% Nondetects	80%	% Nondetects	0%
Est. Mean*	0.5	Est. Mean*	1.9	Est. Mean*	5.6
UCL	- -	UCL	- -	UCL	7.31
Prob. > Limit	0.00	Prob. > Limit	0.01	Prob. > Limit	- -
Pass / Fail	pass	Pass / Fail	pass	Pass / Fail	Pass
a posteriori Sample Size calculation	5 Pass	*a posteriori Sample* Size calculation	5 Pass	*a posteriori Sample* Size calculation	7 Pass

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
1	4A6-T-10	4A6-T-10^RMP	Aroclor-1254	4.1	U	µg/kg
1	4A6-T-10	4A6-T-10^RMP	Aroclor-1260	4.1	U	µg/kg
1	4A6-T-10	4A6-T-10^RMP	Beryllium	·0.46	-	mg/kg
1	4A6-T-10	4A6-T-10^RMP	Radium-226	1.2	-	pCi/g
1	4A6-T-10	4A6-T-10^RMP	Radium-228	0.942	-	pCi/g
1	4A6-T-10	4A6-T-10^RMP	Technetium-99	1.41	U	pCi/g
1	4A6-T-10	4A6-T-10^RMP	Thorium-228	0.941	-	pCi/g
1	4A6-T-10	4A6-T-10^RMP	Thorium-232	0.942	-	pCi/g
1	4A6-T-10	4A6-T-10^RMP	Uranium, Total	6.19	-	mg/kg
1	4A6-T-12	4A6-T-12^RMP	Aroclor-1254	4	U	µg/kg
1	4A6-T-12	4A6-T-12^RMP	Aroclor-1260	4	U	µg/kg
1	4A6-T-12	4A6-T-12^RMP	Beryllium	0.41	-	mg/kg
1	4A6-T-12	4A6-T-12^RMP	Radium-226	0.77	J	pCi/g
1	4A6-T-12	4A6-T-12^RMP	Radium-228	0.671	-	pCi/g
1	4A6-T-12	4A6-T-12^RMP	Technetium-99	1.71	U	pCi/g
1	4A6-T-12	4A6-T-12^RMP	Thorium-228	0.686	J	pCi/g
1	4A6-T-12	4A6-T-12^RMP	Thorium-232	0.671	-	pCi/g
1	4A6-T-12	4A6-T-12^RMP	Uranium, Total	3.29	U	mg/kg
1	4A6-T-13	4A6-T-13^RMP	Aroclor-1254	3.9	U	µg/kg
1	4A6-T-13	4A6-T-13^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-13	4A6-T-13^RMP	Beryllium	0.67	-	mg/kg
1	4A6-T-13	4A6-T-13^RMP	Radium-226	1.01	J	pCi/g
1	4A6-T-13	4A6-T-13^RMP	Radium-228	0.931	-	pCi/g
1	4A6-T-13	4A6-T-13^RMP	Technetium-99	1.56	U	pCi/g
1	4A6-T-13	4A6-T-13^RMP	Thorium-228	0.925	J	pCi/g
1	4A6-T-13	4A6-T-13^RMP	Thorium-232	0.931	-	pCi/g
1	4A6-T-13	4A6-T-13^RMP	Uranium, Total	10.3	-	mg/kg
1	4A6-T-14	4A6-T-14^RMP	Aroclor-1254	3.9	U	µg/kg
1	4A6-T-14	4A6-T-14^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-14	4A6-T-14^RMP	Beryllium	0.43	-	mg/kg
1	4A6-T-14	4A6-T-14^RMP	Radium-226	1.09	J	pCi/g
1	4A6-T-14	4A6-T-14^RMP	Radium-228	0.978	-	pCi/g
1	4A6-T-14	4A6-T-14^RMP	Technetium-99	1.54	U	pCi/g
1	4A6-T-14	4A6-T-14^RMP	Thorium-228	1.01	J	pCi/g
1	4A6-T-14	4A6-T-14^RMP	Thorium-232	0.978	-	pCi/g
1	4A6-T-14	4A6-T-14^RMP	Uranium, Total	4.19	J	mg/kg
1	4A6-T-15	4A6-T-15^RMP	Aroclor-1254	3.9	U	µg/kg
1	4A6-T-15	4A6-T-15^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-15	4A6-T-15^RMP	Beryllium	0.56	-	mg/kg
1	4A6-T-15	4A6-T-15^RMP	Radium-226	1.07	J	pCi/g
1	4A6-T-15	4A6-T-15^RMP	Radium-228	0.988	-	pCi/g
1	4A6-T-15	4A6-T-15^RMP	Technetium-99	1.59	U	pCi/g
1	4A6-T-15	4A6-T-15^RMP	Thorium-228	0.965	J	pCi/g
1	4A6-T-15	4A6-T-15^RMP	Thorium-232	0.988	-	pCi/g
1	4A6-T-15	4A6-T-15^RMP	Uranium, Total	13.4	-	mg/kg
1	4A6-T-23	4A6-T-23^RMP	Aroclor-1254	3.9	U	µg/kg
1	4A6-T-23	4A6-T-23^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-23	4A6-T-23^RMP	Beryllium	0.762	J	mg/kg
1	4A6-T-23	4A6-T-23^RMP	Radium-226	1.47	-	pCi/g
1	4A6-T-23	4A6-T-23^RMP	Radium-228	1.16	-	pCi/g
1	4A6-T-23	4A6-T-23^RMP	Technetium-99	0.826	U	pCi/g
1	4A6-T-23	4A6-T-23^RMP	Thorium-228	1.12	-	pCi/g
1	4A6-T-23	4A6-T-23^RMP	Thorium-232	1.16	-	pCi/g
1	4A6-T-23	4A6-T-23^RMP	Uranium, Total	4.7	J	mg/kg
1	4A6-T-24	4A6-T-24^RMP	Aroclor-1254	8.6	J	µg/kg
1	4A6-T-24	4A6-T-24^RMP	Aroclor-1260	4.3	J	µg/kg
1	4A6-T-24	4A6-T-24^RMP	Beryllium	0.556	J	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
1	4A6-T-24	4A6-T-24^RMP	Radium-226	1.14	-	pCi/g
1	4A6-T-24	4A6-T-24^RMP	Radium-228	0.888	-	pCi/g
1	4A6-T-24	4A6-T-24^RMP	Technetium-99	0.801	U	pCi/g
1	4A6-T-24	4A6-T-24^RMP	Thorium-228	0.858	-	pCi/g
1	4A6-T-24	4A6-T-24^RMP	Thorium-232	0.888	-	pCi/g
1	4A6-T-24	4A6-T-24^RMP	Uranium, Total	13.4	-	mg/kg
1	4A6-T-25	4A6-T-25^RMP	Aroclor-1254	7.3	J	µg/kg
1	4A6-T-25	4A6-T-25^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-25	4A6-T-25^RMP	Beryllium	0.528	J	mg/kg
1	4A6-T-25	4A6-T-25^RMP	Radium-226	1.23	-	pCi/g
1	4A6-T-25	4A6-T-25^RMP	Radium-228	0.895	-	pCi/g
1	4A6-T-25	4A6-T-25^RMP	Technetium-99	0.796	U	pCi/g
1	4A6-T-25	4A6-T-25^RMP	Thorium-228	0.919	-	pCi/g
1	4A6-T-25	4A6-T-25^RMP	Thorium-232	0.895	-	pCi/g
1	4A6-T-25	4A6-T-25^RMP	Uranium, Total	8.75	-	mg/kg
1	4A6-T-4	4A6-T-4^RMP	Aroclor-1254	4	U	µg/kg
1	4A6-T-4	4A6-T-4^RMP	Aroclor-1260	4	U	µg/kg
1	4A6-T-4	4A6-T-4^RMP	Beryllium	0.53	-	mg/kg
1	4A6-T-4	4A6-T-4^RMP	Radium-226	1.03	-	pCi/g
1	4A6-T-4	4A6-T-4^RMP	Radium-228	0.954	-	pCi/g
1	4A6-T-4	4A6-T-4^RMP	Technetium-99	1.66	U	pCi/g
1	4A6-T-4	4A6-T-4^RMP	Thorium-228	0.961	-	pCi/g
1	4A6-T-4	4A6-T-4^RMP	Thorium-232	0.954	-	pCi/g
1	4A6-T-4	4A6-T-4^RMP	Uranium, Total	6.23	J	mg/kg
1	4A6-T-62	4A6-T-62^RMP	Aroclor-1254	4.1	U	µg/kg
1	4A6-T-62	4A6-T-62^RMP	Aroclor-1260	4.1	U	µg/kg
1	4A6-T-62	4A6-T-62^RMP	Beryllium	0.51	-	mg/kg
1	4A6-T-62	4A6-T-62^RMP	Radium-226	0.754	-	pCi/g
1	4A6-T-62	4A6-T-62^RMP	Radium-228	0.697	-	pCi/g
1	4A6-T-62	4A6-T-62^RMP	Technetium-99	1.71	U	pCi/g
1	4A6-T-62	4A6-T-62^RMP	Thorium-228	0.691	-	pCi/g
1	4A6-T-62	4A6-T-62^RMP	Thorium-232	0.697	-	pCi/g
1	4A6-T-62	4A6-T-62^RMP	Uranium, Total	5.15	-	mg/kg
1	4A6-T-63	4A6-T-63^RMP	Aroclor-1254	4.1	U	µg/kg
1	4A6-T-63	4A6-T-63^RMP	Aroclor-1260	4.1	U	µg/kg
1	4A6-T-63	4A6-T-63^RMP	Beryllium	0.7	-	mg/kg
1	4A6-T-63	4A6-T-63^RMP	Radium-226	1.02	-	pCi/g
1	4A6-T-63	4A6-T-63^RMP	Radium-228	0.897	-	pCi/g
1	4A6-T-63	4A6-T-63^RMP	Technetium-99	1.68	U	pCi/g
1	4A6-T-63	4A6-T-63^RMP	Thorium-228	0.876	-	pCi/g
1	4A6-T-63	4A6-T-63^RMP	Thorium-232	0.897	-	pCi/g
1	4A6-T-63	4A6-T-63^RMP	Uranium, Total	5.43	-	mg/kg
1	4A6-T-8	4A6-T-8^RMP	Aroclor-1254	4.1	U	µg/kg
1	4A6-T-8	4A6-T-8^RMP	Aroclor-1260	4.1	U	µg/kg
1	4A6-T-8	4A6-T-8^RMP	Beryllium	0.81	-	mg/kg
1	4A6-T-8	4A6-T-8^RMP	Radium-226	1.1	-	pCi/g
1	4A6-T-8	4A6-T-8^RMP	Radium-228	0.98	J	pCi/g
1	4A6-T-8	4A6-T-8^RMP	Technetium-99	1.46	U	pCi/g
1	4A6-T-8	4A6-T-8^RMP	Thorium-228	0.987	J	pCi/g
1	4A6-T-8	4A6-T-8^RMP	Thorium-232	0.98	J	pCi/g
1	4A6-T-8	4A6-T-8^RMP	Uranium, Total	4.54	-	mg/kg
1	4A6-T-9	4A6-T-9^RMP	Aroclor-1254	3.9	U	µg/kg
1	4A6-T-9	4A6-T-9^RMP	Aroclor-1260	3.9	U	µg/kg
1	4A6-T-9	4A6-T-9^RMP	Beryllium	0.53	-	mg/kg
1	4A6-T-9	4A6-T-9^RMP	Radium-226	1.12	-	pCi/g
1	4A6-T-9	4A6-T-9^RMP	Radium-228	0.992	-	pCi/g
1	4A6-T-9	4A6-T-9^RMP	Technetium-99	1.43	U	pCi/g

