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MAR 30 2006

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DOE-0099-06

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Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF THE DRAFT CERTIFICATION REPORT FOR AREA 6 FORMER
PRODUCTION AREA AND MAIN DRAINAGE CORRIDOR AREA**

Enclosed for your review is the draft Certification Report for Area 6 Former Production Area and Main Drainage Corridor Area.

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

Sincerely,

Johnny W. Reising
Director

Mr. James A. Saric
Mr. Tom Schneider

-2-

DOE-0099-06

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**CERTIFICATION REPORT FOR
AREA 6 FORMER PRODUCTION AREA
AND MAIN DRAINAGE CORRIDOR AREA**

**FERNALD CLOSURE PROJECT
FERNALD, OHIO**



MARCH 2006

U.S. DEPARTMENT OF ENERGY

**20810-RP-0010
REVISION A
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TABLE OF CONTENTS

List of Acronyms and Abbreviations iii
 List of Appendices ii
 List of Figures ii
 List of Tables ii

Executive Summary ES-1

1.0 Introduction 1-1
 1.1 Purpose 1-1
 1.2 Background 1-1
 1.3 Scope and Area Description 1-2
 1.4 Objectives 1-2
 1.5 Report Format 1-3
 1.6 FCP Master Certification Map 1-3

2.0 Certification Approach 2-1
 2.1 Certification Strategy 2-1
 2.1.1 Area-Specific Constituents of Concern 2-1
 2.1.2 ASCOC Selection Criteria 2-1
 2.1.3 ASCOC Selection Process 2-2
 2.2 Certification Approach 2-2
 2.2.1 Area 6 FPA and MDC Certification Unit Design 2-2
 2.2.2 Sample Selection Process 2-3
 2.2.3 Certification Sampling 2-4
 2.2.4 Statistical Analysis 2-4

3.0 Overview of Field Activities 3-1
 3.1 Area Preparation and Precertification 3-1
 3.2 Changes to Scope of Work 3-2

4.0 Analytical Methodologies, Data Validation Processes, and Data Reduction 4-1
 4.1 Analytical Methodologies 4-1
 4.1.1 Chemical Methods 4-1
 4.1.2 Radiochemical Methods 4-2
 4.2 Data Verification and Validation 4-3
 4.3 Data Reduction 4-4

5.0 Certification Evaluation and Conclusions 5-1
 5.1 Certification Results and Evaluation 5-1
 5.2 Area 6 FPA and MDC Certification Conclusions 5-6

6.0 Protection of Certified Areas 6-1

References R-1

LIST OF APPENDICES

Appendix A	Certification Samples, Analytical Results and Final Statistics Tables
Appendix B	Variances/Field Change Notices for the Area 6 Former Production Area and Main Drainage Corridor Area Certification Design Letter and Certification Project Specific Plan

LIST OF TABLES

Table 2-1	Area 3/Area 4/Area 6 ASCOC List
Table 2-2	ASCOC List for Area 6 FPA and MDC Area

LIST OF FIGURES

Figure 1-1	Area 6 FPA and MDC Area Location Map
Figure 1-2	Area 6 FPA and MDC Area Certification Area
Figure 1-3	Area 6 FPA and MDC Area Historical Surface Features
Figure 1-4	FCP Controlled Certification Map
Figure 2-1	Area 6 FPA and MDC Area Certification Area Boundaries
Figure 2-2	Certification Sampling Locations for CU04, CU05, CU10, CU20, CU21, and CU22
Figure 2-3	Certification Sampling Locations for CU17, CU18, and CU19
Figure 2-4	Certification Sampling Locations for CU14, CU15, CU16, and CU23
Figure 2-5	Certification Sampling Locations for CU11, CU12, and CU13
Figure 2-6	Certification Sampling Locations for CU01, CU02, CU03, and CU06 through CU09
Figure 2-7	Certification Sampling Locations for CU27 (UST06)
Figure 2-8	Certification Sampling Locations for CU28 (HWMU36)
Figure 2-9	Certification Sampling Locations for CU29 (HWMU48)
Figure 2-10	CU32 (HWMU11 - Tank Farm Sump) Certification Samples
Figure 2-11A	Certification Sampling Locations for the Northern Half of CU31
Figure 2-11B	Certification Sampling Locations for the Southern Half of CU31

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
µg/kg	micrograms per kilogram
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
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
SU	standard units

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

TAL	Target Analyte List
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

EXECUTIVE SUMMARY

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This Certification Report presents the information and data used by the U.S. Department of Energy (DOE) to determine that soils in Area 6 Former Production Area (FPA), Main Drainage Corridor (MDC) Area meet established final remediation levels (FRLs). Area 6 FPA and MDC Area encompasses portions of areas originally identified as Area 3, Area 4A, Area 4B, and Area 6 FPA. Several certification units (CU) within Area 6 FPA and MDC Area are located within a high leachability zone where the FRL for total uranium is 20 milligrams per kilograms.

The southern section of Area 6 FPA and MDC Area, which includes CUs 24, 25, 26, 30 [Hazardous Waste Management Unit (HWMU) 17], and the southern half of CU 31 is located in a low-lying area. Due to inclement weather, this area has been continuously under water. Therefore, these CUs are not included in this Certification Report, but will be included in a future report.

This Certification Report includes details of the certification sampling, analysis, and validation that took place in Area 6 FPA and MDC Area. Figure 1-1 depicts the original layout of Area 6 FPA and MDC Area and Figure 1-2 depicts the area in Area 6 FPA and MDC Area that is to be certified at this time.

Consistent with the Sitewide Excavation Plan (DOE 1998a), 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 Area 6 FPA and MDC Area CUs with the exception of those listed above were sampled and a statistical analysis was conducted where necessary to ensure the certification criteria was met. As discussed in the Certification Design Letter and Certification Project Specific Plan for Area 6 FPA and MDC Area (DOE 2006) the certification criteria are that the average primary area-specific constituent of concern (ASCOC) concentrations within a CU are below-FRLs at a 95 percent upper confidence level (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 6 FPA and MDC Area for the primary ASCOC total uranium. This hotspot was located in CU 28 at location MDC-C28-H36-7. The location was excavated and re-sampled. Following the re-sample, the pre-excavated data was replaced with the new data.

1 Upon completion of final certification statistics, all of the Area 6 FPA and MDC Area CUs pass the
2 certification criteria. Additionally, following the protocols of the Closure Plan Review Guidance for
3 Resource Conservation and Recovery Act Facilities (OEPA 2004), written by the Ohio Environmental
4 Protection Agency Division of Hazardous Waste Management all HWMUs within this area are closed. On
5 the basis of this reported information and supporting project files, DOE has determined that no additional
6 remedial actions are required in this portion of the site. The area will be considered certified when the
7 U.S. Environmental Protection Agency and the Ohio Environmental Protection Agency concur that
8 certification criteria have been met. DOE intends to proceed with final land use activities as outlined in the
9 Natural Resource Restoration Plan (DOE 2002a).

10
11 DOE has restricted access to certified areas in order to maintain their integrity prior to final land use
12 development. Fernald Closure Project procedure EP-0008 has been developed to implement a process to
13 protect certified areas from becoming re-contaminated.

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 6 Former Production Area (FPA), Main Drainage Corridor (MDC) Area meet established final remediation levels (FRLs). Area 6 FPA and MDC Area, as defined for this certification effort, is located in the eastern half of the FPA of the Fernald Closure Project (FCP) and is bound by Area 3B to the west, the rail yard to the north, the OSDF valve house road to the east, and Area 4A to the south. The southern section of Area 6 FPA and MDC Area, which includes Certification Units (CU) 24, 25, 26, 30 [Hazardous Waste Management Unit (HWMU) 17], and the southern end of CU 31 is located in a low-lying area. Due to inclement weather, this area has been continuously under water. Therefore, these CUs are not included in this Certification Report, but will be included in a future report.

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 1998a) 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 6 FPA and MDC Area 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 1.3 SCOPE AND AREA DESCRIPTION

2 The scope of this Certification Report includes details of certification sampling, analysis and validation
3 that took place in Area 6 FPA and MDC Area with the exception of the southern end of the area.

4 Figure 1-1 depicts the original layout of Area 6 FPA and MDC Area and Figure 1-2 depicts the area in
5 Area 6 FPA and MDC Area that is to be certified under this Certification Report.

6
7 Area 6 FPA and MDC Area is located in between Areas 3A and 3B, to the north and east of Area 3A, and
8 between Areas 3A and 4A. The western section of Area 6 FPA and MDC Area is bounded by 2nd Street to
9 the south, Area 3B and 4B to the west, and Area 3A and 4A to the east. The northern section of Area 6
10 FPA and MDC Area is bounded by "B" Street to the west, Area 3A to the south, Area 1 to the east, and the
11 railyard to the north. The eastern section of Area 6 FPA and MDC Area is bounded by Area 3A to the
12 west, Area 1 to the east, 2nd Street to the south, and the railyard to the north. Predominant structures
13 formerly located in Area 6 FPA and MDC Area includes KC-2 Warehouse and the scrap metal pile, Tank
14 Farm Sump and Tank Farm Settling Basin. Area 6 FPA and MDC Area also includes a high-leachability
15 zone where the total uranium FRL is 20 milligrams per kilogram (mg/kg), HWMU 11 (Tank Farm Sump),
16 HWMU 36 (Storage Pad north of Plant 6), HWMU 48 (UNH Tank southwest of Plant 2A), and
17 Underground Storage Tank (UST) 6 (Maintenance Shop) as shown on Figure 1-3. Area 6 FPA and MDC
18 Area is approximately 34.4 acres. However, as discussed above, only approximately 31.27 acres will be
19 included in the scope of this Certification Report (Figure 1-2). The southern portion of the original Area 6
20 FPA and MDC Area including HWMU 17 will be included in the scope of another certification effort to be
21 defined at a later time.

22
23 1.4 OBJECTIVES

24 The objectives of this Certification Report are:

- 25
26
- Summarize the precertification and remedial activities,
 - Describe the analytical methods, data validation processes, data reduction and statistical processes
29 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
34 FRL attainment and hotspot criteria, and
 - Describe access controls implemented to prevent recontamination.
- 35
36
37

1 1.5 REPORT FORMAT

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

4
5 Section 1.0 Introduction: Purpose, background, area description, scope, and objectives of the report

6
7 Section 2.0 Certification Approach: The approach for certification sampling and analysis

8
9 Section 3.0 Overview of Field Activities: Historical data evaluation, precertification, area
10 preparation, excavation and changes to work scope

11
12 Section 4.0 Analytical Methodologies, Data Validation Processes and Data Reduction

13
14 Section 5.0 Certification Evaluation and Conclusions

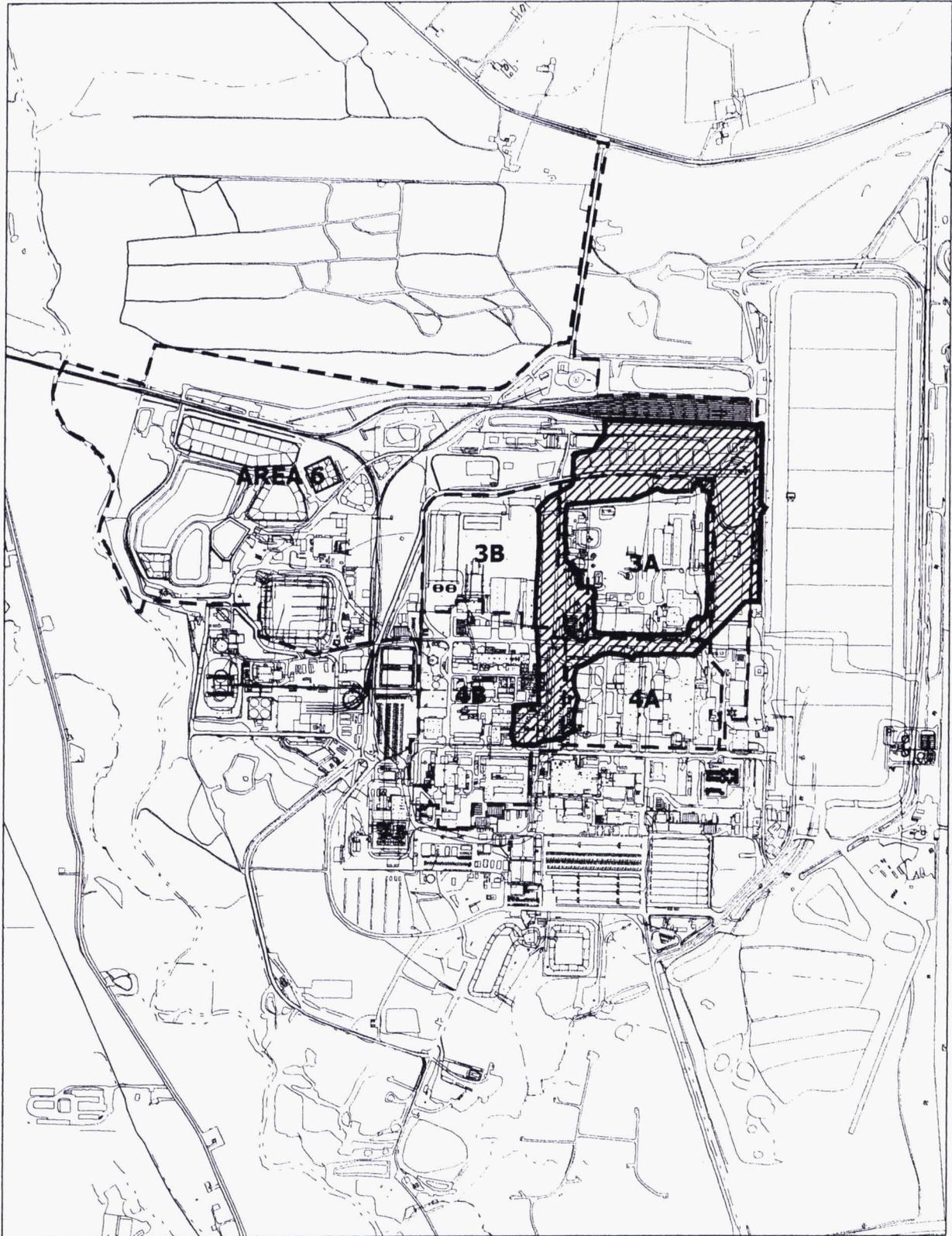
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16 Section 6.0 Protection of Certified Areas

17
18 Appendix A Certification Samples, Analytical Results and Final Statistics Tables

19
20 Appendix B Variances/Field Change Notices (V/FCNs) for the Area 6 Former Production Area and
21 Main Drainage Corridor Area Certification Design Letter (CDL) and Certification
22 Project Specific Plan (PSP, DOE 2006)

23
24 1.6 FCP MASTER CERTIFICATION MAP

25 In order to track certification and characterization for reuse areas at the FCP, DOE updates a controlled
26 map (Figure 1-4) showing the status of the soil remediation areas and phased areas with all Certification
27 Reports. This map has been updated to include certification of Area 6 FPA and MDC Area.