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
1	4A6-T-9	4A6-T-9^RMP	Thorium-228	1.01	-	pCi/g
1	4A6-T-9	4A6-T-9^RMP	Thorium-232	0.992	-	pCi/g
1	4A6-T-9	4A6-T-9^RMP	Uranium, Total	6.65	-	mg/kg
2	4A6-T-125	4A6-T-125^RMP	Aroclor-1254	5	J	µg/kg
2	4A6-T-125	4A6-T-125^RMP	Aroclor-1260	4	U	µg/kg
2	4A6-T-125	4A6-T-125^RMP	Beryllium	0.452	U	mg/kg
2	4A6-T-125	4A6-T-125^RMP	Radium-226	0.955	-	pCi/g
2	4A6-T-125	4A6-T-125^RMP	Radium-228	0.772	-	pCi/g
2	4A6-T-125	4A6-T-125^RMP	Technetium-99	0.85	U	pCi/g
2	4A6-T-125	4A6-T-125^RMP	Thorium-228	0.798	-	pCi/g
2	4A6-T-125	4A6-T-125^RMP	Thorium-232	0.772	-	pCi/g
2	4A6-T-125	4A6-T-125^RMP	Uranium, Total	3.36	U	mg/kg
2	4A6-T-2	4A6-T-2^RMP	Aroclor-1254	4.1	U	µg/kg
2	4A6-T-2	4A6-T-2^RMP	Aroclor-1260	4.1	U	µg/kg
2	4A6-T-2	4A6-T-2^RMP	Beryllium	0.73	-	mg/kg
2	4A6-T-2	4A6-T-2^RMP	Radium-226	1.36	-	pCi/g
2	4A6-T-2	4A6-T-2^RMP	Radium-228	1.13	-	pCi/g
2	4A6-T-2	4A6-T-2^RMP	Technetium-99	1.68	U	pCi/g
2	4A6-T-2	4A6-T-2^RMP	Thorium-228	1.16	-	pCi/g
2	4A6-T-2	4A6-T-2^RMP	Thorium-232	1.13	-	pCi/g
2	4A6-T-2	4A6-T-2^RMP	Uranium, Total	6.7	J	mg/kg
2	4A6-T-22	4A6-T-22^RMP	Aroclor-1254	3.8	U	µg/kg
2	4A6-T-22	4A6-T-22^RMP	Aroclor-1260	3.8	U	µg/kg
2	4A6-T-22	4A6-T-22^RMP	Beryllium	0.878	J	mg/kg
2	4A6-T-22	4A6-T-22^RMP	Radium-226	1.32	-	pCi/g
2	4A6-T-22	4A6-T-22^RMP	Radium-228	1.12	-	pCi/g
2	4A6-T-22	4A6-T-22^RMP	Technetium-99	0.792	U	pCi/g
2	4A6-T-22	4A6-T-22^RMP	Thorium-228	1.1	-	pCi/g
2	4A6-T-22	4A6-T-22^RMP	Thorium-232	1.12	-	pCi/g
2	4A6-T-22	4A6-T-22^RMP	Uranium, Total	16.2	-	mg/kg
2	4A6-T-28	4A6-T-28^RMP	Aroclor-1254	4.1	U	µg/kg
2	4A6-T-28	4A6-T-28^RMP	Aroclor-1260	4.1	U	µg/kg
2	4A6-T-28	4A6-T-28^RMP	Beryllium	0.709	-	mg/kg
2	4A6-T-28	4A6-T-28^RMP	Radium-226	1.25	-	pCi/g
2	4A6-T-28	4A6-T-28^RMP	Radium-228	0.827	-	pCi/g
2	4A6-T-28	4A6-T-28^RMP	Technetium-99	0.846	U	pCi/g
2	4A6-T-28	4A6-T-28^RMP	Thorium-228	0.833	-	pCi/g
2	4A6-T-28	4A6-T-28^RMP	Thorium-232	0.827	-	pCi/g
2	4A6-T-28	4A6-T-28^RMP	Uranium, Total	4.44	U	mg/kg
2	4A6-T-3	4A6-T-3^RMP	Aroclor-1254	4	U	µg/kg
2	4A6-T-3	4A6-T-3^RMP	Aroclor-1260	4	U	µg/kg
2	4A6-T-3	4A6-T-3^RMP	Beryllium	0.54	-	mg/kg
2	4A6-T-3	4A6-T-3^RMP	Radium-226	0.805	-	pCi/g
2	4A6-T-3	4A6-T-3^RMP	Radium-228	0.705	-	pCi/g
2	4A6-T-3	4A6-T-3^RMP	Technetium-99	1.71	U	pCi/g
2	4A6-T-3	4A6-T-3^RMP	Thorium-228	0.719	-	pCi/g
2	4A6-T-3	4A6-T-3^RMP	Thorium-232	0.705	-	pCi/g
2	4A6-T-3	4A6-T-3^RMP	Uranium, Total	5.7	J	mg/kg
2	4A6-T-34	4A6-T-34^RMP	Aroclor-1254	3.8	U	µg/kg
2	4A6-T-34	4A6-T-34^RMP	Aroclor-1260	3.8	U	µg/kg
2	4A6-T-34	4A6-T-34^RMP	Beryllium	0.471	-	mg/kg
2	4A6-T-34	4A6-T-34^RMP	Radium-226	1.01	-	pCi/g
2	4A6-T-34	4A6-T-34^RMP	Radium-228	0.885	-	pCi/g
2	4A6-T-34	4A6-T-34^RMP	Technetium-99	0.871	U	pCi/g
2	4A6-T-34	4A6-T-34^RMP	Thorium-228	0.939	-	pCi/g
2	4A6-T-34	4A6-T-34^RMP	Thorium-232	0.885	-	pCi/g
2	4A6-T-34	4A6-T-34^RMP	Uranium, Total	13.2	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
2	4A6-T-35	4A6-T-35^RMP	Aroclor-1254	3.6	U	µg/kg
2	4A6-T-35	4A6-T-35^RMP	Aroclor-1260	3.6	U	µg/kg
2	4A6-T-35	4A6-T-35^RMP	Beryllium	0.525	-	mg/kg
2	4A6-T-35	4A6-T-35^RMP	Radium-226	0.86	-	pCi/g
2	4A6-T-35	4A6-T-35^RMP	Radium-228	0.809	-	pCi/g
2	4A6-T-35	4A6-T-35^RMP	Technetium-99	0.866	U	pCi/g
2	4A6-T-35	4A6-T-35^RMP	Thorium-228	0.822	-	pCi/g
2	4A6-T-35	4A6-T-35^RMP	Thorium-232	0.809	-	pCi/g
2	4A6-T-35	4A6-T-35^RMP	Uranium, Total	4.04	U	mg/kg
2	4A6-T-5	4A6-T-5^RMP	Aroclor-1254	4	U	µg/kg
2	4A6-T-5	4A6-T-5^RMP	Aroclor-1260	4	U	µg/kg
2	4A6-T-5	4A6-T-5^RMP	Beryllium	0.64	-	mg/kg
2	4A6-T-5	4A6-T-5^RMP	Radium-226	1.03	-	pCi/g
2	4A6-T-5	4A6-T-5^RMP	Radium-228	0.751	J	pCi/g
2	4A6-T-5	4A6-T-5^RMP	Technetium-99	1.54	U	pCi/g
2	4A6-T-5	4A6-T-5^RMP	Thorium-228	0.74	J	pCi/g
2	4A6-T-5	4A6-T-5^RMP	Thorium-232	0.751	J	pCi/g
2	4A6-T-5	4A6-T-5^RMP	Uranium, Total	3.94	-	mg/kg
2	4A6-T-6	4A6-T-6^RMP	Aroclor-1254	3.8	U	µg/kg
2	4A6-T-6	4A6-T-6^RMP	Aroclor-1260	3.8	U	µg/kg
2	4A6-T-6	4A6-T-6^RMP	Beryllium	0.6	-	mg/kg
2	4A6-T-6	4A6-T-6^RMP	Radium-226	0.876	-	pCi/g
2	4A6-T-6	4A6-T-6^RMP	Radium-228	0.769	J	pCi/g
2	4A6-T-6	4A6-T-6^RMP	Technetium-99	1.67	U	pCi/g
2	4A6-T-6	4A6-T-6^RMP	Thorium-228	0.773	J	pCi/g
2	4A6-T-6	4A6-T-6^RMP	Thorium-232	0.769	J	pCi/g
2	4A6-T-6	4A6-T-6^RMP	Uranium, Total	3.72	-	mg/kg
2	4A6-T-60	4A6-T-60^RMP	Aroclor-1254	3.6	U	µg/kg
2	4A6-T-60	4A6-T-60^RMP	Aroclor-1260	3.6	U	µg/kg
2	4A6-T-60	4A6-T-60^RMP	Beryllium	0.54	-	mg/kg
2	4A6-T-60	4A6-T-60^RMP	Radium-226	0.852	-	pCi/g
2	4A6-T-60	4A6-T-60^RMP	Radium-228	0.753	-	pCi/g
2	4A6-T-60	4A6-T-60^RMP	Technetium-99	1.71	U	pCi/g
2	4A6-T-60	4A6-T-60^RMP	Thorium-228	0.742	-	pCi/g
2	4A6-T-60	4A6-T-60^RMP	Thorium-232	0.753	-	pCi/g
2	4A6-T-60	4A6-T-60^RMP	Uranium, Total	4.49	J	mg/kg
2	4A6-T-61	4A6-T-61^RMP	Aroclor-1254	4.1	U	µg/kg
2	4A6-T-61	4A6-T-61^RMP	Aroclor-1260	4.1	U	µg/kg
2	4A6-T-61	4A6-T-61^RMP	Beryllium	0.61	-	mg/kg
2	4A6-T-61	4A6-T-61^RMP	Radium-226	0.881	-	pCi/g
2	4A6-T-61	4A6-T-61^RMP	Radium-228	0.785	-	pCi/g
2	4A6-T-61	4A6-T-61^RMP	Technetium-99	1.72	U	pCi/g
2	4A6-T-61	4A6-T-61^RMP	Thorium-228	0.795	-	pCi/g
2	4A6-T-61	4A6-T-61^RMP	Thorium-232	0.785	-	pCi/g
2	4A6-T-61	4A6-T-61^RMP	Uranium, Total	3.32	-	mg/kg
2	4A6-T-7	4A6-T-7^RMP	Aroclor-1254	3.9	U	µg/kg
2	4A6-T-7	4A6-T-7^RMP	Aroclor-1260	3.9	U	µg/kg
2	4A6-T-7	4A6-T-7^RMP	Beryllium	0.57	-	mg/kg
2	4A6-T-7	4A6-T-7^RMP	Radium-226	0.927	-	pCi/g
2	4A6-T-7	4A6-T-7^RMP	Radium-228	0.886	J	pCi/g
2	4A6-T-7	4A6-T-7^RMP	Technetium-99	1.52	U	pCi/g
2	4A6-T-7	4A6-T-7^RMP	Thorium-228	0.896	J	pCi/g
2	4A6-T-7	4A6-T-7^RMP	Thorium-232	0.886	J	pCi/g
2	4A6-T-7	4A6-T-7^RMP	Uranium, Total	4.75	-	mg/kg
3	4A6-T-18	4A6-T-18^RMP	Aroclor-1254	3.8	U	µg/kg
3	4A6-T-18	4A6-T-18^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-18	4A6-T-18^RMP	Beryllium	0.58	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
3	4A6-T-18	4A6-T-18^RMP	Radium-226	0.792	-	pCi/g
3	4A6-T-18	4A6-T-18^RMP	Radium-228	0.78	-	pCi/g
3	4A6-T-18	4A6-T-18^RMP	Technetium-99	2.16	U	pCi/g
3	4A6-T-18	4A6-T-18^RMP	Thorium-228	0.764	-	pCi/g
3	4A6-T-18	4A6-T-18^RMP	Thorium-232	0.78	-	pCi/g
3	4A6-T-18	4A6-T-18^RMP	Uranium, Total	15.2	-	mg/kg
3	4A6-T-19	4A6-T-19^RMP	Aroclor-1254	3.7	U	µg/kg
3	4A6-T-19	4A6-T-19^RMP	Aroclor-1260	3.7	U	µg/kg
3	4A6-T-19	4A6-T-19^RMP	Beryllium	0.481	-	mg/kg
3	4A6-T-19	4A6-T-19^RMP	Radium-226	0.871	-	pCi/g
3	4A6-T-19	4A6-T-19^RMP	Radium-228	0.77	-	pCi/g
3	4A6-T-19	4A6-T-19^RMP	Technetium-99	0.918	U	pCi/g
3	4A6-T-19	4A6-T-19^RMP	Thorium-228	0.79	-	pCi/g
3	4A6-T-19	4A6-T-19^RMP	Thorium-232	0.77	-	pCi/g
3	4A6-T-19	4A6-T-19^RMP	Uranium, Total	5.65	-	mg/kg
3	4A6-T-20	4A6-T-20^RMP	Aroclor-1254	7.3	J	µg/kg
3	4A6-T-20	4A6-T-20^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-20	4A6-T-20^RMP	Beryllium	0.565	-	mg/kg
3	4A6-T-20	4A6-T-20^RMP	Radium-226	1.01	-	pCi/g
3	4A6-T-20	4A6-T-20^RMP	Radium-228	0.745	-	pCi/g
3	4A6-T-20	4A6-T-20^RMP	Technetium-99	0.91	U	pCi/g
3	4A6-T-20	4A6-T-20^RMP	Thorium-228	0.773	-	pCi/g
3	4A6-T-20	4A6-T-20^RMP	Thorium-232	0.745	-	pCi/g
3	4A6-T-20	4A6-T-20^RMP	Uranium, Total	4.73	J	mg/kg
3	4A6-T-26	4A6-T-26^RMP	Aroclor-1254	3.8	U	µg/kg
3	4A6-T-26	4A6-T-26^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-26	4A6-T-26^RMP	Beryllium	0.209	U	mg/kg
3	4A6-T-26	4A6-T-26^RMP	Radium-226	0.856	-	pCi/g
3	4A6-T-26	4A6-T-26^RMP	Radium-228	0.594	-	pCi/g
3	4A6-T-26	4A6-T-26^RMP	Technetium-99	0.788	U	pCi/g
3	4A6-T-26	4A6-T-26^RMP	Thorium-228	0.609	-	pCi/g
3	4A6-T-26	4A6-T-26^RMP	Thorium-232	0.594	-	pCi/g
3	4A6-T-26	4A6-T-26^RMP	Uranium, Total	2.81	U	mg/kg
3	4A6-T-27	4A6-T-27^RMP	Aroclor-1254	3.8	U	µg/kg
3	4A6-T-27	4A6-T-27^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-27	4A6-T-27^RMP	Beryllium	0.57	U	mg/kg
3	4A6-T-27	4A6-T-27^RMP	Radium-226	1.13	-	pCi/g
3	4A6-T-27	4A6-T-27^RMP	Radium-228	0.937	-	pCi/g
3	4A6-T-27	4A6-T-27^RMP	Technetium-99	0.801	U	pCi/g
3	4A6-T-27	4A6-T-27^RMP	Thorium-228	0.952	-	pCi/g
3	4A6-T-27	4A6-T-27^RMP	Thorium-232	0.937	-	pCi/g
3	4A6-T-27	4A6-T-27^RMP	Uranium, Total	14.6	-	mg/kg
3	4A6-T-29	4A6-T-29^RMP	Aroclor-1254	4	U	µg/kg
3	4A6-T-29	4A6-T-29^RMP	Aroclor-1260	4	U	µg/kg
3	4A6-T-29	4A6-T-29^RMP	Beryllium	0.593	-	mg/kg
3	4A6-T-29	4A6-T-29^RMP	Radium-226	1.04	-	pCi/g
3	4A6-T-29	4A6-T-29^RMP	Radium-228	0.897	-	pCi/g
3	4A6-T-29	4A6-T-29^RMP	Technetium-99	0.84	U	pCi/g
3	4A6-T-29	4A6-T-29^RMP	Thorium-228	0.906	-	pCi/g
3	4A6-T-29	4A6-T-29^RMP	Thorium-232	0.897	-	pCi/g
3	4A6-T-29	4A6-T-29^RMP	Uranium, Total	4.21	U	mg/kg
3	4A6-T-30	4A6-T-30^RMP	Aroclor-1254	3.8	U	µg/kg
3	4A6-T-30	4A6-T-30^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-30	4A6-T-30^RMP	Beryllium	0.59	-	mg/kg
3	4A6-T-30	4A6-T-30^RMP	Radium-226	1.03	-	pCi/g
3	4A6-T-30	4A6-T-30^RMP	Radium-228	0.854	-	pCi/g
3	4A6-T-30	4A6-T-30^RMP	Technetium-99	0.811	U	pCi/g

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
3	4A6-T-30	4A6-T-30^RMP	Thorium-228	0.885	-	pCi/g
3	4A6-T-30	4A6-T-30^RMP	Thorium-232	0.854	-	pCi/g
3	4A6-T-30	4A6-T-30^RMP	Uranium, Total	4.12	U	mg/kg
3	4A6-T-38	4A6-T-38^RMP	Aroclor-1254	4.2	J	µg/kg
3	4A6-T-38	4A6-T-38^RMP	Aroclor-1260	3.8	U	µg/kg
3	4A6-T-38	4A6-T-38^RMP	Beryllium	0.655	U	mg/kg
3	4A6-T-38	4A6-T-38^RMP	Radium-226	0.854	-	pCi/g
3	4A6-T-38	4A6-T-38^RMP	Radium-228	0.71	-	pCi/g
3	4A6-T-38	4A6-T-38^RMP	Technetium-99	0.803	U	pCi/g
3	4A6-T-38	4A6-T-38^RMP	Thorium-228	0.656	-	pCi/g
3	4A6-T-38	4A6-T-38^RMP	Thorium-232	0.71	-	pCi/g
3	4A6-T-38	4A6-T-38^RMP	Uranium, Total	3.82	U	mg/kg
3	4A6-T-53	4A6-T-53^RMP	Aroclor-1254	7.1	J	µg/kg
3	4A6-T-53	4A6-T-53^RMP	Aroclor-1260	3.7	J	µg/kg
3	4A6-T-53	4A6-T-53^RMP	Beryllium	0.57	-	mg/kg
3	4A6-T-53	4A6-T-53^RMP	Radium-226	0.948	-	pCi/g
3	4A6-T-53	4A6-T-53^RMP	Radium-228	0.764	J	pCi/g
3	4A6-T-53	4A6-T-53^RMP	Technetium-99	1.66	U	pCi/g
3	4A6-T-53	4A6-T-53^RMP	Thorium-228	0.809	J	pCi/g
3	4A6-T-53	4A6-T-53^RMP	Thorium-232	0.764	J	pCi/g
3	4A6-T-53	4A6-T-53^RMP	Uranium, Total	7.43	-	mg/kg
3	4A6-T-54	4A6-T-54^RMP	Aroclor-1254	10.8	J	µg/kg
3	4A6-T-54	4A6-T-54^RMP	Aroclor-1260	5.7	J	µg/kg
3	4A6-T-54	4A6-T-54^RMP	Beryllium	0.27	-	mg/kg
3	4A6-T-54	4A6-T-54^RMP	Radium-226	0.84	-	pCi/g
3	4A6-T-54	4A6-T-54^RMP	Radium-228	0.789	J	pCi/g
3	4A6-T-54	4A6-T-54^RMP	Technetium-99	1.7	U	pCi/g
3	4A6-T-54	4A6-T-54^RMP	Thorium-228	0.777	J	pCi/g
3	4A6-T-54	4A6-T-54^RMP	Thorium-232	0.789	J	pCi/g
3	4A6-T-54	4A6-T-54^RMP	Uranium, Total	17.6	-	mg/kg
3	4A6-T-55	4A6-T-55^RMP	Aroclor-1254	4.2	J	µg/kg
3	4A6-T-55	4A6-T-55^RMP	Aroclor-1260	3.7	U	µg/kg
3	4A6-T-55	4A6-T-55^RMP	Beryllium	0.41	-	mg/kg
3	4A6-T-55	4A6-T-55^RMP	Radium-226	0.871	-	pCi/g
3	4A6-T-55	4A6-T-55^RMP	Radium-228	0.665	J	pCi/g
3	4A6-T-55	4A6-T-55^RMP	Technetium-99	41.7	-	pCi/g
3	4A6-T-55	4A6-T-55^RMP	Thorium-228	0.686	J	pCi/g
3	4A6-T-55	4A6-T-55^RMP	Thorium-232	0.665	J	pCi/g
3	4A6-T-55	4A6-T-55^RMP	Uranium, Total	9.12	-	mg/kg
3	4A6-T-57	4A6-T-57^RMP	Aroclor-1254	3.7	U	µg/kg
3	4A6-T-57	4A6-T-57^RMP	Aroclor-1260	3.7	U	µg/kg
3	4A6-T-57	4A6-T-57^RMP	Beryllium	0.4	-	mg/kg
3	4A6-T-57	4A6-T-57^RMP	Radium-226	0.82	-	pCi/g
3	4A6-T-57	4A6-T-57^RMP	Radium-228	0.768	J	pCi/g
3	4A6-T-57	4A6-T-57^RMP	Technetium-99	2.6	-	pCi/g
3	4A6-T-57	4A6-T-57^RMP	Thorium-228	0.781	J	pCi/g
3	4A6-T-57	4A6-T-57^RMP	Thorium-232	0.768	J	pCi/g
3	4A6-T-57	4A6-T-57^RMP	Uranium, Total	6.03	-	mg/kg
3	4A6-T-58	4A6-T-58^RMP	Aroclor-1254	3.6	U	µg/kg
3	4A6-T-58	4A6-T-58^RMP	Aroclor-1260	3.6	U	µg/kg
3	4A6-T-58	4A6-T-58^RMP	Beryllium	0.53	-	mg/kg
3	4A6-T-58	4A6-T-58^RMP	Radium-226	0.858	-	pCi/g
3	4A6-T-58	4A6-T-58^RMP	Radium-228	0.78	J	pCi/g
3	4A6-T-58	4A6-T-58^RMP	Technetium-99	1.74	U	pCi/g
3	4A6-T-58	4A6-T-58^RMP	Thorium-228	0.798	J	pCi/g
3	4A6-T-58	4A6-T-58^RMP	Thorium-232	0.78	J	pCi/g
3	4A6-T-58	4A6-T-58^RMP	Uranium, Total	5.49	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
4	4A6-T-21	4A6-T-21^RMP	Aroclor-1254	154	J	µg/kg
4	4A6-T-21	4A6-T-21^RMP	Aroclor-1260	69.3	J	µg/kg
4	4A6-T-21	4A6-T-21^RMP	Beryllium	0.47	J	mg/kg
4	4A6-T-21	4A6-T-21^RMP	Radium-226	0.998	-	pCi/g
4	4A6-T-21	4A6-T-21^RMP	Radium-228	0.659	-	pCi/g
4	4A6-T-21	4A6-T-21^RMP	Technetium-99	0.861	U	pCi/g
4	4A6-T-21	4A6-T-21^RMP	Thorium-228	0.658	-	pCi/g
4	4A6-T-21	4A6-T-21^RMP	Thorium-232	0.659	-	pCi/g
4	4A6-T-21	4A6-T-21^RMP	Uranium, Total	5.49	-	mg/kg
4	4A6-T-31	4A6-T-31^RMP	Aroclor-1254	3.7	U	µg/kg
4	4A6-T-31	4A6-T-31^RMP	Aroclor-1260	3.7	U	µg/kg
4	4A6-T-31	4A6-T-31^RMP	Beryllium	0.566	-	mg/kg
4	4A6-T-31	4A6-T-31^RMP	Radium-226	0.954	-	pCi/g
4	4A6-T-31	4A6-T-31^RMP	Radium-228	0.673	-	pCi/g
4	4A6-T-31	4A6-T-31^RMP	Technetium-99	0.971	U	pCi/g
4	4A6-T-31	4A6-T-31^RMP	Thorium-228	0.655	-	pCi/g
4	4A6-T-31	4A6-T-31^RMP	Thorium-232	0.673	-	pCi/g
4	4A6-T-31	4A6-T-31^RMP	Uranium, Total	4.43	-	mg/kg
4	4A6-T-32	4A6-T-32^RMP	Aroclor-1254	3.8	U	µg/kg
4	4A6-T-32	4A6-T-32^RMP	Aroclor-1260	3.8	U	µg/kg
4	4A6-T-32	4A6-T-32^RMP	Beryllium	0.555	-	mg/kg
4	4A6-T-32	4A6-T-32^RMP	Radium-226	0.78	-	pCi/g
4	4A6-T-32	4A6-T-32^RMP	Radium-228	0.724	-	pCi/g
4	4A6-T-32	4A6-T-32^RMP	Technetium-99	0.873	U	pCi/g
4	4A6-T-32	4A6-T-32^RMP	Thorium-228	0.755	-	pCi/g
4	4A6-T-32	4A6-T-32^RMP	Thorium-232	0.724	-	pCi/g
4	4A6-T-32	4A6-T-32^RMP	Uranium, Total	6.47	-	mg/kg
4	4A6-T-33	4A6-T-33^RMP	Aroclor-1254	3.8	U	µg/kg
4	4A6-T-33	4A6-T-33^RMP	Aroclor-1260	3.8	U	µg/kg
4	4A6-T-33	4A6-T-33^RMP	Beryllium	0.709	-	mg/kg
4	4A6-T-33	4A6-T-33^RMP	Radium-226	0.945	-	pCi/g
4	4A6-T-33	4A6-T-33^RMP	Radium-228	0.824	-	pCi/g
4	4A6-T-33	4A6-T-33^RMP	Technetium-99	0.86	U	pCi/g
4	4A6-T-33	4A6-T-33^RMP	Thorium-228	0.774	-	pCi/g
4	4A6-T-33	4A6-T-33^RMP	Thorium-232	0.824	-	pCi/g
4	4A6-T-33	4A6-T-33^RMP	Uranium, Total	9.85	-	mg/kg
4	4A6-T-39	4A6-T-39^RMP	Aroclor-1254	7.3	J	µg/kg