LEGEND:

- ORIGINAL AREA 3, AREA 4A, AREA 4B, AND AREA 6 BOUNDARY
-  AREA 6 FPA & MDC BOUNDARY (ORIGINAL SCOPE)

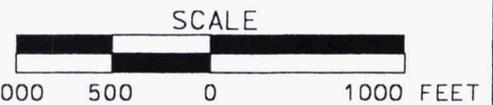
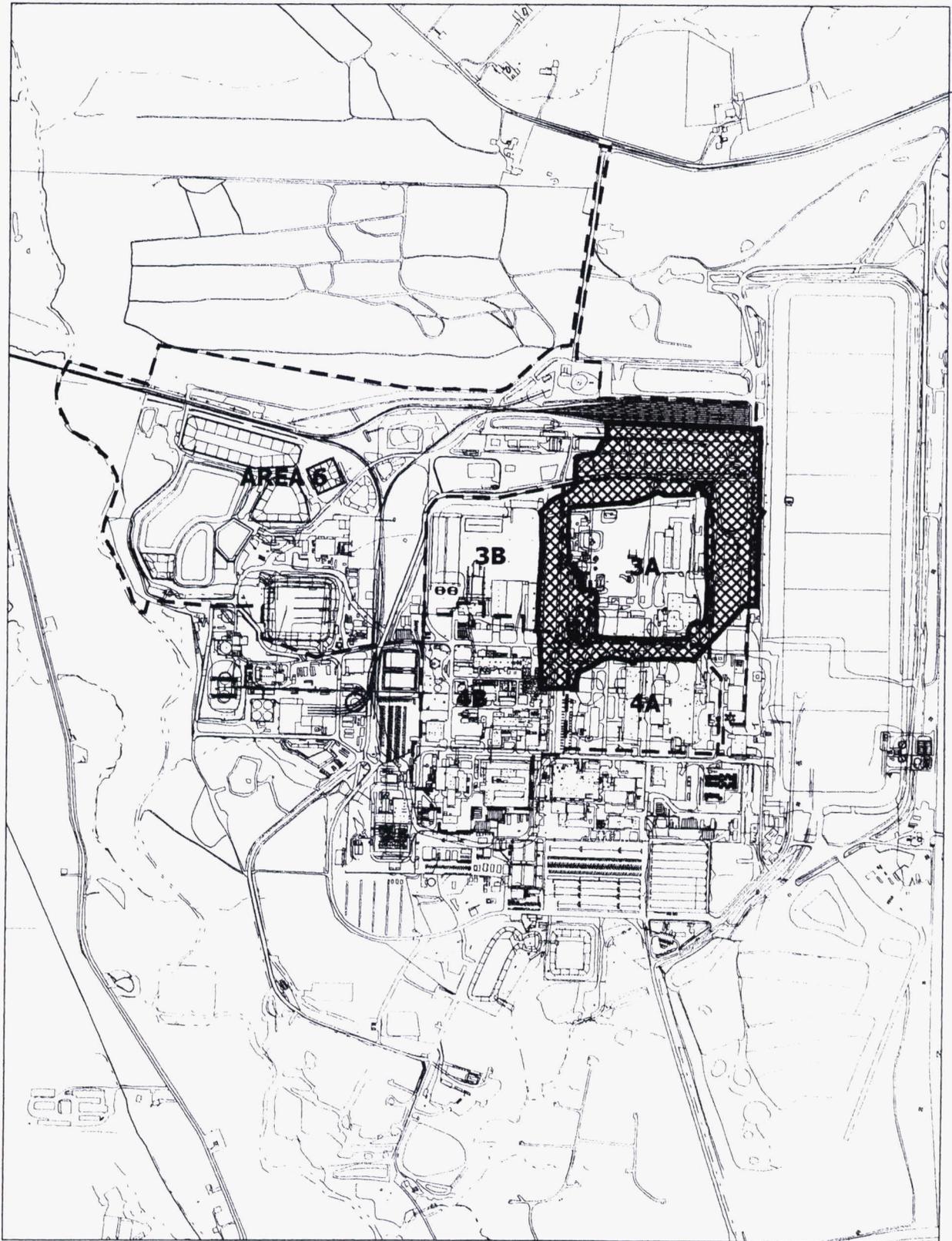


FIGURE 1-1. AREA 6 FPA AND MDC AREA LOCATION MAP



LEGEND:

- ORIGINAL AREA 3, AREA 4A, AREA 4B, AND AREA 6 BOUNDARY
-  AREA 6 FPA & MDC BOUNDARY (REVISED SCOPE)

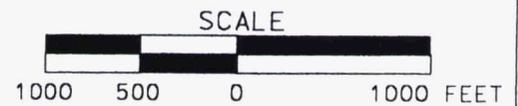
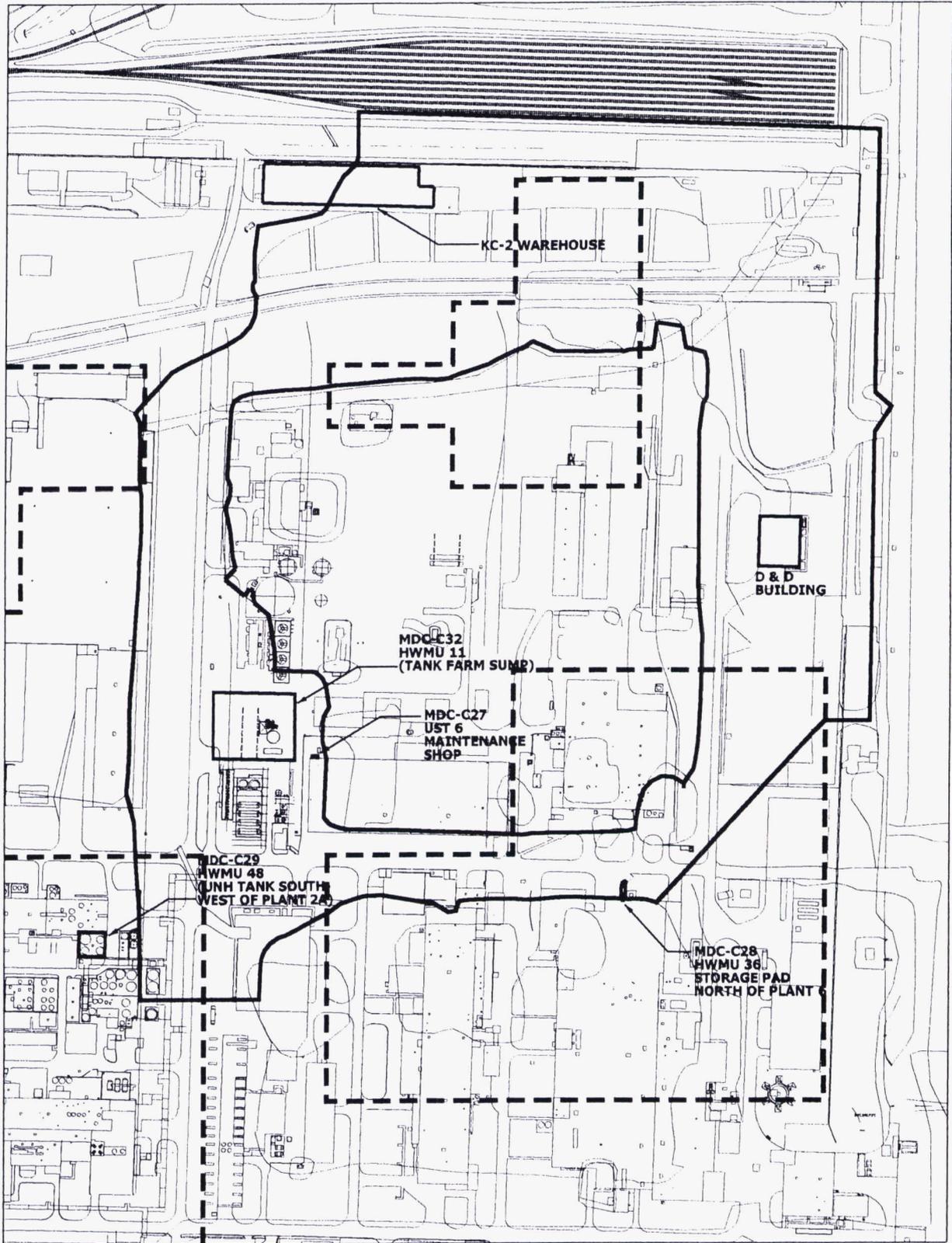


FIGURE 1-2. AREA 6 FPA AND MDC AREA CERTIFICATION AREA



LEGEND:

- AREA 6 FPA & MDC BOUNDARY
- - - HIGH LEACH ZONE

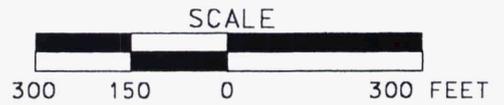


FIGURE 1-3. AREA 6 FPA AND MDC AREA HISTORICAL SURFACE FEATURES

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 6 FPA and MDC Area is described in the CDL and Certification Sampling PSP for Area 6 FPA and MDC Area.

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 are listed in the SEP; however, some COCs were not retained for Area 6 FPA and MDC Area 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 UST and 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 6 FPA and MDC Area.

1 2.1.3 ASCOC Selection Process

2 Each COC listed in Table 2-1 was evaluated for their relevance to Area 6 FPA and MDC Area. Table 2-2
3 presents the reasoning for either retaining or eliminating the ASCOCs listed in Table 2-1. Table 2-2 also
4 lists the applicable HWMU and UST COCs listed in Table 2-1 and Table 2-2 of the SEP. The ASCOCs
5 selected for CU 31, which encompasses the area that fell directly beneath the MDC, include all substances
6 listed as COCs in up-gradient and adjacent CUs. This approach was taken because the MDC carried flows
7 from up-gradient areas that were not certified, and therefore could have transported any of the COCs.

8
9 2.2 CERTIFICATION APPROACH

10 The certification design for Area 6 FPA and MDC Area followed the general approach outlined in
11 Section 3.4 of the SEP. The design for Area 6 FPA and MDC Area is depicted on Figure 2-1 and the
12 sample locations are depicted in Figures 2-2 through 2-11B. The five primary ASCOCs (total uranium,
13 radium-226, radium-228, thorium-228, and thorium-232) were retained in each CU. Additional COCs are
14 identified for specific CUs within the certification area as well as unique COCs for the HWMUs and USTs.

15
16 Many factors were taken into consideration when determining the boundaries for each CU within Area 6
17 FPA and MDC Area. These factors included: areas defined as high leachability zones, historical land use,
18 proximity to other areas of the site, residual COC data, and previous existence of USTs and HWMUs.
19 Additionally, since Area 6 FPA and MDC Area falls within the FPA, it is considered to be an impacted
20 area, and was therefore comprised of Group 1 CUs to allow for more concentrated sampling and ensure
21 excavation activities had no effect on the soil.

22
23 2.2.1 Area 6 FPA and MDC Area Certification Unit Design

24 Area 6 FPA and MDC Area consists of 28 CUs, 24 of which are Group 1 CUs that cover all of Area 6
25 FPA and MDC Area. CU 31 encompasses the footprint of the previously removed main drainage line. It
26 extends from the northern end to the southern end of Area 6 FPA and MDC Area. This CU overlies the
27 existing CUs in this area. The remaining four CUs are either USTs or HWMUs as shown in Figure 2-1.

28
29 Due to the presence of three HWMUs (11, 36, and 48) in Area 6 FPA and MDC Area, this certification
30 includes the demonstration of soil FRL attainment and HWMU closure. Per Section 2.2.5 of the SEP:

- 31
32
 - 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.
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1 Due to the presence of UST 6 in Area 6 FPA and MDC Area, the certification effort must include
2 demonstration of soil FRL attainment and UST closure. Per Section 2.2.6 of the SEP:

- 3
- 4 • Each UST footprint will form a distinct CU
- 5 • At least eight samples will be collected from the excavated base and sidewalls for each UST
- 6 • Samples will be analyzed for the COCs identified for each particular UST in Table 2-2 of the SEP.
- 7

8 Methyl ethyl ketone (2-butanone), which is a COC for UST 6, does not have a FRL. However, eight
9 samples were collected for methyl ethyl ketone analysis and the Residential Generic Cleanup Number
10 (23.5 mg/kg) was used in place of a FRL. This number is listed on the Closure Plan Review Guidance for
11 Resource Conservation and Recovery Act (RCRA) Facilities (OEPA 2004), written by the Ohio
12 Environmental Protection Agency (OEPA) Division of Hazardous Waste Management (DHWM). The
13 Residential Generic Cleanup Number (GCN) was used for the statistical analysis described in the SEP if
14 any residual methyl ethyl ketone was detected in the samples collected for this analyte.

15

16 2.2.2 Sample Selection Process

17 For the 24 Group 1 CUs, the selection of certification sampling locations was conducted according to
18 Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample
19 locations were then generated by randomly selecting an easting and northing coordinate within the
20 boundaries of each sub-CU, then testing those locations against the minimum distance criteria for the CU.
21 If the minimum distance criteria were not met, an alternative random location was selected for that
22 sub-CU, and all the locations were re-tested. This process continued, until all 16 random locations met the
23 minimum distance criteria. CU 31 was originally designed with 16 sample locations, four of which were
24 archives; however, as discussed in Section 3.2 (V/FCN 20810-PSP-0010-02), the archive samples were
25 collected because the sampling locations at the southern end of the CU (locations MDC-C31-11 through
26 MDC-C31-16) were underwater. The sub-CUs and planned certification sampling locations are shown on
27 Figures 2-2 through 2-11B.

28

29 Four of the 16 sample locations (one location from each quadrant of the CU) were designated with a “V,”
30 with the exception of CU 31, indicating archive sample locations. One sample location in the CU was
31 designated with a “D,” indicating a field duplicate sample collection location. Samples were collected for
32 analysis from the 0 to 6-inch interval at 12 of the 16 locations in each CU. The four samples designated as
33 “archive” were not collected in any CU with the exception of CU 31. As discussed in V/FCN
34 20810-PSP-0010-02, archive sample locations were collected in the CU because the southern end of the
35 CU is continuously underwater because of poor weather conditions.

36

37 The selection of sampling locations for the three HWMUs and one UST CUs was also conducted
38 according to Section 3.4.2 of the SEP however, there were only eight sample locations and no archive

1 sample locations were designated. Samples were collected for analysis from the 0 to 6-inch interval at all
2 locations.

3
4 Prior to commencement of certification sampling field activities, all certification sample locations were
5 surveyed and field verified to make sure no surface obstacles would prevent collection at the planned location.
6 It was not necessary to move any planned certification sample locations.

8 2.2.3 Certification Sampling

9 Samples were collected for analysis from 0 to 6 inches at 12 of the 16 locations in each Group 1 CU (with
10 the exception of CU 31, which had 10 samples collected) and all sampling locations within the HWMU
11 and UST CUs. The four samples designated as “archive” were not collected because they were not needed
12 for additional analysis.

14 2.2.4 Statistical Analysis

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

26
27 In the event that a CU passes the *a posteriori* test but fails certification, the following two scenarios will be
28 evaluated: 1) localized contamination, and 2) widespread contamination. Details on the evaluation and
29 responses to these possible outcomes are provided in Section 3.4.5 of the SEP.

**TABLE 2-1
 AREA 3/AREA 4/AREA 6 ASCOC LIST**

ASCOC	FRL/(BTV) ^a
Radionuclides	
Total Uranium ^b	20 mg/kg
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
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	
1,1-dichloroethene	0.16 mg/kg
1,2-dichloroethane	0.015 mg/kg
1,1,1-trichloroethane	4.3 mg/kg
Acetone	43,000 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)
Bromodichloromethane	4.0 mg/kg
Carbon tetrachloride	2.1 mg/kg
Dibenzo(a,h)anthracene	2.0 mg/kg /(0.088 mg/kg)
Dieldrin	0.015 mg/kg
Ethylbenzene	5,100 mg/kg
Fluoride	78,000 mg/kg
Heptachlorodibenzo-p-dioxins	0.00108 mg/kg
Methyl Chloride	37 mg/kg /(85 mg/kg)
Methyl Ethyl Ketone (2-butanone) ^c	23.5 mg/kg ^c
Methyl Isobutyl Ketone (4-Methyl-2-pentanone)	2500 mg/kg
Octachlorodibenzo-p-dioxin	0.0088 mg/kg
Tetrachloroethene	3.6 mg/kg
Toluene	100,000 mg/kg
Trichloroethene	25 mg/kg
Xylene	920,000 mg/kg

TABLE 2-1
AREA 3/AREA 4/AREA 6 ASCOC LIST
(continued)

ASCOC	FRL/(BTV) ^a
Metals	
Antimony	96 mg/kg /(10 mg/kg)
Arsenic	12.0 mg/kg
Barium	68,000 mg/kg
Beryllium	1.5 mg/kg
Cadmium	82 mg/kg /(5.0 mg/kg)
Chromium	300 mg/kg /(0.05 mg/kg)
Lead	400 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)
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)
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 Benchmark toxicity value (BTV) applies to Ecological COCs.

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

^c 2-butanone does not have an associated soil FRL. 23.5 mg/kg is listed on Table 1 of the June 2004 Closure Plan Review Guidance for RCRA Facilities, written by the OEPA DHWM.

pCi/g - picoCuries per gram

1
2
3
4
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11

**TABLE 2-2
 ASCOC LIST FOR AREA 6 FPA AND MDC 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	No	Only one above-FRL concentration was detected within Area 6 FPA and MDC Area. This single exceedance was located within the excavation footprint in the 0 to 0.5-foot interval and will therefore not be retained as a secondary COC.	None
Cesium-137	Yes	One above-FRL concentration was detected within Area 6 FPA and MDC Area. The exceedance was located near the KC-2 Warehouse and was within the excavation footprint in the 0 to 0.5-foot (surface) interval. Therefore it will not be retained as a secondary COC in that area. Based on comment response.	31
Plutonium-238	No	Not detected at concentrations above the FRL.	None
Strontium-90	No	Not detected at concentrations above the FRL.	None
Technetium-99	Yes	Above-FRL and above-WAC concentrations were detected within Area 6 FPA and MDC Area. Based on comment response.	11-18, 23, 27, 28, 29, 31
Organic			
1,1-dichloroethene	Yes	UST 6 specific COC. Based on comment response.	27, 31
1,2-dichloroethane	Yes	UST 6 specific COC. Based on comment response.	27, 31
1,1,1-trichloroethane	Yes	HWMU 36 and UST 6 specific COC. Only one above-FRL concentration detected within Area 6 FPA and MDC Area. This single exceedance was located within the excavation footprint in the 0 to 0.5-foot interval and will therefore not be retained as a secondary COC. Based on comment response.	27, 28, 31
Acetone	Yes	UST 6 specific COC. Based on comment response.	27, 31
Aroclor-1254	Yes	Above-FRL concentrations within Area 6 FPA and MDC Area. Based on comment response.	2-5, 13-16, 22, 27, 29, 31
Aroclor-1260	Yes	Above-FRL concentrations within Area 6 FPA and MDC Area. Based on comment response.	5, 16, 31
Benzene	Yes	UST 6 specific COC. Based on comment response.	27, 31
Benzo(a)anthracene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Benzo(b)fluoranthene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31