4	4A6-T-39	4A6-T-39^RMP	Aroclor-1260	6.3	J	µg/kg
4	4A6-T-39	4A6-T-39^RMP	Beryllium	0.55	-	mg/kg
4	4A6-T-39	4A6-T-39^RMP	Radium-226	0.869	J	pCi/g
4	4A6-T-39	4A6-T-39^RMP	Radium-228	0.903	-	pCi/g
4	4A6-T-39	4A6-T-39^RMP	Technetium-99	1.88	U	pCi/g
4	4A6-T-39	4A6-T-39^RMP	Thorium-228	0.902	-	pCi/g
4	4A6-T-39	4A6-T-39^RMP	Thorium-232	0.903	-	pCi/g
4	4A6-T-39	4A6-T-39^RMP	Uranium, Total	5.82	-	mg/kg
4	4A6-T-40	4A6-T-40^RMP	Aroclor-1254	3.8	U	µg/kg
4	4A6-T-40	4A6-T-40^RMP	Aroclor-1260	3.8	U	µg/kg
4	4A6-T-40	4A6-T-40^RMP	Beryllium	0.67	-	mg/kg
4	4A6-T-40	4A6-T-40^RMP	Radium-226	0.866	J	pCi/g
4	4A6-T-40	4A6-T-40^RMP	Radium-228	0.873	-	pCi/g
4	4A6-T-40	4A6-T-40^RMP	Technetium-99	1.61	U	pCi/g
4	4A6-T-40	4A6-T-40^RMP	Thorium-228	0.881	-	pCi/g
4	4A6-T-40	4A6-T-40^RMP	Thorium-232	0.873	-	pCi/g
4	4A6-T-40	4A6-T-40^RMP	Uranium, Total	4.14	-	mg/kg
4	4A6-T-41	4A6-T-41^RMP	Aroclor-1254	3.9	U	µg/kg
4	4A6-T-41	4A6-T-41^RMP	Aroclor-1260	3.9	U	µg/kg
4	4A6-T-41	4A6-T-41^RMP	Beryllium	0.73	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
4	4A6-T-41	4A6-T-41^RMP	Radium-226	0.818	J	pCi/g
4	4A6-T-41	4A6-T-41^RMP	Radium-228	0.765	-	pCi/g
4	4A6-T-41	4A6-T-41^RMP	Technetium-99	1.74	U	pCi/g
4	4A6-T-41	4A6-T-41^RMP	Thorium-228	0.751	-	pCi/g
4	4A6-T-41	4A6-T-41^RMP	Thorium-232	0.765	-	pCi/g
4	4A6-T-41	4A6-T-41^RMP	Uranium, Total	7.23	-	mg/kg
4	4A6-T-42	4A6-T-42^RMP	Aroclor-1254	3.9	U	µg/kg
4	4A6-T-42	4A6-T-42^RMP	Aroclor-1260	3.9	U	µg/kg
4	4A6-T-42	4A6-T-42^RMP	Beryllium	0.67	-	mg/kg
4	4A6-T-42	4A6-T-42^RMP	Radium-226	0.772	J	pCi/g
4	4A6-T-42	4A6-T-42^RMP	Radium-228	0.848	-	pCi/g
4	4A6-T-42	4A6-T-42^RMP	Technetium-99	1.81	U	pCi/g
4	4A6-T-42	4A6-T-42^RMP	Thorium-228	0.853	-	pCi/g
4	4A6-T-42	4A6-T-42^RMP	Thorium-232	0.848	-	pCi/g
4	4A6-T-42	4A6-T-42^RMP	Uranium, Total	5.31	-	mg/kg
4	4A6-T-51	4A6-T-51^RMP	Aroclor-1254	3.6	U	µg/kg
4	4A6-T-51	4A6-T-51^RMP	Aroclor-1260	3.6	U	µg/kg
4	4A6-T-51	4A6-T-51^RMP	Beryllium	0.69	-	mg/kg
4	4A6-T-51	4A6-T-51^RMP	Radium-226	1.03	-	pCi/g
4	4A6-T-51	4A6-T-51^RMP	Radium-228	0.803	J	pCi/g
4	4A6-T-51	4A6-T-51^RMP	Technetium-99	1.74	U	pCi/g
4	4A6-T-51	4A6-T-51^RMP	Thorium-228	0.793	J	pCi/g
4	4A6-T-51	4A6-T-51^RMP	Thorium-232	0.803	J	pCi/g
4	4A6-T-51	4A6-T-51^RMP	Uranium, Total	5.48	-	mg/kg
4	4A6-T-52	4A6-T-52^RMP	Aroclor-1254	3.6	U	µg/kg
4	4A6-T-52	4A6-T-52^RMP	Aroclor-1260	3.6	U	µg/kg
4	4A6-T-52	4A6-T-52^RMP	Beryllium	0.64	-	mg/kg
4	4A6-T-52	4A6-T-52^RMP	Radium-226	1.06	-	pCi/g
4	4A6-T-52	4A6-T-52^RMP	Radium-228	0.833	J	pCi/g
4	4A6-T-52	4A6-T-52^RMP	Technetium-99	1.73	U	pCi/g
4	4A6-T-52	4A6-T-52^RMP	Thorium-228	0.848	J	pCi/g
4	4A6-T-52	4A6-T-52^RMP	Thorium-232	0.833	J	pCi/g
4	4A6-T-52	4A6-T-52^RMP	Uranium, Total	5.25	-	mg/kg
4	A5A-T-2	A5A-T-2^RM	Beryllium	0.316	J	mg/kg
4	A5A-T-2	A5A-T-2^RM	Radium-226	0.786	-	pCi/g
4	A5A-T-2	A5A-T-2^RM	Radium-228	0.451	J	pCi/g
4	A5A-T-2	A5A-T-2^RM	Thorium-228	0.473	J	pCi/g
4	A5A-T-2	A5A-T-2^RM	Thorium-232	0.451	J	pCi/g
4	A5A-T-2	A5A-T-2^RM	Uranium, Total	8.59	-	mg/kg
4	A5A-T-3	A5A-T-3^RM	Beryllium	0.264	J	mg/kg
4	A5A-T-3	A5A-T-3^RM	Radium-226	0.72	-	pCi/g
4	A5A-T-3	A5A-T-3^RM	Radium-228	0.519	J	pCi/g
4	A5A-T-3	A5A-T-3^RM	Thorium-228	0.547	J	pCi/g
4	A5A-T-3	A5A-T-3^RM	Thorium-232	0.519	J	pCi/g
4	A5A-T-3	A5A-T-3^RM	Uranium, Total	5.63	J	mg/kg
4	A5A-T-4	A5A-T-4^RM	Beryllium	0.336	J	mg/kg
4	A5A-T-4	A5A-T-4^RM	Radium-226	1.05	-	pCi/g
4	A5A-T-4	A5A-T-4^RM	Radium-228	0.78	J	pCi/g
4	A5A-T-4	A5A-T-4^RM	Thorium-228	0.802	J	pCi/g
4	A5A-T-4	A5A-T-4^RM	Thorium-232	0.78	J	pCi/g
4	A5A-T-4	A5A-T-4^RM	Uranium, Total	19.1	-	mg/kg
4	A5A-T-9	A5A-T-9^RM	Beryllium	0.611	-	mg/kg
4	A5A-T-9	A5A-T-9^RM	Radium-226	0.94	-	pCi/g
4	A5A-T-9	A5A-T-9^RM	Radium-228	0.818	-	pCi/g
4	A5A-T-9	A5A-T-9^RM	Thorium-228	0.829	-	pCi/g
4	A5A-T-9	A5A-T-9^RM	Thorium-232	0.818	-	pCi/g
4	A5A-T-9	A5A-T-9^RM	Uranium, Total	8.99	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
5	4A6-T-44	4A6-T-44^RMP	Aroclor-1254	3.7	U	µg/kg
5	4A6-T-44	4A6-T-44^RMP	Aroclor-1260	3.7	U	µg/kg
5	4A6-T-44	4A6-T-44^RMP	Beryllium	0.63	-	mg/kg
5	4A6-T-44	4A6-T-44^RMP	Radium-226	0.76	J	pCi/g
5	4A6-T-44	4A6-T-44^RMP	Radium-228	0.855	-	pCi/g
5	4A6-T-44	4A6-T-44^RMP	Technetium-99	1.81	U	pCi/g
5	4A6-T-44	4A6-T-44^RMP	Thorium-228	0.828	-	pCi/g
5	4A6-T-44	4A6-T-44^RMP	Thorium-232	0.855	-	pCi/g
5	4A6-T-44	4A6-T-44^RMP	Uranium, Total	6.18	-	mg/kg
5	4A6-T-45	4A6-T-45^RMP	Aroclor-1254	3.9	U	µg/kg
5	4A6-T-45	4A6-T-45^RMP	Aroclor-1260	5.4	J	µg/kg
5	4A6-T-45	4A6-T-45^RMP	Beryllium	0.65	-	mg/kg
5	4A6-T-45	4A6-T-45^RMP	Radium-226	0.815	J	pCi/g
5	4A6-T-45	4A6-T-45^RMP	Radium-228	0.813	-	pCi/g
5	4A6-T-45	4A6-T-45^RMP	Technetium-99	1.79	U	pCi/g
5	4A6-T-45	4A6-T-45^RMP	Thorium-228	0.815	-	pCi/g
5	4A6-T-45	4A6-T-45^RMP	Thorium-232	0.813	-	pCi/g
5	4A6-T-45	4A6-T-45^RMP	Uranium, Total	9.36	-	mg/kg
5	4A6-T-46	4A6-T-46^RMP	Aroclor-1254	3.7	U	µg/kg
5	4A6-T-46	4A6-T-46^RMP	Aroclor-1260	3.7	U	µg/kg
5	4A6-T-46	4A6-T-46^RMP	Beryllium	0.77	-	mg/kg
5	4A6-T-46	4A6-T-46^RMP	Radium-226	1.68	J	pCi/g
5	4A6-T-46	4A6-T-46^RMP	Radium-228	8.13	-	pCi/g
5	4A6-T-46	4A6-T-46^RMP	Technetium-99	1.91	U	pCi/g
5	4A6-T-46	4A6-T-46^RMP	Thorium-228	8.25	-	pCi/g
5	4A6-T-46	4A6-T-46^RMP	Thorium-232	8.13	-	pCi/g
5	4A6-T-46	4A6-T-46^RMP	Uranium, Total	107	-	mg/kg
5	4A6-T-47	4A6-T-47^RMP	Aroclor-1254	3.7	U	µg/kg
5	4A6-T-47	4A6-T-47^RMP	Aroclor-1260	3.7	U	µg/kg
5	4A6-T-47	4A6-T-47^RMP	Beryllium	0.71	-	mg/kg
5	4A6-T-47	4A6-T-47^RMP	Radium-226	0.971	J	pCi/g
5	4A6-T-47	4A6-T-47^RMP	Radium-228	0.783	-	pCi/g
5	4A6-T-47	4A6-T-47^RMP	Technetium-99	2.65	-	pCi/g
5	4A6-T-47	4A6-T-47^RMP	Thorium-228	0.782	-	pCi/g
5	4A6-T-47	4A6-T-47^RMP	Thorium-232	0.783	-	pCi/g
5	4A6-T-47	4A6-T-47^RMP	Uranium, Total	6.46	-	mg/kg
5	4A6-T-64	4A6-T-64^RMP	Aroclor-1254	4	U	µg/kg
5	4A6-T-64	4A6-T-64^RMP	Aroclor-1260	4	U	µg/kg
5	4A6-T-64	4A6-T-64^RMP	Beryllium	0.65	-	mg/kg
5	4A6-T-64	4A6-T-64^RMP	Radium-226	0.854	-	pCi/g
5	4A6-T-64	4A6-T-64^RMP	Radium-228	0.869	-	pCi/g
5	4A6-T-64	4A6-T-64^RMP	Technetium-99	1.73	U	pCi/g
5	4A6-T-64	4A6-T-64^RMP	Thorium-228	0.799	-	pCi/g
5	4A6-T-64	4A6-T-64^RMP	Thorium-232	0.869	-	pCi/g
5	4A6-T-64	4A6-T-64^RMP	Uranium, Total	7.31	-	mg/kg
5	4A6-T-65	4A6-T-65^RMP	Aroclor-1254	4	U	µg/kg
5	4A6-T-65	4A6-T-65^RMP	Aroclor-1260	4	U	µg/kg
5	4A6-T-65	4A6-T-65^RMP	Beryllium	0.59	-	mg/kg
5	4A6-T-65	4A6-T-65^RMP	Radium-226	0.854	-	pCi/g
5	4A6-T-65	4A6-T-65^RMP	Radium-228	0.674	-	pCi/g
5	4A6-T-65	4A6-T-65^RMP	Technetium-99	1.66	U	pCi/g
5	4A6-T-65	4A6-T-65^RMP	Thorium-228	0.691	-	pCi/g
5	4A6-T-65	4A6-T-65^RMP	Thorium-232	0.674	-	pCi/g
5	4A6-T-65	4A6-T-65^RMP	Uranium, Total	5.61	-	mg/kg
5	4A6-T-66	4A6-T-66^RMP	Aroclor-1254	3.6	U	µg/kg
5	4A6-T-66	4A6-T-66^RMP	Aroclor-1260	3.6	U	µg/kg
5	4A6-T-66	4A6-T-66^RMP	Beryllium	0.49	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
5	4A6-T-66	4A6-T-66^RMP	Radium-226	0.881	-	pCi/g
5	4A6-T-66	4A6-T-66^RMP	Radium-228	0.792	-	pCi/g
5	4A6-T-66	4A6-T-66^RMP	Technetium-99	1.83	U	pCi/g
5	4A6-T-66	4A6-T-66^RMP	Thorium-228	0.8	-	pCi/g
5	4A6-T-66	4A6-T-66^RMP	Thorium-232	0.792	-	pCi/g
5	4A6-T-66	4A6-T-66^RMP	Uranium, Total	5.19	-	mg/kg
5	4A6-T-67	4A6-T-67^RMP	Aroclor-1254	3.9	U	µg/kg
5	4A6-T-67	4A6-T-67^RMP	Aroclor-1260	3.9	U	µg/kg
5	4A6-T-67	4A6-T-67^RMP	Beryllium	0.58	-	mg/kg
5	4A6-T-67	4A6-T-67^RMP	Radium-226	0.913	-	pCi/g
5	4A6-T-67	4A6-T-67^RMP	Radium-228	0.862	-	pCi/g
5	4A6-T-67	4A6-T-67^RMP	Technetium-99	1.79	U	pCi/g
5	4A6-T-67	4A6-T-67^RMP	Thorium-228	0.789	-	pCi/g
5	4A6-T-67	4A6-T-67^RMP	Thorium-232	0.862	-	pCi/g
5	4A6-T-67	4A6-T-67^RMP	Uranium, Total	5.58	-	mg/kg
5	4A6-T-75	4A6-T-75^RMP	Aroclor-1254	3.5	U	µg/kg
5	4A6-T-75	4A6-T-75^RMP	Aroclor-1260	3.5	U	µg/kg
5	4A6-T-75	4A6-T-75^RMP	Beryllium	0.76	-	mg/kg
5	4A6-T-75	4A6-T-75^RMP	Radium-226	0.894	-	pCi/g
5	4A6-T-75	4A6-T-75^RMP	Radium-228	0.795	-	pCi/g
5	4A6-T-75	4A6-T-75^RMP	Technetium-99	1.89	U	pCi/g
5	4A6-T-75	4A6-T-75^RMP	Thorium-228	0.792	-	pCi/g
5	4A6-T-75	4A6-T-75^RMP	Thorium-232	0.795	-	pCi/g
5	4A6-T-75	4A6-T-75^RMP	Uranium, Total	3.65	-	mg/kg
5	4A6-T-76	4A6-T-76^RMP	Aroclor-1254	3.5	U	µg/kg
5	4A6-T-76	4A6-T-76^RMP	Aroclor-1260	3.5	U	µg/kg
5	4A6-T-76	4A6-T-76^RMP	Beryllium	0.69	-	mg/kg
5	4A6-T-76	4A6-T-76^RMP	Radium-226	0.883	-	pCi/g
5	4A6-T-76	4A6-T-76^RMP	Radium-228	0.932	-	pCi/g
5	4A6-T-76	4A6-T-76^RMP	Technetium-99	1.81	U	pCi/g
5	4A6-T-76	4A6-T-76^RMP	Thorium-228	0.934	-	pCi/g
5	4A6-T-76	4A6-T-76^RMP	Thorium-232	0.932	-	pCi/g
5	4A6-T-76	4A6-T-76^RMP	Uranium, Total	4.73	-	mg/kg
5	4A6-T-77	4A6-T-77^RMP	Aroclor-1254	3.7	U	µg/kg
5	4A6-T-77	4A6-T-77^RMP	Aroclor-1260	3.7	U	µg/kg
5	4A6-T-77	4A6-T-77^RMP	Beryllium	0.74	-	mg/kg
5	4A6-T-77	4A6-T-77^RMP	Radium-226	0.848	-	pCi/g
5	4A6-T-77	4A6-T-77^RMP	Radium-228	0.793	-	pCi/g
5	4A6-T-77	4A6-T-77^RMP	Technetium-99	1.75	U	pCi/g
5	4A6-T-77	4A6-T-77^RMP	Thorium-228	0.764	-	pCi/g
5	4A6-T-77	4A6-T-77^RMP	Thorium-232	0.793	-	pCi/g
5	4A6-T-77	4A6-T-77^RMP	Uranium, Total	4.54	J	mg/kg
5	4A6-T-78	4A6-T-78^RMP	Aroclor-1254	3.5	U	µg/kg
5	4A6-T-78	4A6-T-78^RMP	Aroclor-1260	3.5	U	µg/kg
5	4A6-T-78	4A6-T-78^RMP	Beryllium	0.71	-	mg/kg
5	4A6-T-78	4A6-T-78^RMP	Radium-226	0.94	-	pCi/g
5	4A6-T-78	4A6-T-78^RMP	Radium-228	0.866	-	pCi/g
5	4A6-T-78	4A6-T-78^RMP	Technetium-99	2.03	U	pCi/g
5	4A6-T-78	4A6-T-78^RMP	Thorium-228	0.842	-	pCi/g
5	4A6-T-78	4A6-T-78^RMP	Thorium-232	0.866	-	pCi/g
5	4A6-T-78	4A6-T-78^RMP	Uranium, Total	3.16	J	mg/kg
6	4A6-T-48	4A6-T-48^RMP	Aroclor-1254	3.7	U	µg/kg
6	4A6-T-48	4A6-T-48^RMP	Aroclor-1260	3.7	U	µg/kg
6	4A6-T-48	4A6-T-48^RMP	Beryllium	0.58	-	mg/kg
6	4A6-T-48	4A6-T-48^RMP	Radium-226	0.813	J	pCi/g
6	4A6-T-48	4A6-T-48^RMP	Radium-228	0.585	-	pCi/g
6	4A6-T-48	4A6-T-48^RMP	Technetium-99	1.96	U	pCi/g