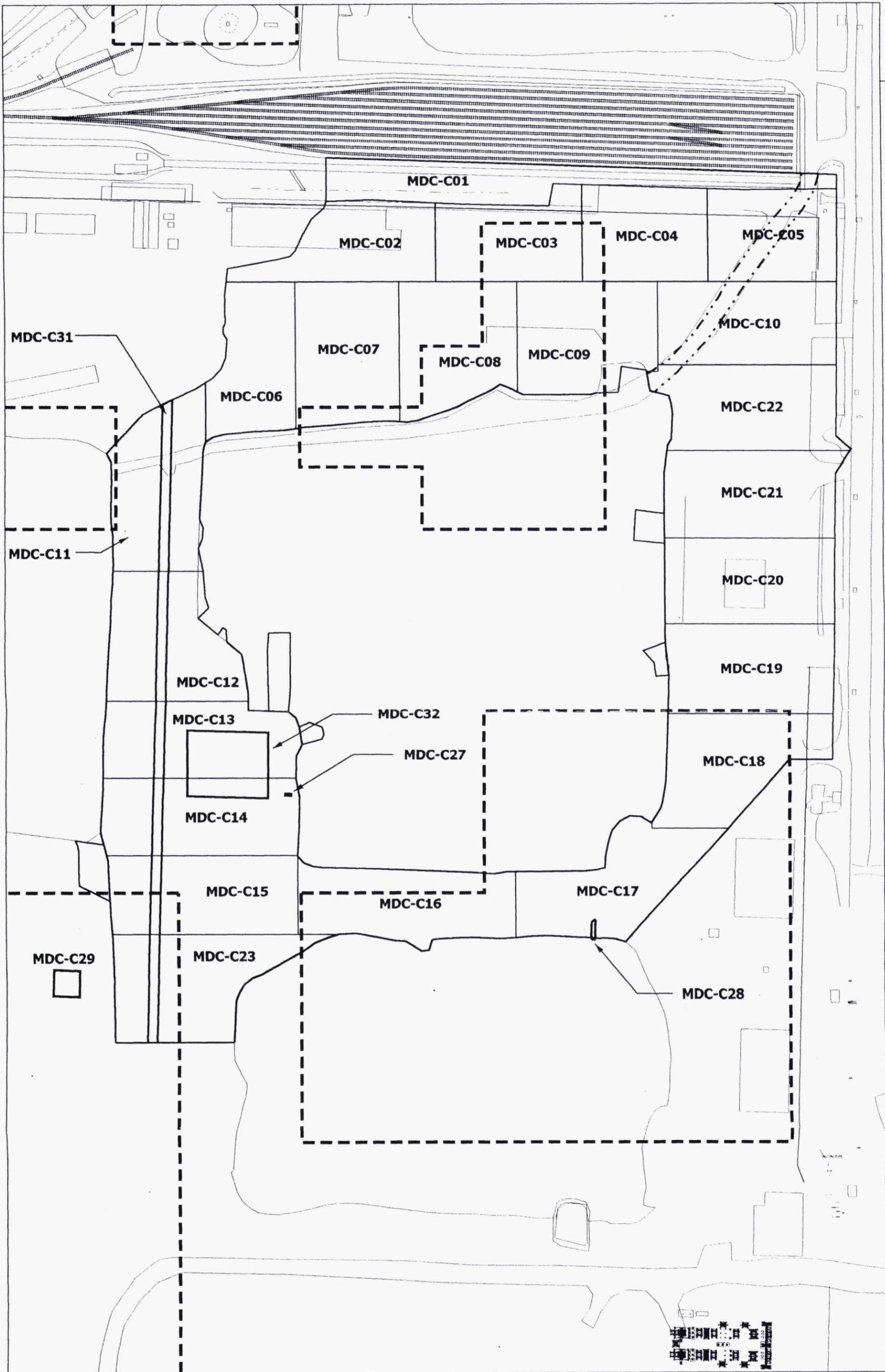
TABLE 2-2
ASCOC LIST FOR AREA 6 FPA AND MDC AREA
(continued)

ASCOC	Retained as ASCOC?	Justification	CU(s)
Organic (continued)			
Benzo(a)pyrene	Yes	Above-FRL concentrations within Area 6 FPA and MDC Area. UST 6 specific COC. Ecological ASCOC. Based on comment response.	2, 3, 13, 14, 16, 27, 31
Benzo(g,h,i)perylene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Benzo(k)fluoranthene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Bromodichloromethane	No	Not detected at concentrations above the FRL.	None
Carbon tetrachloride	Yes	UST 6 specific COC. Based on comment response.	27, 31
Chrysene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Dibenzo(a,h)anthracene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Dieldrin	Yes	Not detected at concentrations above the FRL. Based on comment response.	31
Ethylbenzene	Yes	UST 6 specific COC. Based on comment response.	27, 31
Fluoranthene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Fluoride	No	Not detected at concentrations above the FRL.	None
Heptachlorodibenzo-p-dioxins	No	Not detected at concentrations above the FRL.	None
Indeno(1,2,3-cd)pyrene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Methyl Chloride	Yes	UST 6 specific COC. Based on comment response.	27, 31
2-butanone	Yes	UST 6 specific COC.	27
4-Methyl-2-pentanone (MIK)	Yes	Based on comment response.	31
Octachlorodibenzo-p-dioxin	No	Not detected at concentrations above the FRL.	None
Phenanthrene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Pyrene	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	13, 14, 27, 31
Tetrachloroethene	Yes	UST 6 specific COC. Based on comment response.	27, 31
Toluene	Yes	UST 6 specific COC. Based on comment response.	27, 31
Trichloroethene	Yes	UST 6 specific COC. Based on comment response.	27, 31
Xylenes	Yes	UST 6 specific COC. Based on comment response.	27, 31
Metals			
Arsenic	Yes	UST 6 specific COC. Five above-FRL concentrations detected within Area 6 FPA and MDC Area. Based on comment response.	2, 5, 7, 22, 27, 31
Barium	Yes	HWMU 48 specific COC. Based on comment response.	29, 31

TABLE 2-2
ASCOC LIST FOR AREA 6 FPA AND MDC AREA
(continued)

ASCOC	Retained as ASCOC?	Justification	CU(s)
Metals (continued)			
Beryllium	Yes	Above-FRL concentrations within Area 6 FPA and MDC Area. Based on comment response.	7, 16, 18, 29, 31
Cadmium	Yes	UST 6 specific COC. Ecological ASCOC. Based on comment response.	6, 7, 11-15, 17, 18, 27, 28, 31
Chromium	Yes	HWMU 48 and UST 6 specific COC. Based on comment response.	27, 29, 31
Lead	Yes	HWMUs 17, 36, 48, and UST 6 specific COC. Above-FRL concentrations within Area 6 FPA and MDC Area. Based on comment response.	22, 27, 28, 29, 30, 31
Mercury	Yes	HWMU 48 and UST 6 specific COC. Based on comment response.	27, 29, 31
Selenium	Yes	UST 6 specific COC. Based on comment response.	27, 31
Ecological			
Antimony	Yes	Ecological ASCOC. Based on comment response.	11-15, 27, 31
Molybdenum	Yes	Ecological ASCOC. Based on comment response.	2, 6, 7, 11-15, 27, 31
Silver	Yes	Ecological ASCOC. Based on comment response.	6-8, 11-15, 27, 31

1



LEGEND:

- RESTORATION ROAD
- HIGH LEACHATE ZONE

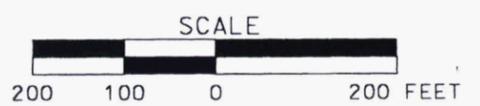
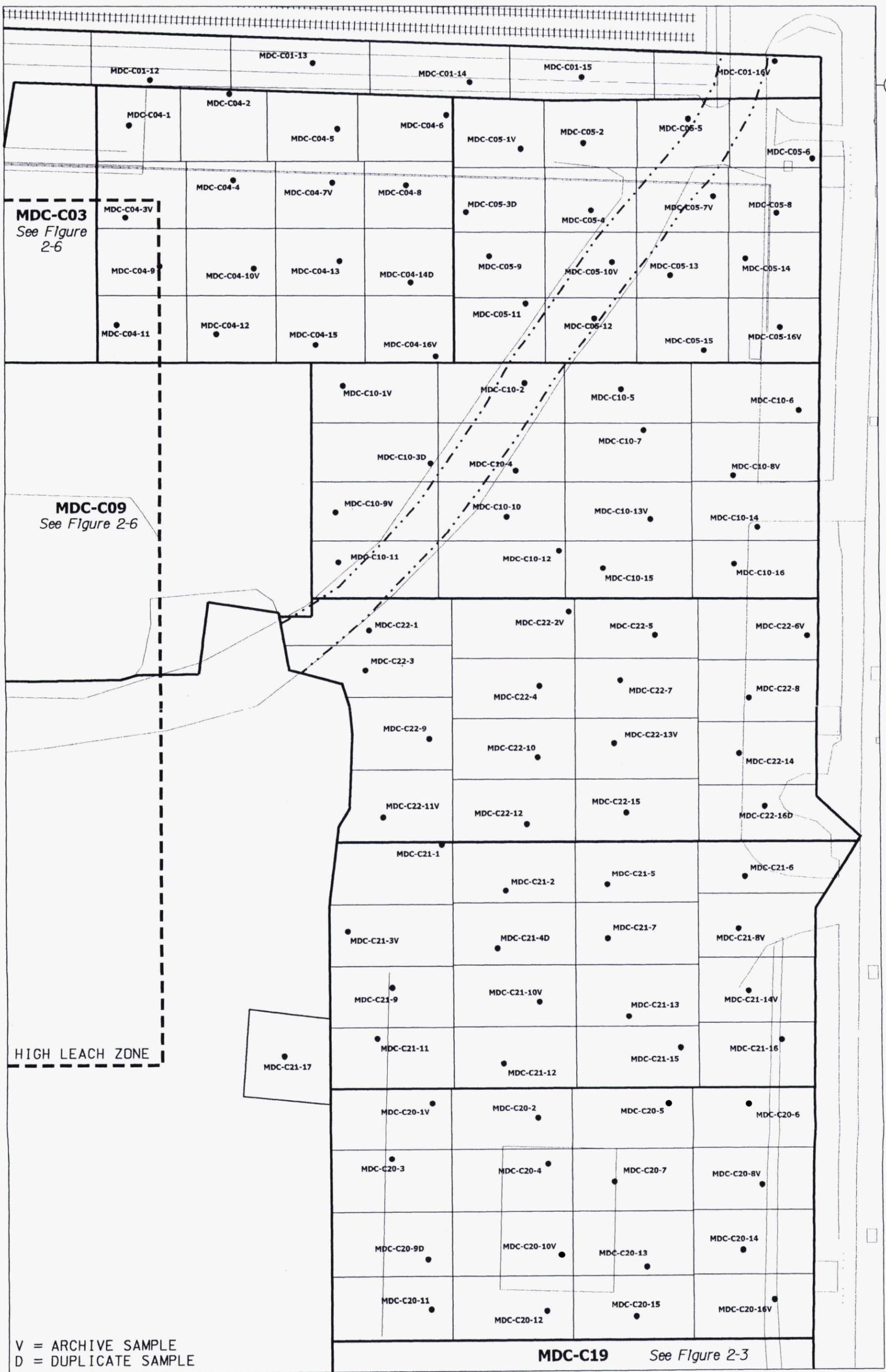


FIGURE 2-1. AREA 6 FPA AND MDC AREA CERTIFICATION AREA BOUNDARIES



V = ARCHIVE SAMPLE
 D = DUPLICATE SAMPLE

LEGEND:

- - - - RESTORATION ROAD
- SAMPLE LOCATION

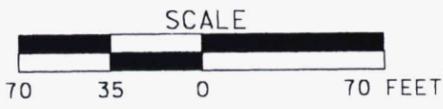


FIGURE 2-2. CERTIFICATION SAMPLING LOCATIONS FOR CU04, CU05, CU10, CU20, CU21, AND CU22

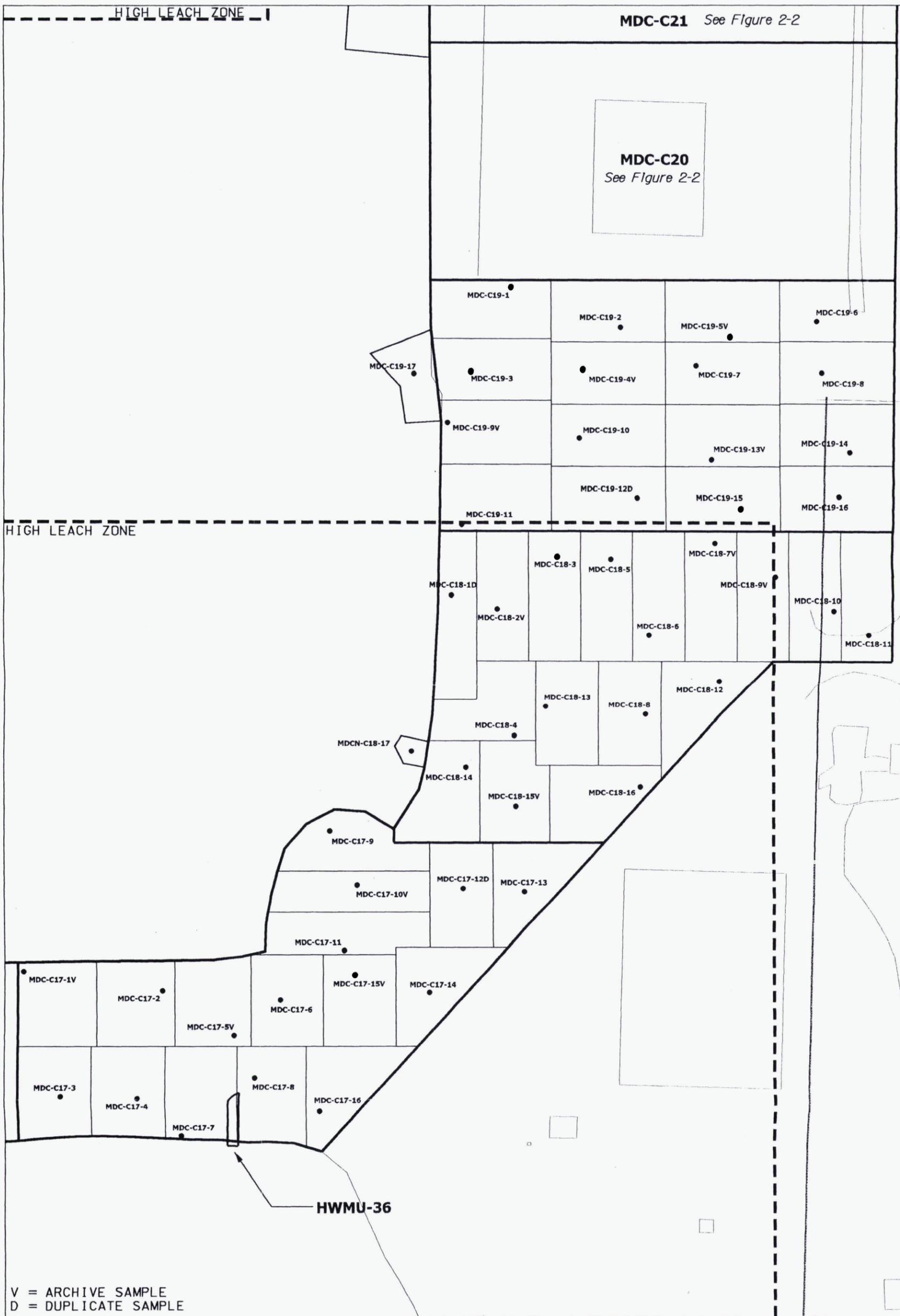


FIGURE 2-3. CERTIFICATION SAMPLING LOCATIONS FOR CU17, CU18, AND CU19

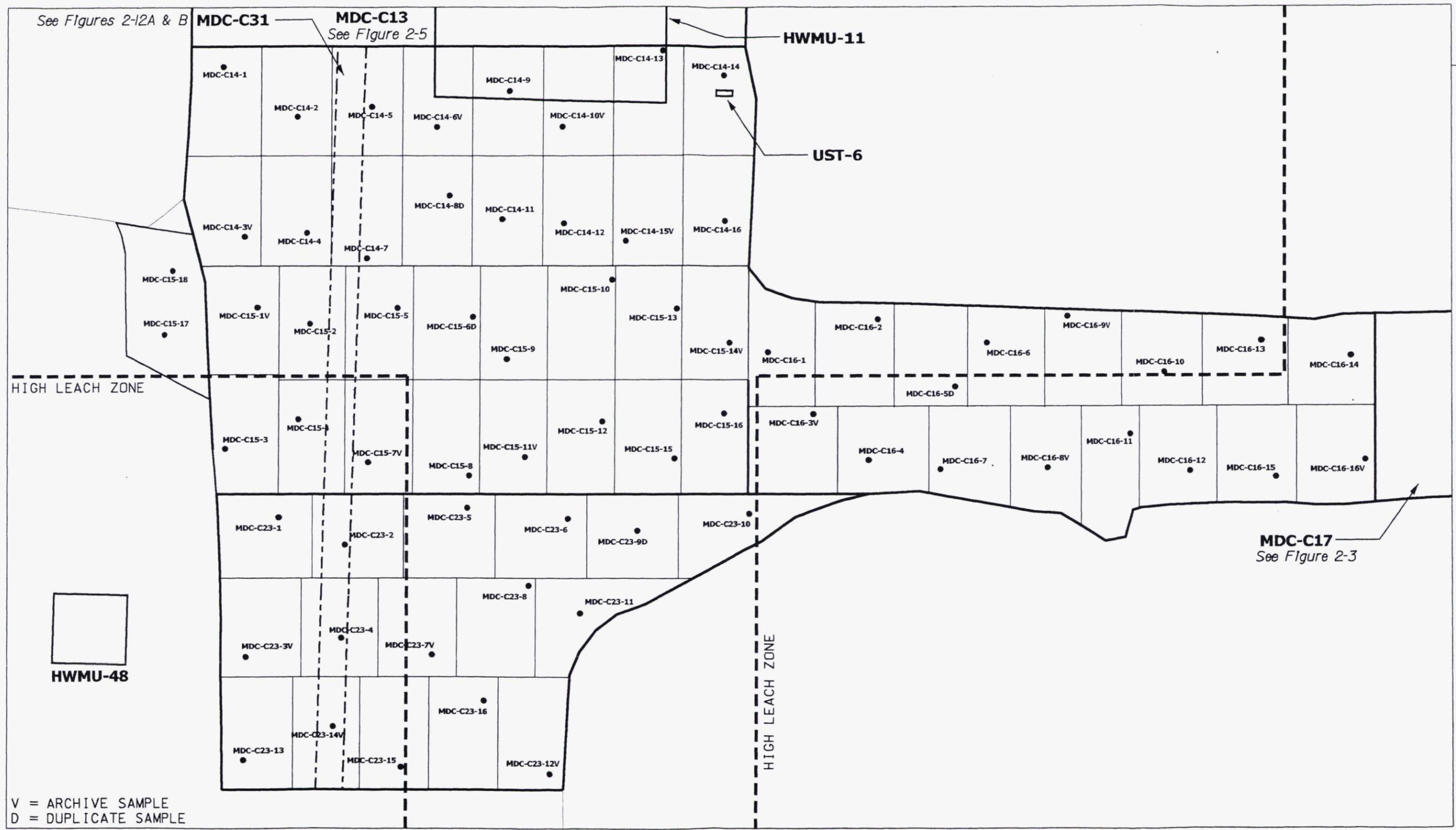
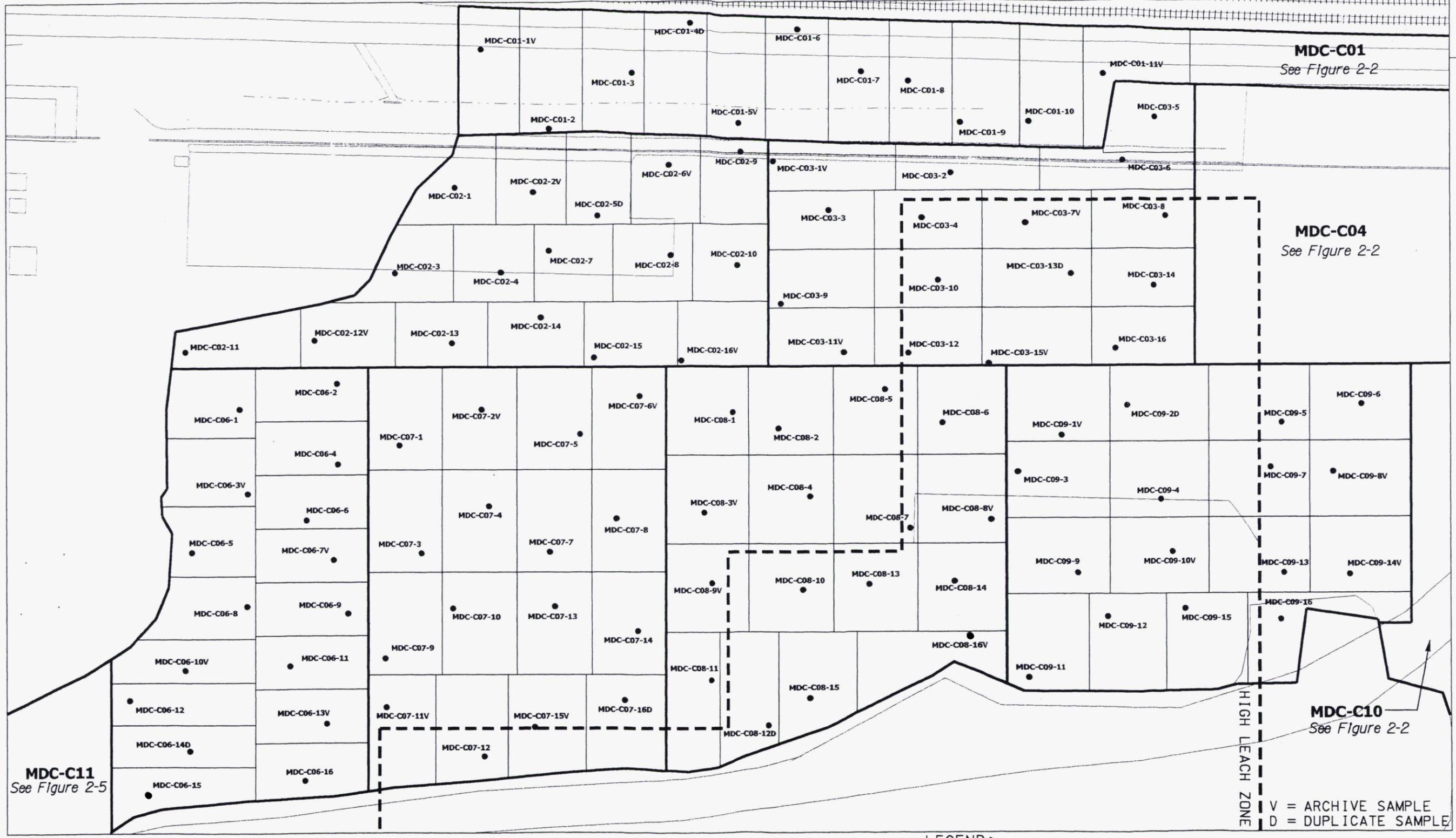


FIGURE 2-4. CERTIFICATION SAMPLING LOCATIONS FOR CU14, CU15, CU16, AND CU23



V = ARCHIVE SAMPLE
 D = DUPLICATE SAMPLE

LEGEND:

• SAMPLE LOCATION

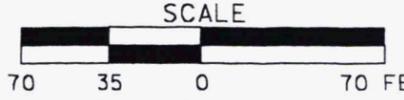


FIGURE 2-6. CERTIFICATION SAMPLING LOCATIONS FOR CU01, CU02, CU03, AND CU06 THROUGH CU09

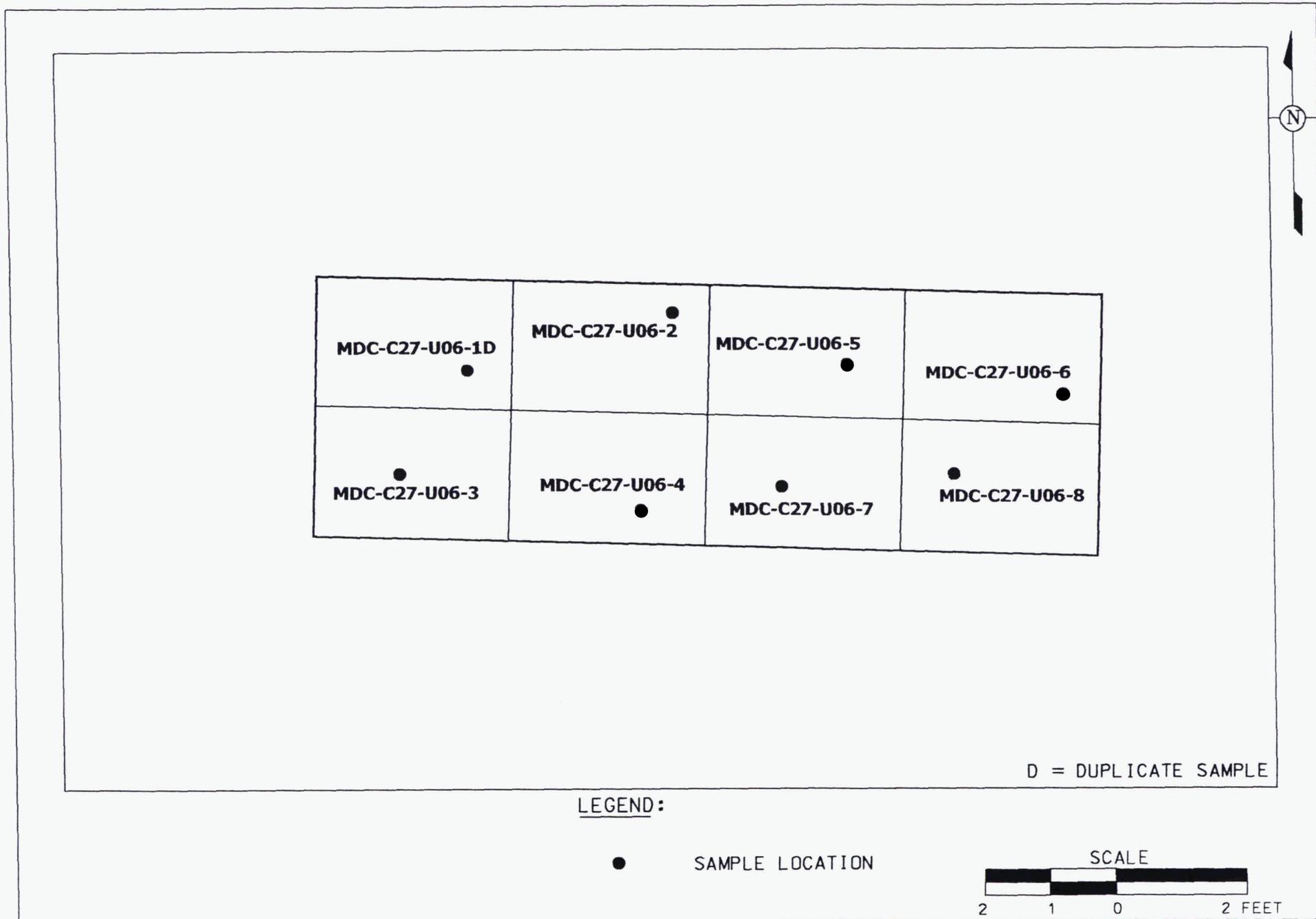
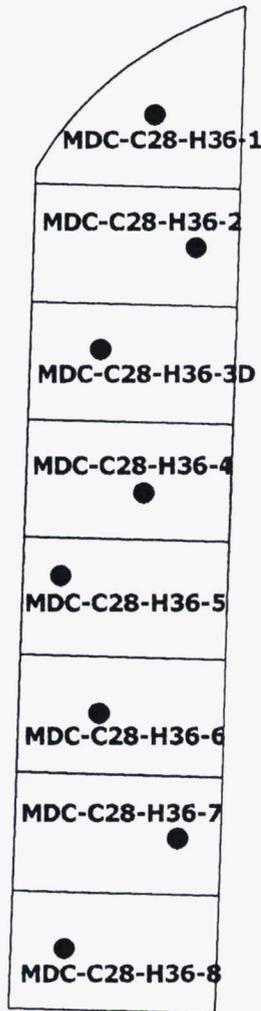


FIGURE 2-7. CERTIFICATION SAMPLING LOCATIONS FOR CU27 (UST6)



D = DUPLICATE SAMPLE

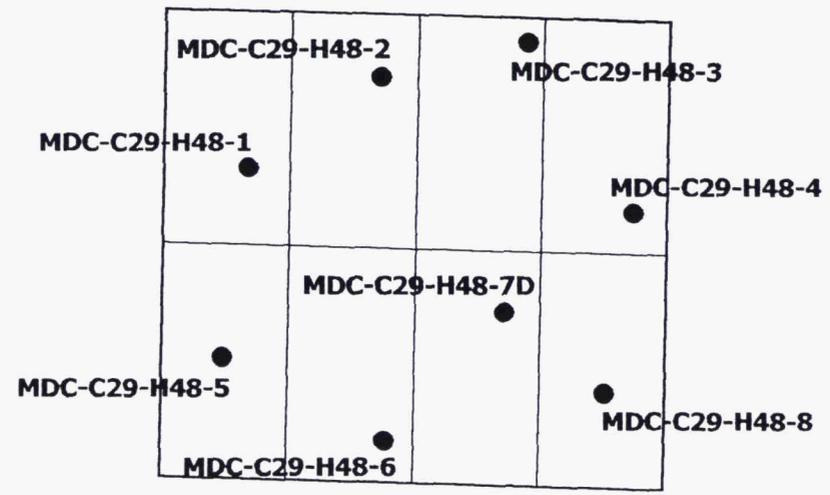
LEGEND:

● SAMPLE LOCATION



7.5 3.75 0 7.5 FEET

FIGURE 2-8. CERTIFICATION SAMPLING LOCATIONS FOR CU28 (HWMU36)



D = DUPLICATE SAMPLE

LEGEND:

● SAMPLE LOCATION

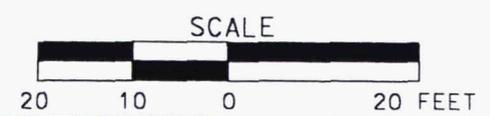
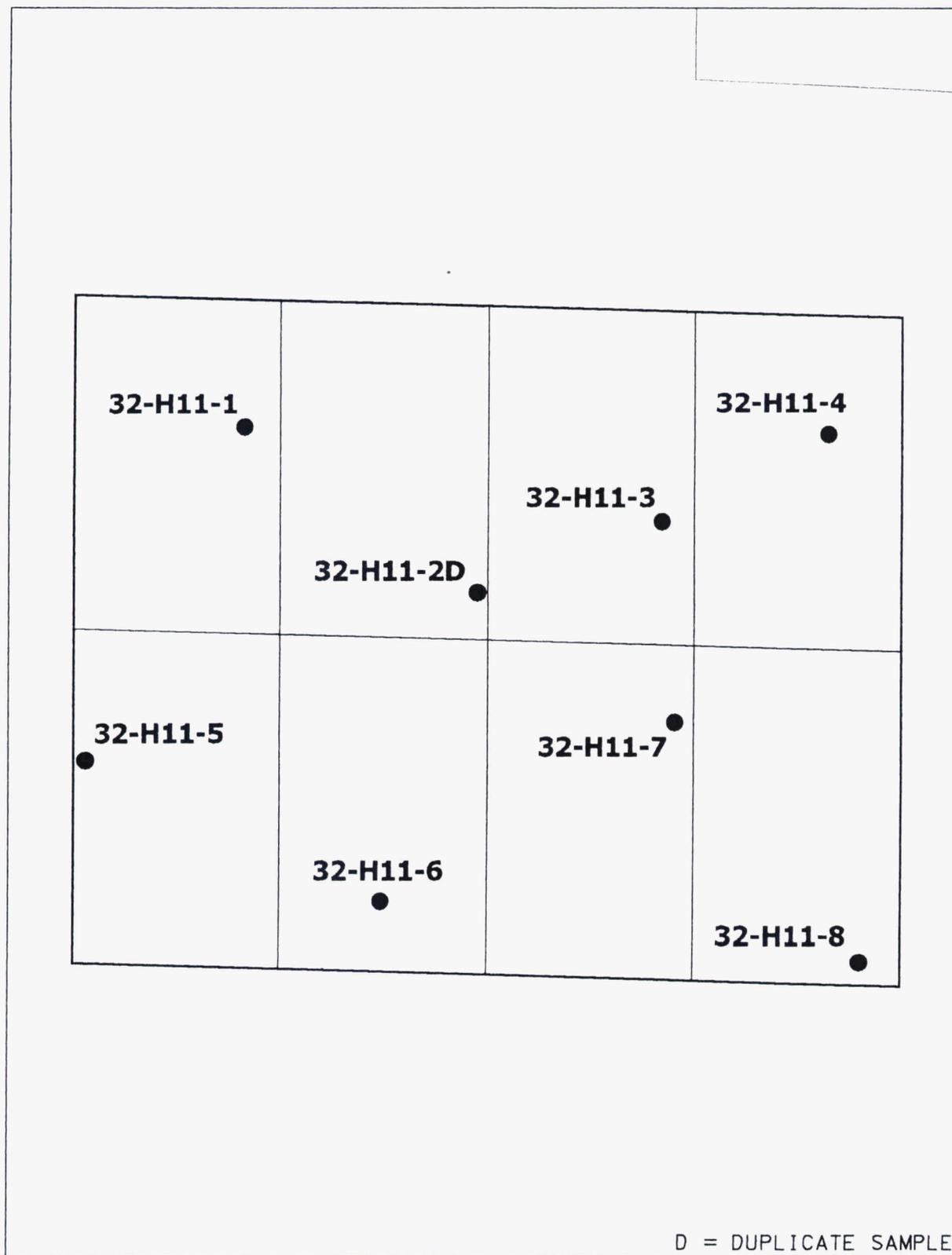


FIGURE 2-9. CERTIFICATION SAMPLING LOCATIONS FOR CU29 (HWMU48)

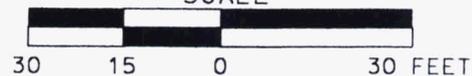


LEGEND:



SAMPLE LOCATION

SCALE



DRAFT

FIGURE 2-10. CU-32 (HWMU-11 - TANK FARM SUMP) CERTIFICATION SAMPLES

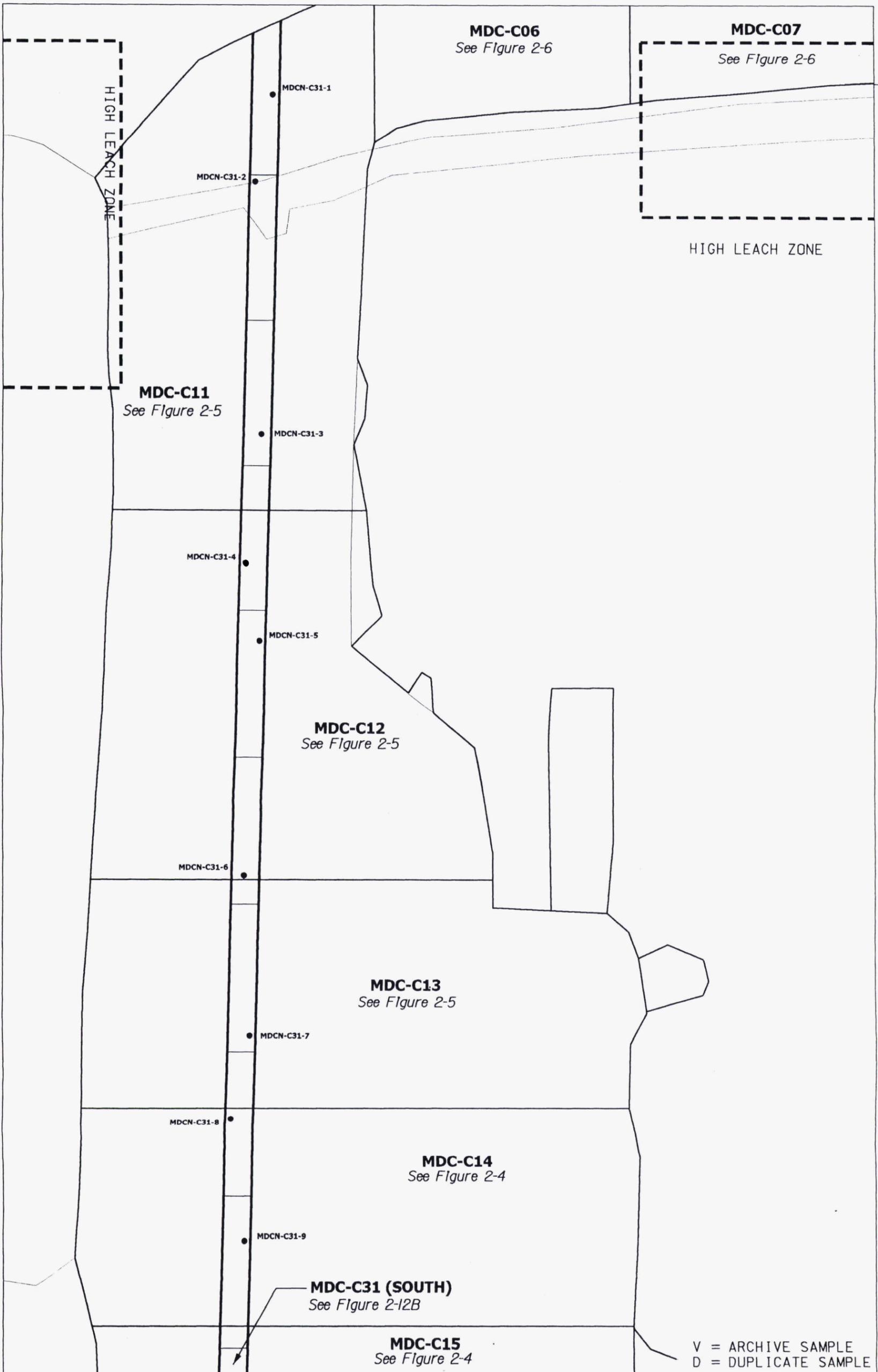


FIGURE 2-11A. CERTIFICATION SAMPLING LOCATIONS FOR THE NORTHERN HALF OF CU31

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 6 FPA and MDC Area. 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 6 FPA and MDC Area 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.

3.1 AREA PREPARATION AND PRECERTIFICATION

All historical data for Area 6 FPA and MDC Area are presented in the Implementation Plan for Area 3A/4A (DOE 2001), Implementation Plan for Area 3B/4B/5 (DOE 2004a), and the Implementation Plan for Area 6 Former Production Area (DOE 2005a). This includes data collected during the RI/FS and during three separate predesign investigations; PSP for Delineating Known Exceedances of the On-Site Disposal Facility WAC in Areas 3B/4B/5 (DOE 2002b), PSP for Area 3 Predesign Investigation of Potentially Characteristic Areas (DOE 1998b), PSP for Predesign of Area 6 Subarea 1 (Supplement to 20300-PSP-0011) (DOE 2005b), and PSP for Predesign of Area 6 Subarea 2 (Supplement to 20300-PSP-0011) (DOE 2004b). Data were also collected during the remediation/excavation activities for excavation control and following the remediation/excavation activities for precertification per the PSP for Area 3A/4A Excavation Characterization and Precertification (DOE 2002c), PSP for Excavation Control of Areas 3B, 4B, and 5 (Supplement to 20300-PSP-0011) (DOE 2004c), and PSP for Excavation Control of Area 6 - Former Production Area (Supplement to 20300-PSP-0011) (DOE 2005c).

The following is a brief discussion of the remediation/excavation activities of above-WAC, HWMU, and UST areas in Area 6 FPA and MDC Area. The excavation activities within this area were completed to not only capture the contamination plume but were extended to capture any subsurface utilities that existed below the design grade.

There was one designed above-WAC area that fell in Area 6 FPA. During remediation/excavation activities in Area 6 FPA, additional above-WAC (i.e., visible product) material was discovered in the

1 northwest section of the area. This material was excavated until all of the visible product material was
2 removed. All above-WAC material was removed during the remediation/excavation activities in Area 6
3 FPA and MDC Area. Once all of the above-WAC material was removed from these areas, the excavation
4 proceeded to remove the remaining above-FRL material.

5
6 One UST was listed in Section 2.1.5 of the Implementation Plan for Area 3A/4A as being within the
7 original Area 3A boundaries; however, because the certification boundary for Area 3A was reduced,
8 UST 6 is now within the boundaries of Area 6 FPA and MDC Area.

9
10 One HWMU was listed in Section 2.1.4 of the Implementation Plan for Area 3A/4A as being within the
11 original Area 4A boundary; however, because the certification boundary for Area 4A was reduced,
12 HWMU 36 is now within the boundary of MDC Area. HWMU 48 was added to the list of HWMUs to be
13 closed by the Soils Project as Part of the Joint RCRA/Comprehensive Environmental Response,
14 Compensation and Liability Act (CERCLA) Process as discussed in Letter DOE-0005-05 entitled Final
15 Remediation Level Development and Resource Conservation and Recovery Act Hazardous Waste
16 Management Unit Closure (DOE 2004d).

17
18 Following the excavation activities in Area 6 FPA and MDC Area, precertification activities were
19 conducted according to the guidelines established in Section 3.3.3 of the SEP to evaluate residual
20 radiological contamination patterns as specified in the PSP for Excavation Control of Areas 3B, 4B, 5.
21 Prior to conducting a precertification real-time scan, Area 6 FPA and MDC Area was scanned with a
22 magnetometer to determine if residual debris remained following excavation activities. Minor occurrences
23 of metallic objects were located and were either excavated or hand picked from the area.

24
25 All areas in Area 6 FPA and MDC Area passed the requirements of precertification, and it was determined
26 that certification of the soil in Area 6 FPA and MDC Area could be completed.

27 28 3.2 CHANGES TO SCOPE OF WORK

29 The scope of work for Area 6 FPA and MDC Area Certification Sampling required seven changes, which
30 were documented with seven V/FCNs (see Appendix B) and discussed in the following paragraphs.

31
32 Variance 20810-PSP-0008-01 documents that the collection of two grab soil samples for total uranium
33 [Target Analyte List (TAL) Z] to delineate the hotspot sampling location in CU 28 (sub-CU
34 MDC-C28-H36-7).

35
36 Variance 20810-PSP-0008-2 documents the collection of the archive samples in CU 31 due to the fact that
37 the southern end of the CU is continuously underwater because of poor weather conditions.

- 1 Variance 20810-PSP-0008-3 documents the collection of a grab soil sample for total uranium (TAL Z)
2 from two times the FRL excavated area in CU 28 (sub-CU MDC-C28-H36-7).
3
- 4 Variance 20810-PSP-0008-4 documents the correction of CU 15's sample IDs listed in Appendix C of the
5 CDL and Certification PSP for Area 4B - Part One (DOE 2005d).
6
- 7 Variance 20810-PSP-0008-5 documents the collection of three grab compost samples for TAL A from the
8 Area 6 FPA/MDC (Area 6C) where the compost from the OSDF was spread.
9
- 10 Variance 20810-PSP-0008-6 documents the choice of analytical methods to analyze the samples collected
11 under V/FCN 20810-PSP-0010-03.
12
- 13 Variance 20810-PSP-0008-7 documents the collection of eight grab soil samples for pH (TAL A1) from
14 CU 32 (HWMU 11).

1 **4.0 ANALYTICAL METHODOLOGIES, DATA VALIDATION PROCESSES, AND DATA REDUCTION**

2
3 **4.1 ANALYTICAL METHODOLOGIES**

4 All samples collected were sent off-site for analysis. The laboratories complied with Sitewide CERCLA
5 Quality Assurance Project Plan (SCQ) requirements (DOE 2003). The SCQ is the source for analytical
6 methodologies (Appendix G), data verification and validation, and analytical quality assurance/quality
7 control requirements.

8
9 Laboratory analysis of certification samples was conducted using approved analytical methods, as
10 discussed in Appendix H of the SEP. The minimum detection level (MDL) was set at 10 percent of the
11 FRL and analyses were conducted to Analytical Support Level (ASL) D or E, where the MDL of
12 10 percent of the FRL is above the SCQ ASL detection level, but the analyses meet all other SCQ ASL D
13 criteria. ASL D data packages were provided for all of the analytical data. All data were validated. Once
14 data were validated as required, results were entered into the FCP SED. Final certification results are
15 provided in Appendix A, and a summary of the analytical methods follows:

16
17 **4.1.1 Chemical Methods**

18 Metals

19 Samples submitted for arsenic, cadmium, and lead analysis were analyzed by inductively coupled plasma-
20 mass spectrometry (ICP-MS).

21
22 Samples submitted for antimony, barium, beryllium, chromium, lead, molybdenum, selenium, and silver
23 were analyzed by inductively coupled plasma-atomic emission spectroscopy (ICP-AES).

24
25 Samples submitted for mercury analysis were analyzed by cold vapor atomic absorption.

26
27 Polychlorinated Biphenyl (PCBs)

28 Samples submitted for PCB analyses were analyzed by gas chromatography.

29
30 Semi-Volatile Organic Compounds (SVOCs)

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

32
33 Volatile Organic Compounds (VOCs)

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

1 4.1.2 Radiochemical Methods

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

7
8 Total Uranium

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

11
12
$$\text{Total uranium (mg/kg)} = (2.998544) \times \text{uranium-238 gamma spectrometry result (pCi/g)}$$

13
14 The validation qualifier assigned to the total uranium value was the same as the uranium-238 qualifier.

15
16 Radium-226

17 Samples were analyzed by gamma spectrometry, and radium-226 was quantified by measuring gamma rays
18 emitted by members of its decay chain. This method does not require chemical separation, but the samples
19 must be allowed a 20-day progeny in-growth period before counting. The off-site laboratory used the same
20 gamma ray emission lines and error weighted average methodology to calculate all of the Area 6 FPA and
21 MDC Area certification results.

22
23 Radium-228

24 Following gamma spectrometry analysis, radium-228 was also quantified by measuring gamma rays
25 emitted by members of its decay chain. The off-site laboratory used the same gamma ray emission lines
26 and error weighted average methodology to calculate all Area 6 FPA and MDC Area certification results.

27
28 Isotopic Thorium

29 Isotopic thorium (thorium-228 and thorium-232) was also quantified by measuring gamma rays emitted by
30 members of its decay chain by gamma spectrometry. The off-site laboratory used the same gamma ray
31 emission lines and error weighted average methodology to calculate all Area 6 FPA and MDC Area
32 certification results.

33
34 Cesium-137

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

1 Technetium-99

2 Technetium-99 was quantified by using a liquid scintillation counter.
3

4 4.2 DATA VERIFICATION AND VALIDATION

5 This section discusses the data verification and validation (V&V) process used to examine the quality of
6 field and laboratory results. Data were qualified to indicate the level of data usability, or level of confidence
7 in the reported analytical results following Section 11.2 and Appendix D of the SCQ.
8

9 Specific parameters associated with the data were evaluated during V&V to determine whether or not the
10 data quality objectives were met. Five principal quality assurance parameters (i.e., precision, accuracy,
11 completeness, comparability, and representativeness) were addressed during V&V. Field sampling and
12 handling, laboratory analysis and reporting, and non-conformances and discrepancies in the data were
13 examined to ensure compliance with appropriate and applicable procedures.
14

15 The V&V process evaluated the following parameters:

- 17 • Specific field forms for sample collection and handling
- 18 • Chain of Custody forms
- 19 • Completeness of laboratory data deliverable.
20

21 The data validation process examined the analytical data to determine the validation qualifier of the results.
22 General areas examined that apply to all the chemical data include the following:
23

- 24 • Holding Times
- 25 • Instrument calibrations
- 26 • Calculation of results
- 27 • Matrix spike/matrix spike duplicate recoveries
- 28 • Laboratory/field duplicate precision
- 29 • Field/Laboratory Blank contamination
- 30 • Dry weight correction for solid samples
- 31 • Correct detection limits reported
- 32 • Laboratory control sample recoveries and compliance with established limits.
33

34 Parameters unique to the evaluation of radiochemical analyses include:

- 36 • Calibration data for specific energies
- 37 • Background checks
- 38 • Relative Error ratios
- 39 • Detector efficiencies
- 40 • Background count correction.
41

1 For this project, all the radiological data were reviewed and validated for all criteria noted above. Per
2 project requirements, a minimum of 10 percent of the certification data were validated to Level D. This
3 validation included the same review process as for Level B, but included a systematic review of the raw data
4 and recalculations.

5
6 Following V&V, qualifier codes were applied to specific data points, reflecting the level of confidence
7 assigned to the particular datum. These codes included:

- 8
9 - No qualification; the positive result or detection limit is confident as reported
10
11 J Positive result is estimated or imprecise; data point is usable for decision-making purposes.
12 Positive results less than the contract required reporting limits are also qualified in this manner
13
14 R Positive result or detection limit is considered unreliable; data point should not be used for
15 decision-making purposes
16
17 U Undetected result at the stated limit of detection
18
19 UJ Undetected result; detection limit is considered estimated or imprecise; the data point is usable
20 for decision-making purposes
21
22 N Positive result is tentatively identified - that is, there is some question regarding the actual
23 identification and quantification of the result. Compound reported is best professional
24 judgement of the interpretation of the supporting data, such as mass spectra. Caution must be
25 exercised with the use of these data
26
27 NJ The analysis indicates the presence of an analyte that has been "tentatively identified" and the
28 associated numerical value represents its approximate concentration. This qualifier indicates the
29 presumptive presence of the analyte, but the result can only be considered estimated. This
30 qualifier is not used in typical inorganic analyses, but could be used to qualify organic or
31 radiochemistry data due to spectral interpretation problems.
32
33 NV Not Validated. The results for this sample were not validated
34
35 Z This result, or detection limit in this analysis is not the best one to use; another analysis (e.g., the
36 dilution or re-analysis) contains a more confident and usable result.
37

38 4.3 DATA REDUCTION

39 Each sample used to support the Area 6 FPA and MDC Area certification decision was entered in the SED
40 with the following information:

41 Field Information

- 42 • Sample Identification Number - A unique number assigned to each discrete sample point
 - 43 • Coordinate Information - Northing and Easting locations.
- 44
45

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

- 3
- 4 1. All of the data for each CU were queried from SED. All of the data were used even if the CU had
5 more than the minimum required data points.
- 6
- 7 2. The data from the validation fields were used for statistical calculations.
- 8
- 9 3. Data with a qualifier of R or Z was not used in the statistical calculations.
- 10
- 11 4. The higher of the two duplicate results was used in the statistical calculations.
- 12
- 13 5. One half on the non-detect (U or UJ) values were used in the statistical calculations.
- 14

15 Laboratory Information

16 For each sample result the following information is entered:

- 17
- 18 ● Laboratory Result - The reported analytical value from the laboratory
- 19
- 20 ● Laboratory Qualifier - The qualifier reported from the lab. For radiological parameters non-detect
21 values are assigned a U qualifier
- 22
- 23 ● Total Propagated Uncertainty (TPU) - The TPU is an estimate of the overall uncertainty associated
24 with a measured or calculated result that has been derived from an evaluation of all factors that can
25 influence a result, including both systematic and random sources of uncertainty. For both *in situ*
26 and laboratory-based radioactivity measurements, factors such as the random nature of the
27 radioactive decay process (i.e., counting uncertainty), the mass or volume of the “sample” being
28 analyzed, the variation in radiation detection efficiency with the energy of the emitted radiation
29 and the density and chemical composition of the sample, uncertainty in nuclear decay parameters
30 used to convert counts to activity, and attenuation of the radiation must be considered to properly
31 assess the overall uncertainty of the measured result.
- 32
- 33 ● Units - The units in which the Laboratory Result is reported.
- 34

35 Validation Information

- 36
- 37 ● Validation Result - The result based on the validation process. During the validation process,
38 sample results may be adjusted. If the laboratory result is less than the associated minimum
39 detectable concentration, the validation result becomes the minimum detectable concentration
40 value.
- 41
- 42 ● Validation TPU - The TPU based on the validation process (applicable to radiological parameters
43 only). The data Validation Section evaluates the reported TPU as described in the SCQ in
44 Section 11.2 and Appendix D to assess the impact on the data quality and will qualify the data as
45 estimated if the uncertainty is excessive.
- 46

- 1 • Validation Qualifier - The qualifier assigned as a result of the data validation process.
- 2
- 3 • Validation Units - The units in which the Validation Result is reported.

1 MDC-C08

2 CU MDC-C08 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
3 are presented in Appendix A.

4
5 MDC-C09

6 CU MDC-C09 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
7 are presented in Appendix A.

8
9 MDC-C10

10 CU MDC-C10 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
11 are presented in Appendix A.

12
13 MDC-C11

14 CU MDC-C11 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
15 are presented in Appendix A.

16
17 MDC-C12

18 CU MDC-C12 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
19 are presented in Appendix A.

20
21 MDC-C13

22 CU MDC-C13 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
23 are presented in Appendix A.

24
25 MDC-C14

26 CU MDC-C14 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
27 are presented in Appendix A.

28
29 MDC-C15

30 CU MDC-C15 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
31 are presented in Appendix A.

32
33 MDC-C16

34 CU MDC-C16 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
35 are presented in Appendix A.

36

1 MDC-C17

2 CU MDC-C17 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
3 are presented in Appendix A.

4
5 MDC-C18

6 CU MDC-C18 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
7 are presented in Appendix A.

8
9 MDC-C19

10 CU MDC-C19 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
11 are presented in Appendix A.

12
13 MDC-C20

14 CU MDC-C20 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
15 are presented in Appendix A.

16
17 MDC-C21

18 CU MDC-C21 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
19 are presented in Appendix A.

20
21 MDC-C22

22 CU MDC-C22 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
23 are presented in Appendix A.

24
25 MDC-C23

26 CU MDC-C23 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
27 are presented in Appendix A.

28
29 MDC-C27-U06

30 CU MDC-C27-U06 passed all of the certification criteria as discussed in Section 2.2.4. Final certification
31 data are presented in Appendix A.

32
33 MDC-C28-H36

34 There was one result for total uranium (56.3 mg/kg) that was greater than two times the FRL (20 mg/kg)
35 in MDC-C28-H36. Two existing certification sampling locations were used to bound this hotspot.
36 Additionally, V/FCN 20810-PSP-0010-01 was written to collect two additional samples for total uranium

1 approximately 5 feet from the original sample location. These four locations were used to delineate the
2 hotspot.

3
4 After the hotspot was delineated, the hotspot was excavated and a replacement sample was collected. The
5 replacement sample result was below the FRL; therefore, no further action was required.

6
7 MDC-C28-H36 passed all of the certification criteria as discussed in Section 2.2.4. Final certification data
8 are presented in Appendix A.

9
10 MDC-C29-H48

11 CU MDC-C29-H48 passed all of the certification criteria as discussed in Section 2.2.4. Final certification
12 data are presented in Appendix A.

13
14 MDC-C31

15 CU MDC-C31 was originally designed with 16 sample locations, four of which were archives; however, as
16 discussed in Section 3.2 (V/FCN 20810-PSP-0010-02), the archive samples were collected because the
17 sampling locations at the southern end of the CU (locations MDC-C31-11 through MDC-C31-16) were
18 underwater. Therefore, only 10 of the original 16 samples were collected, analyzed, and statistically
19 evaluated. CU MDC-C31 passed all of the certification criteria as discussed in Section 2.2.4. Final
20 certification data are presented in Appendix A.

21
22 MDC-C32-H11

23 CU MDC-C32-H11 passed all of the certification criteria as discussed in Section 2.2.4. Final certification
24 data are presented in Appendix A.

25
26 HWMU CLOSURES (HWMUs 11, 17, 36, and 48)

27 As discussed in Section 4.1.2 of the CDL, there are three HWMUs (17, 36, and 48) in Area 6 FPA and
28 MDC Area identified for closure. However, as discussed in V/FCN 20810-PSP-0010-07, a fourth HWMU
29 (11, Tank Farm Sump) was originally omitted from this certification effort due to the fact that the single
30 constituent of concern for this HWMU is pH. Additionally, there is no GCN for pH in the Closure Plan
31 Review Guidance for RCRA Facilities by the OEPA DHWM that is used to satisfy HWMU closure.
32 V/FCN 20810-PSP-0010-07 adds HWMU 11 into the certification effort so that this HWMU can be
33 closed. As previously discussed, HWMU 17 is inaccessible due to poor field conditions in the southern
34 end of Area 6 FPA and MDC Area. Therefore, this HWMU will be closed in a future certification report.

35
36 Based on SEP protocol described in Section 2.2.5, a unique CU should be established with a minimum of
37 eight sample locations collected and analyzed for the HWMU COCs. CUs that required eight sample

1 locations for certification were designed around each of the four HWMUs. CU 32 defines HWMU 11,
2 CU 28 defines HWMU 36, and CU 29 defines HWMU 48.

3
4 As an added measure, the calculations described in the Closure Plan Review Guidance for RCRA
5 Facilities by the OEPA DHWM, were evaluated for applicability. Specifically, Appendix N, Section
6 entitled "Using GCNs to Determine that No Further Action is Necessary at a Unit" was used.

7
8 In short, this OEPA guidance describes the application of GCNs to a specific RCRA site. According to
9 this guidance, elimination of a COC from assessment can be done based on two conditions: 1) if the
10 frequency of detection is less than 5 percent, and 2) the 95 percent UCL or maximum concentration of the
11 compound is below the site-specific background for the compound (for inorganic metals only).

12
13 For HWMU 36, lead and 1,1,1-trichloroethane, which were the only two HWMU COCs, were eliminated
14 from the assessment list because 1,1,1-trichloroethane had no detected results (i.e., frequency of detection
15 is less than 5 percent) and lead does not have a GCN.

16
17 For HWMU 48, barium, lead, chromium, and mercury are the COCs.

- 18
- 19 • Barium was eliminated from the assessment list because the maximum concentration of
20 57.7 mg/kg is less than the site-specific maximum background concentration of 261 mg/kg.
 - 21
 - 22 • Lead was eliminated because it does not have a GCN.
 - 23
 - 24 • Chromium was eliminated from the assessment list because the maximum concentration of
25 10.3 mg/kg is less than the site-specific maximum background concentration of 27.3 mg/kg.
 - 26
 - 27 • Mercury was eliminated from the assessment list because there were no detected results
28 (i.e., frequency of detection is less than 5 percent).
- 29

30 For HWMU 11, pH is the only constituent listed. Eight sample locations were collected and analyzed for
31 soil pH. All results for these samples were between 7.62 standard units (SU) and 8.20 SU, which are well
32 below the RCRA limit of 12.5 SU. As stated earlier, there is no guidance presented in the OEPA
33 DHWM's Closure Plan Review Guidance for RCRA Facilities related to pH. However, with the results of
34 the soil pH analyses being well below the RCRA limit, it is concluded that there is no residual impact from
35 this HWMU.

36
37 Taking both approaches (SEP protocols and OEPA DHWM guidance) into consideration, HWMUs 11, 36,
38 and 48 pass all relevant criteria and therefore are considered closed.

39

1 5.2 AREA 6 FPA AND MDC AREA CERTIFICATION CONCLUSIONS

2 Based on the certification analytical results, precertification data, and statistical analysis, DOE has
3 determined that the remedial objectives in the OU5 ROD have been achieved for Area 6 FPA and MDC
4 Area including all HWMUs and the UST described in this report. No further remedial actions are
5 required. This portion of the FCP will be released for restoration and final land use upon
6 U.S. Environmental Protection Agency (EPA) and OEPA concurrence.

6.0 PROTECTION OF CERTIFIED AREAS

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

The procedure is summarized as follows:

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

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

- 1 U.S. Department of Energy, 2003, "Sitewide CERCLA Quality Assurance Project Plan (SCQ),"
2 Revision 3, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
3
- 4 U.S. Department of Energy, 2004a, "Implementation Plan for Areas 3B/4B/5," Final, Fernald Closure
5 Project, DOE, Fernald Area Office, Cincinnati, Ohio.
6
- 7 U.S. Department of Energy, 2004b, "Project Specific Plan for Predesign of Area 6 Subarea 2 (Supplement
8 to 20300-PSP-0011)," Revision 0, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
9
- 10 U.S. Department of Energy, 2004c, "Project Specific Plan for the Excavation Control of Areas 3B, 4B,
11 and 5 (Supplement to 20300-PSP-0011)," Revision 1, Fernald Closure Project, DOE, Fernald Area Office,
12 Cincinnati, Ohio.
13
- 14 U.S. Department of Energy, 2004d, "Final Remediation Level Development and Resource Conservation
15 and Recovery Act Hazardous Waste Management Unit Closure," Letter DOE-2005-05 dated
16 October 1, 2004, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
17
- 18 U.S. Department of Energy, 2005a, "Implementation Plan for Area 6 - Former Production Area," Final,
19 Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
20
- 21 U.S. Department of Energy, 2005b, "Project Specific Plan for Predesign of Area 6 Subarea 1 (Supplement
22 to 20300-PSP-0011)," Revision 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
23
- 24 U.S. Department of Energy, 2005c, "Project Specific Plan for Excavation Control of Area 6 - Former
25 Production Area (Supplement to 20300-PSP-0011)," Revision 0, Fernald Closure Project, DOE, Fernald
26 Area Office, Cincinnati, Ohio.
27
- 28 U.S. Department of Energy, 2005d, "Certification Design Letter and Certification Project Specific Plan for
29 Area 4B - Part One," Revision 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.
30
- 31 U.S. Department of Energy, 2006, "Certification Design Letter and Certification Project Specific Plan for
32 Area 6 Former Production Area and Main Drainage Corridor Area," Revision 0, Fernald Closure Project,
33 DOE, Fernald Area Office, Cincinnati, Ohio.

APPENDIX A

**CERTIFICATION SAMPLES, ANALYTICAL RESULTS
AND FINAL STATISTICS TABLES**

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APPENDIX A STATISTICAL ABBREVIATIONS AND SYMBOLS

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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:

28
29
30
31
32

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.)

33
34
35
36
37

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

38
39
40
41
42

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

43
44
45
46
47

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.

48
49
50
51
52

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.

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54
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57

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).

58
59
60
61
62

Number of NDs - number of non-detects.

63
64
65
66
67

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

Appendix A
Certification Unit MDC-C01

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C01-2	1.34 -	0.959 J	0.955 -	0.959 J	7.53 -
MDC-C01-3	1.55 -	1.08 J	1.14 -	1.08 J	14.0 -
MDC-C01-4	1.55 -	1.21 J	1.27 -	1.21 J	5.78 -
MDC-C01-4-D	1.42 -	1.37 J	1.38 -	1.37 J	3.61 U
MDC-C01-6	1.50 -	1.18 J	1.19 -	1.18 J	5.54 J
MDC-C01-7	1.65 -	1.43 J	1.49 -	1.43 J	8.72 -
MDC-C01-8	1.42 -	1.12 J	1.13 -	1.12 J	7.93 -
MDC-C01-9	1.30 -	1.25 J	1.28 -	1.25 J	7.95 -
MDC-C01-10	1.15 -	0.941 J	0.922 -	0.941 J	6.41 -
MDC-C01-12	0.889 -	0.637 J	0.653 -	0.637 J	2.44 U
MDC-C01-13	1.09 -	1.08 J	1.11 -	1.08 J	4.38 -
MDC-C01-14	0.707 -	0.538 J	0.531 -	0.538 J	2.11 J
MDC-C01-15	1.02 -	0.875 J	0.867 -	0.875 J	4.01 -
Limit	1.7	1.8	1.7	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.65	1.43	1.49	1.43	14
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	12	12	12	12	12
Nondetects	0	0	0	0	1
% Nondetects	0%	0%	0%	0%	8%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C02

SampleID	Primary COCs					Secondary COCs			
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Molybdenum	Aroclor-1254	Benzo(a)pyrene
MDC-C02-1	1.39 -	1.39 J	1.46 J	1.39 J	5.72 -	6.60 J	0.658 U	4.2 U	42.1 U
MDC-C02-3	1.40 -	1.20 J	1.21 J	1.20 J	5.98 -	5.39 J	0.505 U	4.2 U	42.2 U
MDC-C02-4	1.31 -	1.18 J	1.16 J	1.18 J	6.55 -	6.50 J	0.526 U	4.4 U	44.3 U
MDC-C02-5	1.34 -	1.25 J	1.31 J	1.25 J	7.64 -	6.43 J	0.459 U	4.1 U	40.7 U
MDC-C02-5-D	1.30 -	1.11 J	1.09 J	1.11 J	7.39 -	6.53 J	0.755 U	4.0 J	39.0 U
MDC-C02-7	1.07 -	1.02 J	1.00 J	1.02 J	8.51 -	6.82 J	0.706 U	4.4 J	41.7 U
MDC-C02-8	1.46 -	1.41 J	1.41 J	1.41 J	6.99 -	7.62 J	0.693 U	4.1 U	41.1 U
MDC-C02-9	1.36 -	1.26 J	1.24 J	1.26 J	6.29 -	9.45 J	0.686 U	4.4 U	44.0 U
MDC-C02-10	1.24 -	1.14 J	1.13 J	1.14 J	5.83 -	8.97 J	0.694 U	4.1 U	40.6 U
MDC-C02-11	1.21 -	1.05 J	1.04 J	1.05 J	9.99 -	7.67 J	0.876 U	4.0 U	39.9 U
MDC-C02-13	0.897 -	0.705 J	0.711 J	0.705 J	4.20 -	8.31 J	2.29 U	4.1 U	40.6 U
MDC-C02-14	1.47 -	1.43 J	1.47 J	1.43 J	3.69 -	5.15 J	0.398 U	4.1 U	41.2 U
MDC-C02-15	1.28 -	1.07 J	1.07 J	1.07 J	8.96 -	6.86 J	0.794 U	4.8 J	39.7 U
Limit	1.7	1.8	1.7	1.5	82	12	2900	130	2000
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%
Max. Result	1.47	1.43	1.47	1.43	9.99	9.45	2.29 U	4.8	44.3 U
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	0	12	9	12
% Nondetects	0%	0%	0%	0%	0%	0%	100%	75%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C03

SampleID	Primary COCs					Secondary COCs	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Aroclor-1254	Benzo(a)pyrene
MDC-C03-2	1.02 J	0.934 -	0.913 -	0.934 -	7.63 -	12.6 U	42.1 U
MDC-C03-3	1.21 J	1.01 -	0.995 -	1.01 -	9.33 -	12.3 U	40.9 U
MDC-C03-4	1.14 J	0.917 -	1.00 -	0.917 -	6.56 -	14.4 -	37.9 U
MDC-C03-5	0.843 J	0.713 -	0.692 -	0.713 -	11.0 -	12.6 U	42.0 U
MDC-C03-6	1.19 J	0.991 -	0.994 -	0.991 -	8.63 -	18.2 -	39.2 U
MDC-C03-8	0.966 J	0.791 -	0.806 -	0.791 -	3.29 J	11.6 U	38.8 U
MDC-C03-9	1.02 J	0.802 -	0.765 -	0.802 -	7.23 -	11.7 U	39.1 U
MDC-C03-10	0.768 J	0.634 -	0.652 -	0.634 -	4.27 -	11.5 U	38.2 U
MDC-C03-12	1.00 J	0.751 -	0.757 -	0.751 -	7.10 -	11.1 U	36.9 U
MDC-C03-13	1.12 J	0.876 -	0.887 -	0.876 -	7.67 -	19.7 -	37.1 U
MDC-C03-13-D	1.19 J	0.884 -	0.875 -	0.884 -	9.05 -	21.2 -	37.4 U
MDC-C03-14	1.10 J	0.884 -	0.881 -	0.884 -	6.17 -	11.6 J	38.4 U
MDC-C03-16	1.36 J	0.977 -	0.995 -	0.977 -	5.99 -	12.2 U	40.6 U
Limit	1.7	1.8	1.7	1.5	20	130	2000
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.36	1.01	1.00	1.01	11.0	21.2	42.1 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	0	0	0	0	0	8	12
% Nondetects	0%	0%	0%	0%	0%	67%	100%
Est. Mean*	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C04

SampleID	Primary COCs					Secondary COC
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Aroclor-1254
MDC-C04-1	1.28 J	0.957 J	0.956 J	0.957 J	8.98 J	3.90 U
MDC-C04-2	1.04 -	0.830 -	0.858 -	0.830 -	11.8 -	3.60 U
MDC-C04-4	0.887 -	0.778 -	0.772 -	0.778 -	2.36 UJ	3.60 U
MDC-C04-5	0.903 J	0.889 J	0.903 J	0.889 J	8.59 J	12.1 J
MDC-C04-6	0.826 J	0.673 J	0.661 J	0.673 J	4.14 J	3.60 U
MDC-C04-8	0.877 -	0.689 -	0.689 -	0.689 -	5.40 -	3.90 J
MDC-C04-9	1.02 -	0.757 -	0.814 -	0.757 -	2.88 UJ	6.40 J
MDC-C04-11	0.950 -	0.782 -	0.806 -	0.782 -	3.12 UJ	3.60 U
MDC-C04-12	0.917 -	0.637 -	0.656 -	0.637 -	4.78 J	7.90 J
MDC-C04-13	0.973 -	0.726 -	0.758 -	0.726 -	6.28 J	13.3 J
MDC-C04-14	1.14 -	0.784 -	0.880 -	0.784 -	8.31 -	11.8 J
MDC-C04-14-D	1.13 -	0.695 -	0.721 -	0.695 -	10.4 -	32.1 J
MDC-C04-15	1.00 -	0.665 -	0.633 -	0.665 -	8.84 -	16.2 J
Limit	1.7	1.8	1.7	1.5	20	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	1.28	0.957	0.956	0.957	11.8	0.454
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	3	5
% Nondetects	0%	0%	0%	0%	25%	42%
Est. Mean*	--	--	--	--	--	--
UCL	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C05