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
6	4A6-T-48	4A6-T-48^RMP	Thorium-228	0.602	-	pCi/g
6	4A6-T-48	4A6-T-48^RMP	Thorium-232	0.585	-	pCi/g
6	4A6-T-48	4A6-T-48^RMP	Uranium, Total	18.3	-	mg/kg
6	4A6-T-49	4A6-T-49^RMP	Aroclor-1254	3.8	U	µg/kg
6	4A6-T-49	4A6-T-49^RMP	Aroclor-1260	3.8	U	µg/kg
6	4A6-T-49	4A6-T-49^RMP	Beryllium	0.63	-	mg/kg
6	4A6-T-49	4A6-T-49^RMP	Radium-226	0.717	J	pCi/g
6	4A6-T-49	4A6-T-49^RMP	Radium-228	0.688	-	pCi/g
6	4A6-T-49	4A6-T-49^RMP	Technetium-99	1.78	U	pCi/g
6	4A6-T-49	4A6-T-49^RMP	Thorium-228	0.674	-	pCi/g
6	4A6-T-49	4A6-T-49^RMP	Thorium-232	0.688	-	pCi/g
6	4A6-T-49	4A6-T-49^RMP	Uranium, Total	3.41	-	mg/kg
6	4A6-T-50	4A6-T-50^RMP	Aroclor-1254	3.8	U	µg/kg
6	4A6-T-50	4A6-T-50^RMP	Aroclor-1260	3.8	U	µg/kg
6	4A6-T-50	4A6-T-50^RMP	Beryllium	0.5	-	mg/kg
6	4A6-T-50	4A6-T-50^RMP	Radium-226	0.849	-	pCi/g
6	4A6-T-50	4A6-T-50^RMP	Radium-228	0.833	J	pCi/g
6	4A6-T-50	4A6-T-50^RMP	Technetium-99	1.84	U	pCi/g
6	4A6-T-50	4A6-T-50^RMP	Thorium-228	0.838	J	pCi/g
6	4A6-T-50	4A6-T-50^RMP	Thorium-232	0.833	J	pCi/g
6	4A6-T-50	4A6-T-50^RMP	Uranium, Total	4.45	J	mg/kg
6	4A6-T-59	4A6-T-59^RMP	Aroclor-1254	3.7	U	µg/kg
6	4A6-T-59	4A6-T-59^RMP	Aroclor-1260	3.7	U	µg/kg
6	4A6-T-59	4A6-T-59^RMP	Beryllium	0.47	-	mg/kg
6	4A6-T-59	4A6-T-59^RMP	Radium-226	0.88	-	pCi/g
6	4A6-T-59	4A6-T-59^RMP	Radium-228	0.857	J	pCi/g
6	4A6-T-59	4A6-T-59^RMP	Technetium-99	1.69	U	pCi/g
6	4A6-T-59	4A6-T-59^RMP	Thorium-228	0.871	J	pCi/g
6	4A6-T-59	4A6-T-59^RMP	Thorium-232	0.857	J	pCi/g
6	4A6-T-59	4A6-T-59^RMP	Uranium, Total	8.19	-	mg/kg
6	4A6-T-69	4A6-T-69^RMP	Aroclor-1254	3.6	U	µg/kg
6	4A6-T-69	4A6-T-69^RMP	Aroclor-1260	3.6	U	µg/kg
6	4A6-T-69	4A6-T-69^RMP	Beryllium	0.5	-	mg/kg
6	4A6-T-69	4A6-T-69^RMP	Radium-226	0.636	-	pCi/g
6	4A6-T-69	4A6-T-69^RMP	Radium-228	0.669	-	pCi/g
6	4A6-T-69	4A6-T-69^RMP	Technetium-99	2.12	U	pCi/g
6	4A6-T-69	4A6-T-69^RMP	Thorium-228	0.663	-	pCi/g
6	4A6-T-69	4A6-T-69^RMP	Thorium-232	0.669	-	pCi/g
6	4A6-T-69	4A6-T-69^RMP	Uranium, Total	4.01	J	mg/kg
6	4A6-T-70	4A6-T-70^RMP	Aroclor-1254	3.6	U	µg/kg
6	4A6-T-70	4A6-T-70^RMP	Aroclor-1260	3.6	U	µg/kg
6	4A6-T-70	4A6-T-70^RMP	Beryllium	0.67	-	mg/kg
6	4A6-T-70	4A6-T-70^RMP	Radium-226	0.898	-	pCi/g
6	4A6-T-70	4A6-T-70^RMP	Radium-228	0.826	-	pCi/g
6	4A6-T-70	4A6-T-70^RMP	Technetium-99	1.88	U	pCi/g
6	4A6-T-70	4A6-T-70^RMP	Thorium-228	0.838	-	pCi/g
6	4A6-T-70	4A6-T-70^RMP	Thorium-232	0.826	-	pCi/g
6	4A6-T-70	4A6-T-70^RMP	Uranium, Total	3.84	J	mg/kg
6	4A6-T-71	4A6-T-71^RMP	Aroclor-1254	3.7	U	µg/kg
6	4A6-T-71	4A6-T-71^RMP	Aroclor-1260	3.7	U	µg/kg
6	4A6-T-71	4A6-T-71^RMP	Beryllium	0.56	-	mg/kg
6	4A6-T-71	4A6-T-71^RMP	Radium-226	0.884	-	pCi/g
6	4A6-T-71	4A6-T-71^RMP	Radium-228	0.847	-	pCi/g
6	4A6-T-71	4A6-T-71^RMP	Technetium-99	1.85	U	pCi/g
6	4A6-T-71	4A6-T-71^RMP	Thorium-228	0.853	-	pCi/g
6	4A6-T-71	4A6-T-71^RMP	Thorium-232	0.847	-	pCi/g
6	4A6-T-71	4A6-T-71^RMP	Uranium, Total	5.82	-	mg/kg

UTILITY SAMPLING RESULTS

CU	Boring	SampleID	Parameter	Val Res	VQ	Units
6	4A6-T-72	4A6-T-72^RMP	Aroclor-1254	3.7	U	µg/kg
6	4A6-T-72	4A6-T-72^RMP	Aroclor-1260	3.7	U	µg/kg
6	4A6-T-72	4A6-T-72^RMP	Beryllium	0.63	-	mg/kg
6	4A6-T-72	4A6-T-72^RMP	Radium-226	0.879	-	pCi/g
6	4A6-T-72	4A6-T-72^RMP	Radium-228	0.756	-	pCi/g
6	4A6-T-72	4A6-T-72^RMP	Technetium-99	1.73	U	pCi/g
6	4A6-T-72	4A6-T-72^RMP	Thorium-228	0.764	-	pCi/g
6	4A6-T-72	4A6-T-72^RMP	Thorium-232	0.756	-	pCi/g
6	4A6-T-72	4A6-T-72^RMP	Uranium, Total	4.77	-	mg/kg
6	4A6-T-74	4A6-T-74^RMP	Aroclor-1254	4.8	J	µg/kg
6	4A6-T-74	4A6-T-74^RMP	Aroclor-1260	3.6	U	µg/kg
6	4A6-T-74	4A6-T-74^RMP	Beryllium	0.74	-	mg/kg
6	4A6-T-74	4A6-T-74^RMP	Radium-226	1.04	-	pCi/g
6	4A6-T-74	4A6-T-74^RMP	Radium-228	1.01	-	pCi/g
6	4A6-T-74	4A6-T-74^RMP	Technetium-99	1.9	U	pCi/g
6	4A6-T-74	4A6-T-74^RMP	Thorium-228	0.995	-	pCi/g
6	4A6-T-74	4A6-T-74^RMP	Thorium-232	1.01	-	pCi/g
6	4A6-T-74	4A6-T-74^RMP	Uranium, Total	8.71	-	mg/kg
6	4A6-T-81	4A6-T-81^R	Radium-226	0.945	-	pCi/g
6	4A6-T-81	4A6-T-81^R	Radium-228	0.788	-	pCi/g
6	4A6-T-81	4A6-T-81^R	Thorium-228	0.747	-	pCi/g
6	4A6-T-81	4A6-T-81^R	Thorium-232	0.788	-	pCi/g
6	4A6-T-81	4A6-T-81^R	Uranium, Total	6.9	-	mg/kg
6	4A6-T-82	4A6-T-82^R	Radium-226	0.997	-	pCi/g
6	4A6-T-82	4A6-T-82^R	Radium-228	0.889	-	pCi/g
6	4A6-T-82	4A6-T-82^R	Thorium-228	0.966	-	pCi/g
6	4A6-T-82	4A6-T-82^R	Thorium-232	0.889	-	pCi/g
6	4A6-T-82	4A6-T-82^R	Uranium, Total	2.02	J	mg/kg
6	A5A-T-1	A5A-T-1^RM	Beryllium	0.584	J	mg/kg
6	A5A-T-1	A5A-T-1^RM	Radium-226	1.17	-	pCi/g
6	A5A-T-1	A5A-T-1^RM	Radium-228	0.89	J	pCi/g
6	A5A-T-1	A5A-T-1^RM	Thorium-228	0.87	J	pCi/g
6	A5A-T-1	A5A-T-1^RM	Thorium-232	0.89	J	pCi/g
6	A5A-T-1	A5A-T-1^RM	Uranium, Total	3.63	U	mg/kg
6	A5A-T-10	A5A-T-10^RM	Beryllium	0.186	U	mg/kg
6	A5A-T-10	A5A-T-10^RM	Radium-226	1.35	-	pCi/g
6	A5A-T-10	A5A-T-10^RM	Radium-228	1.13	-	pCi/g
6	A5A-T-10	A5A-T-10^RM	Thorium-228	1.1	-	pCi/g
6	A5A-T-10	A5A-T-10^RM	Thorium-232	1.13	-	pCi/g
6	A5A-T-10	A5A-T-10^RM	Uranium, Total	4.86	J	mg/kg

APPENDIX B

VARIANCE/FIELD CHANGE NOTICES FOR THE AREA 4B - PART TWO CERTIFICATION SAMPLING PSP

VARIANCE / FIELD CHANGE NOTICE	Significant? (Yes or No): NO	V/F: 20810-PSP-0012-01
WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0012 REV A		**Page: 1 of 2**
PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 4B - Part Two and Main Drainage Corridor Area - 1st Street		**Date: 8/31/06**

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of five total uranium (TAL T) samples in sub-CU A4B2-C04-6, where a result greater than 2 times the FRL was detected. The hotspot area was delineated by Real-Time and excavated by Construction. Four locations will be sampled at the edge of the excavation (sidewall), one in each of the four cardinal directions. The fifth location shall be taken in the floor of the excavation.

Attachment 1 contains the Sampling and Analytical Requirements, and TAL.

The sample IDs are A4B2-C04-6B-N^R, A4B2-C04-6B-E^R, A4B2-C04-6B-S^R, A4B2-C04-6B-W^R, and A4B2-C04-6B^R.