SampleID	Primary COCs					Secondary COCs		
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Aroclor-1254	Aroclor-1260
MDC-C05-2	0.855 J	0.688 J	0.686 J	0.688 J	9.44 J	4.51 -	12.1 J	5.5 J
MDC-C05-3	0.986 -	0.732 -	0.759 -	0.732 -	4.66 -	5.13 -	13.9 J	7.7 J
MDC-C05-3-D	1.04 -	0.797 -	0.800 -	0.797 -	4.35 J	5.97 -	3.7 U	3.7 U
MDC-C05-4	0.956 -	0.747 -	0.768 -	0.747 -	2.39 UJ	5.31 -	3.6 U	3.6 U
MDC-C05-5	1.01 J	0.793 J	0.843 J	0.793 J	4.98 J	8.01 -	3.7 U	3.7 U
MDC-C05-6	1.13 -	0.772 -	0.783 -	0.772 -	3.60 J	4.95 -	3.7 U	3.7 U
MDC-C05-8	1.03 -	0.85 -	0.877 -	0.850 -	4.72 J	5.64 -	3.9 U	3.9 U
MDC-C05-9	0.987 -	0.731 -	0.699 -	0.731 -	6.63 -	5.10 -	64.2 J	15.9 -
MDC-C05-11	1.52 -	1.03 -	1.04 -	1.03 -	24.7 -	9.35 -	18.8 J	6.1 J
MDC-C05-12	1.03 J	0.612 J	0.618 J	0.612 J	4.69 J	4.46 -	3.7 U	3.7 U
MDC-C05-13	0.753 -	0.640 -	0.657 -	0.640 -	2.34 UJ	5.19 -	10.1 J	3.6 U
MDC-C05-14	0.911 -	0.717 -	0.751 -	0.717 -	8.35 -	5.07 -	18.6 J	6.0 J
MDC-C05-15	0.904 -	0.702 -	0.726 -	0.702 -	6.71 -	4.58 -	3.7 U	3.7 U
Limit	1.7	1.8	1.7	1.5	82	12	130	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
Max. Result	1.52	1.03	1.04	1.03	24.7	9.35	64.2	15.9
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	0	0	2	0	6	7
% Nondetects	0%	0%	0%	0%	17%	0%	50%	58%
Est. Mean*	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C06

SampleID	Primary COCs					Secondary COCs		
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Cadmium	Molybdenum	Silver
MDC-C06-1	1.36 -	1.40 -	1.42 -	1.40 -	3.90 -	0.372 J	0.626 J	0.298 U
MDC-C06-2	1.25 -	1.08 -	1.08 -	1.08 -	9.04 -	0.285 J	0.997 J	0.293 U
MDC-C06-4	1.30 -	1.14 -	1.13 -	1.14 -	10.2 -	0.318 J	1.18 J	0.249 U
MDC-C06-5	1.84 -	1.37 -	1.36 -	1.37 -	7.60 -	0.454 J	1.33 J	0.299 U
MDC-C06-6	1.50 -	1.26 -	1.27 -	1.26 -	18.6 -	0.335 J	0.949 J	0.276 U
MDC-C06-8	0.895 -	0.807 -	0.786 -	0.807 -	9.36 -	0.299 J	1.57 J	0.264 U
MDC-C06-9	0.997 -	0.720 -	0.714 -	0.720 -	10.7 -	0.255 J	1.52 J	0.262 U
MDC-C06-11	0.886 -	0.712 -	0.701 -	0.712 -	7.59 -	0.290 J	1.56 J	0.215 U
MDC-C06-12	1.02 -	0.789 -	0.765 -	0.789 -	5.91 -	0.270 J	1.54 J	0.266 U
MDC-C06-14	0.986 -	0.809 -	0.802 -	0.809 -	10.1 -	0.305 J	1.66 J	0.222 U
MDC-C06-14-D	1.00 -	0.746 -	0.740 -	0.746 -	11.7 -	0.271 J	1.21 J	0.248 U
MDC-C06-15	0.974 -	1.71 -	1.78 -	1.71 -	8.70 -	0.250 J	1.68 J	0.226 U
MDC-C06-16	1.08 -	0.845 -	0.836 -	0.845 -	4.81 J	0.258 J	1.42 J	0.245 U
Limit	1.7	1.8	1.7	1.5	82	82	2900	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
Max. Result	1.84	1.71	1.78	1.71	18.6	0.454	1.68	0.299 U
Max. >= Limit	Yes	No	Yes	Yes	Yes	No	No	No
W-statistic Prob. #	31.1% (LN)	--	26.8% (LN)	26.1% (LN)	--	--	--	--
Test Procedure	Lognormal	--	Lognormal	Lognormal	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	0	0	12
% Nondetects	0%	0%	0%	0%	0%	0%	0%	100%
Est. Mean*	1.18	--	1.06	1.06	--	--	--	--
UCL	1.34	--	1.27	1.26	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--
Pass / Fail	pass	--	pass	pass	--	--	--	--
<i>a posteriori</i> Sample Size calculation	4 Pass	-- --	4 Pass	5 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.

Appendix A
Certification Unit MDC-C07

SampleID	Primary COCs					Secondary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Beryllium	Cadmium	Molybdenum	Silver
MDC-C07-1	1.4 -	1.27 J	1.3 J	1.27 J	7.44 -	8.49 -	1.08 J	0.397 J	0.853 J	0.59 U
MDC-C07-3	1.36 -	1.12 J	1.09 J	1.12 J	5.49 -	10.7 -	0.806 J	0.418 J	1.79 -	0.75 J
MDC-C07-4	1.26 -	1.1 J	1.09 J	1.1 J	6.57 -	8.28 -	1.01 J	0.406 J	0.7 J	0.674 J
MDC-C07-5	1.6 -	1.26 J	1.26 J	1.26 J	8.92 -	12.1 -	0.984 J	0.746 -	1.49 -	0.572 U
MDC-C07-7	1.08 -	0.914 J	0.928 J	0.914 J	8.78 -	4.87 -	0.543 J	0.217 J	0.918 J	0.265 U
MDC-C07-8	1.54 -	1.28 J	1.27 J	1.28 J	4.12 -	8.37 -	1.06 J	0.569 -	0.933 J	0.609 J
MDC-C07-9	1.02 -	0.785 J	0.763 J	0.785 J	9.57 -	4.21 -	0.45 J	0.363 J	2.11 -	0.276 J
MDC-C07-10	1.15 -	0.773 J	0.771 J	0.773 J	9.87 -	6.42 -	0.548 J	0.299 J	2.01 -	0.271 U
MDC-C07-12	1.06 -	0.85 J	0.833 J	0.85 J	14.4 -	7.3 -	0.567 J	0.32 J	1.7 -	0.282 U
MDC-C07-13	0.913 -	0.643 J	0.615 J	0.643 J	10.8 -	5.28 -	0.477 J	0.302 J	1.98 -	0.25 U
MDC-C07-14	1.23 -	0.953 J	0.956 J	0.953 J	5.99 -	6.7 -	0.701 J	0.277 J	1.06 -	0.227 U
MDC-C07-16	1.04 -	0.787 J	0.804 J	0.787 J	5.72 -	4.69 -	0.561 J	0.36 J	1.96 -	0.274 U
MDC-C07-16-D	1.15 -	1.09 J	1.1 J	1.09 J	5.88 -	6.81 -	0.739 J	0.329 J	1.6 -	0.238 U
Limit	1.7	1.8	1.7	1.5	82	12	1.5	82	2900	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.60	1.28	1.30	1.28	14.4	12.1	1.08	0.746	2.11	0.750
Max. >= Limit	No	No	No	No	No	Yes	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	93.8% (LN)	--	--	--	--
Test Procedure	--	--	--	--	--	Lognormal	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	0	0	0	0	8
% Nondetects	0%	0%	0%	0%	0%	0%	0%	0%	0%	67%
Est. Mean*	--	--	--	--	--	7.49	--	--	--	--
UCL	--	--	--	--	--	8.57	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	pass	--	--	--	--
<i>a posteriori</i> Sample Size calculation	--	--	--	--	--	3	--	--	--	--
	--	--	--	--	--	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.

Appendix A
Certification Unit MDC-C08

SampleID	Primary COCs					Secondary COC
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Silver
MDC-C08-1	1.25 J	1.02 -	1.01 J	1.02 -	8.47 -	0.0670 J
MDC-C08-2	1.28 J	1.19 -	1.20 J	1.19 -	11.5 -	0.0760 J
MDC-C08-4	0.860 J	0.748 -	0.756 J	0.748 -	5.95 -	0.0458 U
MDC-C08-5	0.872 J	0.786 -	0.801 J	0.786 -	6.13 -	0.0790 J
MDC-C08-6	0.854 J	0.633 -	0.638 J	0.633 -	4.04 -	0.0448 U
MDC-C08-7	0.689 J	0.505 -	0.513 J	0.505 -	3.44 -	0.0429 U
MDC-C08-10	0.961 J	0.744 -	0.752 J	0.744 -	4.57 -	0.0830 J
MDC-C08-11	0.913 J	0.782 -	0.811 J	0.782 -	4.96 -	0.0460 J
MDC-C08-12	0.880 J	0.780 -	0.785 J	0.780 -	4.18 -	0.0438 U
MDC-C08-12-D	1.11 J	0.792 -	0.809 J	0.792 -	4.83 -	0.0462 U
MDC-C08-13	1.03 J	0.825 -	0.836 J	0.825 -	5.34 -	0.0480 J
MDC-C08-14	0.882 J	0.644 -	0.660 J	0.644 -	4.26 -	0.0600 J
MDC-C08-15	0.830 J	0.723 -	0.727 J	0.723 -	3.19 -	0.0445 U
Limit	1.7	1.8	1.7	1.5	20	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	1.28	1.19	1.2	1.19	11.5	0.083
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	5
% Nondetects	0%	0%	0%	0%	0%	42%
Est. Mean*	--	--	--	--	--	--
UCL	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C09

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C09-2	0.746 -	0.522 -	0.516 -	0.522 -	2.72 -
MDC-C09-2-D	0.628 -	0.470 -	0.469 -	0.470 -	3.28 -
MDC-C09-3	0.737 -	0.665 -	0.658 -	0.665 -	5.12 -
MDC-C09-4	0.821 -	0.618 -	0.628 -	0.618 -	3.95 -
MDC-C09-5	0.681 -	0.540 -	0.550 -	0.540 -	2.91 -
MDC-C09-6	0.804 -	0.674 -	0.697 -	0.674 -	3.76 J
MDC-C09-7	0.808 -	0.682 -	0.692 -	0.682 -	3.00 J
MDC-C09-9	0.846 -	0.679 -	0.685 -	0.679 -	3.73 -
MDC-C09-11	1.00 -	0.950 -	0.953 -	0.950 -	4.30 J
MDC-C09-12	0.956 -	0.776 -	0.755 -	0.776 -	12.0 -
MDC-C09-13	0.857 -	0.626 -	0.641 -	0.626 -	5.92 -
MDC-C09-15	1.03 -	0.958 -	0.977 -	0.958 -	9.09 -
MDC-C09-16	0.755 -	0.681 -	0.684 -	0.681 -	4.54 -
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	1.03	0.958	0.977	0.958	12
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	12	12	12	12	12
Nondetects	0	0	0	0	0
% Nondetects	0%	0%	0%	0%	0%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C10

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C10-2	1.01 J	0.708 J	0.730 J	0.708 J	3.31 J
MDC-C10-3	1.13 J	0.809 J	0.814 J	0.809 J	7.54 J
MDC-C10-3-D	1.06 J	0.895 J	0.925 J	0.895 J	12.8 J
MDC-C10-4	0.934 J	0.803 J	0.789 J	0.803 J	2.83 UJ
MDC-C10-5	0.897 J	0.656 J	0.640 J	0.656 J	7.70 J
MDC-C10-6	0.850 J	0.768 J	0.787 J	0.768 J	5.09 J
MDC-C10-7	0.958 J	0.749 J	0.737 J	0.749 J	8.34 J
MDC-C10-10	1.13 J	0.859 J	0.832 J	0.859 J	6.64 J
MDC-C10-11	1.30 J	1.18 J	1.26 J	1.18 J	6.04 J
MDC-C10-12	0.945 J	0.732 J	0.736 J	0.732 J	4.16 J
MDC-C10-14	0.848 J	0.646 J	0.637 J	0.665 J	2.20 UJ
MDC-C10-15	0.912 J	0.697 J	0.703 J	0.697 J	2.41 UJ
MDC-C10-16	0.850 J	0.578 J	0.581 J	0.578 J	2.45 J
Limit	1.7	1.8	1.7	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.30	1.18	1.26	1.18	12.8
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	12	12	12	12	12
Nondetects	0	0	0	0	3
% Nondetects	0%	0%	0%	0%	25%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C11

SampleID	Primary COCs					Secondary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Cadmium	Molybdenum	Silver
MDC-C11-1	0.897 -	0.569 -	0.535 -	0.569 -	2.38 U	0.827 U	0.594 U	0.25 J	1.46 -	0.223 U
MDC-C11-2	0.716 -	0.581 -	0.560 -	0.581 -	2.06 U	0.804 U	0.602 U	0.258 J	1.67 -	0.226 U
MDC-C11-3	1.03 -	0.841 -	0.863 -	0.841 -	3.90 J	1.01 U	1.20 J	0.18 J	1.50 -	0.0476 U
MDC-C11-5	0.727 -	0.608 -	0.582 -	0.608 -	3.45 U	0.967 J	0.960 J	0.18 J	1.10 -	0.0640 J
MDC-C11-6	0.872 -	0.462 -	0.442 -	0.462 -	2.82 U	0.865 U	2.40 J	0.20 J	1.30 -	0.0451 U
MDC-C11-8	0.916 -	0.654 -	0.671 -	0.654 -	8.59 J	0.940 U	0.610 J	0.33 J	2.00 -	0.0510 J
MDC-C11-9	0.783 -	0.719 -	0.717 -	0.719 -	4.42 J	1.05 U	1.00 J	0.19 J	1.40 -	0.0437 U
MDC-C11-10	0.815 -	0.617 -	0.634 -	0.617 -	3.49 J	0.906 U	1.10 J	0.20 J	1.30 -	0.0460 J
MDC-C11-12	0.973 -	0.660 -	0.684 -	0.660 -	10.6 J	0.936 U	0.980 J	0.18 J	1.30 -	0.0437 U
MDC-C11-12-D	0.877 -	0.562 -	0.578 -	0.562 -	5.43 J	0.894 U	0.860 J	0.17 J	1.50 -	0.0460 J
MDC-C11-13	0.888 -	0.717 -	0.718 -	0.717 -	3.13 U	0.913 U	0.970 J	0.18 J	1.40 -	0.0440 U
MDC-C11-15	0.885 -	0.689 -	0.732 -	0.689 -	5.28 J	0.881 U	0.890 J	0.22 J	1.30 -	0.0470 J
MDC-C11-16	0.807 -	0.535 -	0.586 -	0.535 -	3.14 U	0.872 U	0.740 J	0.24 J	1.80 -	0.0426 U
Limit	1.7	1.8	1.7	1.5	82	30	96	82	2900	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.03	0.841	0.863	0.841	10.6	0.967	2.4	0.33	2.0	0.064
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	6	11	2	0	0	7
% Nondetects	0%	0%	0%	0%	50%	92%	17%	0%	0%	58%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C12

SampleID	Primary COCs					Secondary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Cadmium	Molybdenum	Silver
MDC-C12-1	0.866 -	0.724 -	0.811 -	0.724 -	5.95 -	0.872 U	0.443 U	0.18 J	1.3 U	0.0439 U
MDC-C12-3	0.784 -	0.492 -	0.514 -	0.492 -	3.30 J	0.812 U	0.79 U	0.15 J	1.3 U	0.0433 U
MDC-C12-4	0.866 -	0.735 -	0.752 -	0.735 -	3.29 U	0.869 U	1.1 U	0.15 J	1.2 U	0.0445 U
MDC-C12-5	1.06 -	0.763 -	0.777 -	0.763 -	4.33 J	0.821 U	1.1 U	0.14 J	0.94 U	0.0425 U
MDC-C12-6	0.957 -	0.668 -	0.672 -	0.668 -	3.21 U	0.814 U	0.49 U	0.14 J	1.3 U	0.0451 U
MDC-C12-7	0.990 -	0.676 -	0.688 -	0.676 -	6.23 J	0.825 U	1.0 U	0.16 J	1.7 U	0.0452 U
MDC-C12-9	1.10 -	0.728 -	0.764 -	0.728 -	3.18 U	0.802 U	0.78 U	0.19 J	1.5 U	0.0459 U
MDC-C12-10	1.02 -	0.694 -	0.689 -	0.694 -	3.86 J	0.782 U	0.87 U	0.15 J	1.9 J	0.0463 U
MDC-C12-12	0.837 -	0.638 -	0.663 -	0.638 -	3.10 U	0.776 U	0.66 U	0.12 J	1.2 U	0.0442 U
MDC-C12-14	0.970 -	0.759 -	0.771 -	0.759 -	5.99 J	0.81 U	0.92 U	0.16 J	1.5 U	0.0455 U
MDC-C12-15	0.909 -	0.675 -	0.666 -	0.675 -	3.58 U	0.769 U	0.86 U	0.15 J	1.5 U	0.0449 U
MDC-C12-16	0.982 -	0.711 -	0.730 -	0.711 -	3.45 U	0.79 U	0.76 U	0.16 J	2.1 J	0.044 J
MDC-C12-16-D	0.910 -	0.657 -	0.692 -	0.657 -	3.23 U	0.797 U	0.443 U	0.15 J	1.3 U	0.0432 U
Limit	1.7	1.8	1.7	1.5	82	30	96	82	2900	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	1.10	0.763	0.811	0.763	6.23	0.872 U	1.1 U	1.9	2.1	0.044
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	6	12	12	0	10	11
% Nondetects	0%	0%	0%	0%	50%	100%	100%	0%	83%	92%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C13