Where:
A4B2 = Area 4B – Part Two
C04 = original CU 04
6B = post-excavation sampling at location A4B2-C04-6
N = north bounding location; E = east bounding location; S = south bounding location; W = west bounding location
^R = total uranium

Justification:

Sub-CU A4B2-C04-6 had a result for total uranium that was greater than 2 times the FRL, which was delineated and excavated. Five additional locations will be sampled to determine if the all of the impacted soil has been excavated. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton Date: 8/31/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: R. Frisk	9/8/06	X	PROJECT MANAGER: J D Chiou	9/8/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: K. Antiz	8/8/06
X	ANALYTICAL CUSTOMER SUPPORT: Paul J. McSwigan	8/31/06		RTIMP Manager	
	WAO		X	Sampling Manager: T. Buhrlage	9/14/06

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

DISTRIBUTION

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

Attachment 1
Sampling and Analytical Requirements

TAL(s)	Method[a]	Matrix	Preservative	ASL	TAT	Container[b]	Minimum Mass/Volume
Radiological TAL T	Gamma Spec	Solid	None	D/E	24 hrs COAs 7 days final	Plastic	300 g (900 g) [c]

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

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

[c] Triple the specified volume must be collected in order for the contract laboratory to perform the required quality control analysis. The sample shall be identified on the Chain of Custody/Request for Analysis forms as "designated for laboratory QC".

Target Analyte List
20810-PSP-0012-T, 5 samples
(Radiological - ASL D/E*)

Analyte	On-Property FRL	MDL (soil)
Total Uranium	20 mg/kg	2.0 mg/kg

Special Instructions:
Field QC (~~split) will be collected under this V/FCN.~~ No
Analytical Data Validation is required (VSL D).
Highest total uranium result for the area is 41.7 mg/kg from location A4B2-C04-6^RM

APPENDIX C

CORRECTION ON 7-DAY RADIUM-226 RESULTS

APPENDIX C
CORRECTION OF 7-DAY RADIUM-226 RESULTS

On July 10, 2006, OEPA approved DOE's July 6, 2006 request to reduce the in-growth period for radon, with the stipulation that additional soil samples would be collected from non-certified areas to verify initial assumptions and finalize the documentation of the process. This attachment to the certification report presents the analytical results for 7- and 21-day in-growth periods for samples collected from non-certified areas, as described in variance 20810-PSP-0004-36.

Figure 1 summarizes the results for 48 samples collected from non-certified areas. A regression of the data ($R^2 = 0.9969$) yields the following equation for the estimate of the 21-day value:

21-day value = 1.053*7-day value – 0.0156

This correction will be applied to 7-day analytical results to yield an estimate of the 21-day result. If statistical calculations are performed in the certification report, the estimate for 21-day results will be used to determine the pass/fail criteria for the certification units.

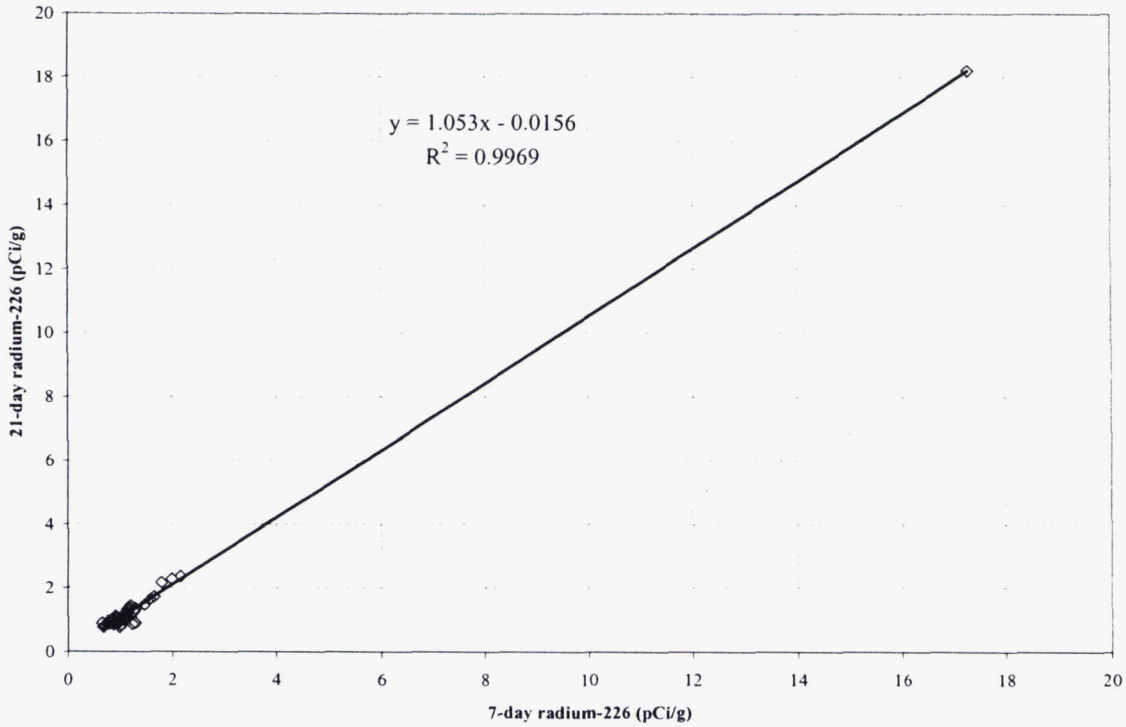

FIGURE 1. Regression analysis of radium-226 data based on 7- and 21-day ingrowth period for radon-222

APPENDIX D

HWMUs 05 AND 22 RCRA CALCULATIONS

APPLICATON OF GENERAL CLEANUP NUMBERS

From Ohio Environmental Protection Agency
Division of Hazardous Waste Management
June 2004

HWMU 22	Carcinogenic (CA) Non-Carcinogenic (NC)	GCN from Table O-1 mg/kg		Number of COCs (NC vs. CA)	Adjusted GCN mg/kg		Maximum Concentration mg/kg
		1 DAF	20 DAF		1 DAF	20 DAF	
Benzene*	CA	1.72E-03	3.43E-02	--			--
Tetrachloroethene	CA	3.98E-03	7.95E-02	1.00E+00	3.98E-03	7.95E-02	2.00E-02
Barium**	NC	2.05E-01	4.09E+00	--	--	--	1.06E+02
Chromium**	NC	6.96E-03	1.39E-01	--	--	--	1.99E+01
Lead**	--	--	2.45E+02	--	--	--	1.30E+01
Mercury**	NC	9.49E-05	1.90E-03	--	--	--	3.47E-02

Carcinogenic

$$\text{RISK} = \left\{ \left[\frac{\text{Conc A}}{\text{adj GCN A}}\right] + \left[\frac{\text{Conc B}}{\text{adj GCN B}}\right] + \ldots \right\} \times 1.00\text{E-05} = \textit{LIMIT OF 1.00E-5}$$

20 DAF

$$\text{RISK} = \left[\frac{\overset{\text{Tetrachloroethene}}{2.00\text{E-02}}}{7.95\text{E-02}}\right] \times 1.00\text{E-05} = \mathbf{2.52E\text{-}06}$$

Non-Carcinogenic

$$\text{Hazard Index (1)} = \left[\frac{\text{Conc A}}{\text{adj GCN A}}\right] + \left[\frac{\text{Conc A}}{\text{adj GCN A}}\right] = \textit{LIMIT OF 1.00}$$

Not evaluated. All COCs are less than background values

- Benzene is eliminated based on the frequency of detection, which is less than 5%. (There was no detected concentration of this constituent.)
- Barium, chromium, lead and mercury are eliminated from the COC list because the maximum concentrations are less than the site-specific maximum background values (Ba = 261 mg/kg, Total Cr = 27.3 mg/kg, PB = 42 mg/kg and Hg = 0.1 mg/kg).
  Total chromium was determined but the GCNs listed here are for hexavalent chromium (Cr+6).
  Lead does not have a GCN. However, Section 8.3 of the Ohio EPA Closure Plan Review Guidance suggests an upper lead level of 245 mg/kg.

APPLICATON OF GENERAL CLEANUP NUMBERS

From Ohio Environmental Protection Agency
Division of Hazardous Waste Management
June 2004

HWMU 05	Carcinogenic (CA) Non-Carcinogenic (NC)	GCN from Table O-1 mg/kg			Number of COCs (NC vs. CA)		Adjusted GCN mg/kg			Maximum Concentration mg/kg
		1 DAF	20 DAF				1 DAF	20 DAF		
Lead*	NC	--	2.45E+02		--		--	--		2.52E+01
Mercury**	NC	9.49E-05	1.90E-03		--		--	--		

Carcinogenic

$$\text{RISK} = \left\{ \left[\frac{\text{Conc A}}{\text{adj GCN A}} \right] + \left[\frac{\text{Conc B}}{\text{adj GCN B}} \right] + \ldots \right\} \times 1.00\text{E-05} = \textit{LIMIT OF 1.00E-5}$$

No Carcinogenic Constituents

Non-Carcinogenic

$$\text{Hazard Index (1)} = \left[\frac{\text{Conc A}}{\text{adj GCN A}} \right] + \left[\frac{\text{Conc A}}{\text{adj GCN A}} \right] = \textit{LIMIT OF 1.00}$$

Not evaluated. Lead is below background levels and mercury is undetected in all soil samples.

* Lead is eliminated from the COC list because the maximum concentration is less than the site-specific maximum of 42 mg/kg.
** Mercury is eliminated based on the frequency of detection, which is less than 5%. (There was no detected concentration of this constituent.)
Lead does not have a GCN. However, Section 8.3 of the Ohio EPA Closure Plan Review Guidance suggests an upper lead level of 245 mg/kg.