SampleID	Primary COCs					Secondary COCs							
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Cadmium	Molybdenum	Silver	Aroclor-1254	Benzo(a)anthracene	Benzo(a)pyrene
MDC-C13-1	0.939 -	0.574 J	0.558 J	0.574 J	2.96 U	0.842 U	0.427 U	0.17 J	1.7 J	0.0421 U	3.6 U	35.7 U	35.7 U
MDC-C13-2	0.920 -	0.708 J	0.727 J	0.708 J	4.19 J	0.784 U	0.432 U	0.14 J	1.4 J	0.0439 U	3.7 U	37.3 U	37.3 U
MDC-C13-3	0.826 -	0.679 J	0.696 J	0.679 J	4.83 J	0.82 U	0.446 U	0.14 J	1.4 J	0.0435 U	3.8 U	37.7 U	37.7 U
MDC-C13-5	0.962 -	0.668 J	0.688 J	0.668 J	3.63 U	0.815 U	0.44 U	0.14 J	1.2 J	0.044 U	3.7 U	36.8 U	36.8 U
MDC-C13-7	0.882 -	0.755 J	0.771 J	0.755 J	3.80 -	0.838 U	0.444 U	0.14 J	1.1 J	0.0438 U	3.8 U	37.5 U	129 -
MDC-C13-8	1.01 -	0.745 J	0.745 J	0.745 J	4.01 U	0.835 U	0.428 U	0.10 J	0.67 J	0.0442 U	3.7 U	37.1 U	37.1 U
MDC-C13-9	0.943 -	0.708 J	0.725 J	0.708 J	4.34 U	0.79 U	0.479 U	0.14 J	1.4 J	0.0483 U	4.0 U	40.2 U	138 -
MDC-C13-10	0.926 -	0.769 J	0.785 J	0.769 J	4.47 U	0.818 U	0.425 U	0.13 J	1.1 J	0.0445 U	3.7 U	37.2 U	128 -
MDC-C13-11	0.895 -	0.770 J	0.787 J	0.770 J	4.20 -	0.837 U	0.439 U	0.16 J	1.2 J	0.0438 U	3.8 U	38.1 U	38.1 U
MDC-C13-14	0.865 -	0.688 J	0.684 J	0.688 J	5.29 -	0.799 U	0.45 U	0.13 J	1.3 J	0.0438 U	3.8 U	38.3 U	144 -
MDC-C13-15	0.743 -	0.594 J	0.583 J	0.594 J	2.31 J	0.783 U	0.46 U	0.15 J	1.0 J	0.0451 U	3.8 U	38.2 U	38.2 U
MDC-C13-15-D	0.833 -	0.813 J	0.886 J	0.813 J	3.07 J	0.809 U	0.423 U	0.14 J	1.2 J	0.0411 U	6.3 J	35.6 U	35.6 U
MDC-C13-16	0.808 -	0.632 J	0.620 J	0.632 J	2.43 U	0.804 U	0.421 U	0.15 J	1.5 J	0.0435 U	9.1 J	36.4 U	122 -
MDC-C13-17	0.897 -	0.628 J	0.620 J	0.628 J	2.66 U	0.752 U	0.441 U	0.18 J	1.3 J	0.0433 U	3.8 U	37.5 U	37.5 U
MDC-C13-18	0.796 -	0.565 J	0.555 J	0.565 J	2.32 U	0.793 U	0.425 U	0.15 J	1.1 J	0.0429 U	3.7 U	37.0 U	37.0 U
MDC-C13-19	0.755 -	0.594 J	0.590 J	0.594 J	2.19 U	0.803 U	0.446 U	0.14 J	1.0 J	0.045 U	3.9 U	38.6 U	38.6 U
Limit	1.7	1.8	1.7	1.5	82	30	96	82	2900	29000	130	20000	2000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.01	0.813	0.886	0.813	5.29	0.842 U	0.479 U	0.18	1.7	0.0483 U	9.1	40.2 U	144
Max. >= Limit	No	No	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--	--	--
Sample Size	15	15	15	15	15	15	15	15	15	15	15	15	15
Nondetects	0	0	0	0	9	15	15	0	0	15	13	15	10
% Nondetects	0%	0%	0%	0%	60%	100%	100%	0%	0%	100%	87%	100%	67%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C13

SampleID	Secondary COCs								
	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
MDC-C13-1	35.7 U	35.7 U	35.7 U	35.7 U	35.7 U	35.7 U	35.7 U	35.7 U	35.7 U
MDC-C13-2	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U
MDC-C13-3	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U
MDC-C13-5	85.6 J	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U	36.8 U
MDC-C13-7	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U
MDC-C13-8	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U	37.1 U
MDC-C13-9	40.2 U	40.2 U	40.2 U	40.2 U	40.2 U	40.2 U	40.2 U	40.2 U	40.2 U
MDC-C13-10	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U	37.2 U
MDC-C13-11	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U
MDC-C13-14	38.3 U	117 -	38.3 U	51.3 J	38.3 U	52.5 J	137 -	38.3 U	52.0 J
MDC-C13-15	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U
MDC-C13-15-D	35.6 U	35.6 U	35.6 U	35.6 U	35.6 U	35.6 U	35.6 U	35.6 U	35.6 U
MDC-C13-16	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U	36.4 U
MDC-C13-17	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U
MDC-C13-18	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U
MDC-C13-19	38.6 U	38.6 U	38.6 U	38.6 U	38.6 U	38.6 U	38.6 U	38.6 U	38.6 U
Limit	20000	1000	200000	2000000	2000	10000	20000	5000	10000
Units	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	40.2 U	117	40.2 U	51.3	40.2 U	52.5	137	40.2 U	52.0
Max. >= Limit	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--
Sample Size	15	15	15	15	15	15	15	15	15
Nondetects	14	14	15	14	15	14	14	15	14
% Nondetects	93%	93%	100%	93%	100%	93%	93%	100%	93%
Est. Mean*	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C14

SampleID	Primary COCs					Secondary CC				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Cadmium	Molybdenum	Silver
MDC-C14-1	0.999 -	0.777 J	0.793 J	0.777 J	5.14 J	1.35 U	3.5 J	0.46 J	0.97 J	0.063 J
MDC-C14-2	0.710 -	0.644 J	0.670 J	0.644 J	4.72 J	1.41 U	5.0 J	0.40 J	1.1 -	0.053 J
MDC-C14-4	0.807 -	0.781 J	0.759 J	0.781 J	4.81 J	1.49 U	3.4 J	0.67 -	0.94 J	0.087 J
MDC-C14-5	0.913 -	0.681 J	0.676 J	0.681 J	3.08 J	1.44 U	3.0 J	0.45 J	1.3 -	0.062 J
MDC-C14-7	0.867 -	0.660 J	0.686 J	0.660 J	3.56 J	1.48 U	3.8 J	0.42 J	1.1 -	0.053 J
MDC-C14-8	0.838 -	0.676 J	0.701 J	0.676 J	3.56 J	1.58 U	3.3 J	0.48 J	1.5 -	0.069 J
MDC-C14-8-D	0.876 -	0.821 J	0.838 J	0.821 J	9.37 J	1.50 U	3.8 J	0.40 J	1.2 -	0.060 J
MDC-C14-9	0.941 -	0.752 J	0.753 J	0.752 J	4.02 J	1.60 U	1.6 J	0.39 J	1.3 -	0.056 J
MDC-C14-11	0.796 -	0.776 J	0.774 J	0.776 J	3.55 J	1.45 U	4.6 J	0.45 J	0.96 J	0.060 J
MDC-C14-12	0.722 -	0.686 J	0.676 J	0.686 J	3.51 J	1.49 U	1.4 J	0.38 J	1.1 -	0.056 J
MDC-C14-13	0.840 -	0.723 J	0.734 J	0.723 J	4.51 J	1.31 U	3.7 J	0.43 J	1.1 -	0.075 J
MDC-C14-14	0.812 -	0.757 J	0.765 J	0.757 J	4.14 J	1.68 U	1.4 J	0.47 J	1.1 -	0.065 J
MDC-C14-16	0.873 -	0.720 J	0.703 J	0.720 J	5.46 J	1.38 U	1.6 J	0.43 J	1.2 -	0.055 J
Limit	1.7	1.8	1.7	1.5	82	30	96	82	2900	29000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	0.999	0.821	0.838	0.821	9.37	1.68 U	5.0	0.67	1.5	0.087
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	0	0	0
% Nondetects	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C14

OCs				Secondary COCs					
SampleID	Aroclor-1254	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene
MDC-C14-1	3.7 U	36.7 U	36.7 U	36.7 U	36.7 U	36.7 U	36.7 U	36.7 U	36.7 U
MDC-C14-2	3.7 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
MDC-C14-4	3.7 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
MDC-C14-5	3.8 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U	37.7 U
MDC-C14-7	3.7 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
MDC-C14-8	4.9 J	39.6 U	39.6 U	39.6 U	39.6 U	39.6 U	39.6 U	39.6 U	39.6 U
MDC-C14-8-D	3.9 U	39.1 U	39.1 U	39.1 U	39.1 U	39.1 U	39.1 U	39.1 U	39.1 U
MDC-C14-9	3.8 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U
MDC-C14-11	3.9 U	39.2 U	39.2 U	39.2 U	39.2 U	39.2 U	39.2 U	39.2 U	39.2 U
MDC-C14-12	4.0 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U
MDC-C14-13	7.0 J	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U
MDC-C14-14	8.3 J	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U
MDC-C14-16	3.8 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U	38.1 U
Limit	130	20000	2000	20000	1000	200000	2000000	2000	10000
Units	mg/kg	mg/kg	ug/kg	mg/kg	ug/kg	ug/kg	mg/kg	mg/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	8.3	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U
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	9	12	12	12	12	12	12	12	12
% Nondetects	75%	100%	100%	100%	100%	100%	100%	100%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C14

SampleID	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
MDC-C14-1	36.7 U	36.7 U	36.7 U
MDC-C14-2	37.4 U	37.4 U	37.4 U
MDC-C14-4	37.4 U	37.4 U	37.4 U
MDC-C14-5	37.7 U	37.7 U	37.7 U
MDC-C14-7	37.4 U	37.4 U	37.4 U
MDC-C14-8	39.6 U	39.6 U	39.6 U
MDC-C14-8-D	39.1 U	39.1 U	39.1 U
MDC-C14-9	38.0 U	38.0 U	38.0 U
MDC-C14-11	39.2 U	39.2 U	39.2 U
MDC-C14-12	39.8 U	39.8 U	39.8 U
MDC-C14-13	37.0 U	37.0 U	37.0 U
MDC-C14-14	38.2 U	38.2 U	38.2 U
MDC-C14-16	38.1 U	38.1 U	38.1 U
Limit	20000	5000	10000
Units	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%
Max. Result	39.8 U	39.8 U	39.8 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	--	--	--
<i>a posteriori</i> Sample Size calculation	--	--	--

Note: Est. Mean = Esti
The maximum valu
#: This is the high
The test is perf

Appendix A
Certification Unit MDC-C15

SampleID	Primary COCs					Secondary COCs					
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Cadmium	Molybdenum	Silver	Aroclor-1254
MDC-C15-2	0.758 -	0.637 J	0.641 J	0.637 J	3.13 J	0.888 U	0.575 U	0.252 J	2.24 J	0.216 U	3.8 U
MDC-C15-3	0.917 -	0.6 -	0.584 -	0.6 -	9.05 -	0.817 U	0.626 U	0.288 J	1.59 -	0.586 U	3.9 U
MDC-C15-4	0.803 -	0.63 -	0.642 -	0.63 -	5.22 J	0.868 U	0.72 U	0.281 U	1.16 J	0.675 U	10.8 J
MDC-C15-5	0.795 -	0.615 J	0.596 J	0.615 J	6.04 -	0.876 U	0.709 U	0.262 J	1.53 J	0.266 U	4 U
MDC-C15-6	0.878 -	0.913 J	0.917 J	0.913 J	5.32 -	0.945 U	0.611 U	0.227 J	6.14 J	0.229 U	3.8 U
MDC-C15-6-D	0.847 -	0.753 J	0.734 J	0.753 J	4.06 -	0.971 U	0.663 U	0.234 J	2.54 J	0.249 U	3.7 U
MDC-C15-8	0.913 -	0.728 -	0.78 -	0.728 -	4.76 J	0.858 U	0.71 U	0.279 J	1.32 J	0.666 U	3.8 U
MDC-C15-9	0.788 -	0.62 J	0.603 J	0.62 J	5.08 -	0.913 U	0.631 U	0.222 J	1.79 J	0.237 U	3.9 U
MDC-C15-10	0.866 -	0.683 J	0.694 J	0.683 J	4.27 -	0.904 U	0.703 U	0.232 J	3.74 J	0.264 U	3.6 U
MDC-C15-12	0.758 -	0.784 J	0.797 J	0.784 J	4.29 -	0.874 U	0.575 U	0.293 J	1.58 J	0.215 U	4 U
MDC-C15-13	0.794 -	0.678 J	0.677 J	0.678 J	3.24 J	0.943 U	0.595 U	0.189 J	1.58 J	0.223 U	3.8 U
MDC-C15-15	0.87 -	0.643 J	0.644 J	0.643 J	4.98 -	0.889 U	0.712 U	0.264 J	2.01 J	0.267 U	3.7 U
MDC-C15-16	0.872 -	0.756 J	0.804 J	0.756 J	6.06 -	0.843 U	0.691 U	0.223 J	1.53 J	0.259 U	3.7 U
MDC-C15-17	0.883 -	0.68 J	0.667 J	0.68 J	2.77 J	0.821 U	0.7 U	0.17 J	2.54 J	0.263 U	3.8 U
MDC-C15-18	1.04 -	0.735 J	0.721 J	0.735 J	4.54 -	0.8 U	0.745 U	0.319 J	1.57 J	0.279 U	3.9 U
Limit	1.7	1.8	1.7	1.5	20	30	96	82	2900	29000	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	pCi/g	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%
Max. Result	1.04	0.913	0.917	0.913	9.05	0.971 U	0.745 U	0.319	6.14	0.675 U	10.8
Max. > Limit	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--
Sample Size	14	14	14	14	14	14	14	14	14	14	14
Nondetects	0	0	0	0	0	14	14	1	0	14	13
% Nondetects	0%	0%	0%	0%	0%	100%	100%	7%	0%	100%	93%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C16

SampleID	Primary COCs					Secondary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Beryllium	Aroclor-1254	Aroclor-1260	Benzo(a)pyrene
MDC-C16-1	0.758 -	0.648 -	0.660 -	0.648 -	4.88 -	1.87 U	0.48 -	3.8 U	3.8 U	37.7 U
MDC-C16-2	0.587 -	0.379 -	0.382 -	0.379 -	3.51 -	2.05 U	0.32 -	3.6 U	3.6 U	36.4 U
MDC-C16-4	0.849 -	0.678 -	0.675 -	0.678 -	6.74 -	1.81 U	0.47 -	3.8 U	3.8 U	38.1 U
MDC-C16-5	0.802 -	0.726 -	0.743 -	0.726 -	5.62 -	1.61 U	0.52 -	3.8 U	3.8 U	113 U
MDC-C16-5-D	0.893 -	0.682 -	0.686 -	0.682 -	5.59 -	1.93 U	0.54 -	3.8 U	3.8 U	113 U
MDC-C16-6	0.897 -	0.797 -	0.792 -	0.797 -	7.11 -	2.09 U	0.58 -	3.8 U	3.8 U	37.8 U
MDC-C16-7	0.855 -	0.689 -	0.668 -	0.689 -	5.21 -	1.95 U	0.55 -	3.8 U	3.8 U	129 -
MDC-C16-10	0.853 -	0.744 -	0.770 -	0.744 -	4.21 -	2.19 U	0.56 -	3.8 U	3.8 U	129 -
MDC-C16-11	0.949 -	0.816 -	0.789 -	0.816 -	6.28 -	1.89 U	0.54 -	3.9 U	3.9 U	39.3 U
MDC-C16-12	0.897 -	0.685 -	0.709 -	0.685 -	3.19 -	1.90 U	0.54 -	3.9 U	3.9 U	38.5 U
MDC-C16-13	0.840 -	0.701 -	0.697 -	0.701 -	11.6 -	1.97 U	0.53 -	6.0 J	3.8 U	114 U
MDC-C16-14	0.797 -	0.672 -	0.676 -	0.672 -	3.76 -	1.71 U	0.54 -	3.8 U	3.8 U	115 U
MDC-C16-15	0.821 -	0.794 -	0.817 -	0.794 -	5.40 -	2.29 U	0.55 -	3.8 U	3.8 U	38.2 U
Limit	1.7	1.8	1.7	1.5	20	30	1.5	130	130	2000
Units	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	pCi/g	pCi/g	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%
Max. Result	0.949	0.816	0.817	0.816	11.6	2.29 U	0.58	6.0	3.9 U	129
Max. >= Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	12	12	12	12	12	12	12	12	12	12
Nondetects	0	0	0	0	0	12	0	11	12	10
% Nondetects	0%	0%	0%	0%	0%	100%	0%	92%	100%	83%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C17

SampleID	Primary COCs					Secondary COCs	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Cadmium
MDC-C17-2	0.957 -	0.784 -	0.792 -	0.784 -	4.77 -	1.61 U	0.22 J
MDC-C17-3	0.835 -	0.822 -	0.812 -	0.822 -	6.64 -	1.47 U	0.17 J
MDC-C17-4	0.908 -	0.718 -	0.725 -	0.718 -	6.60 -	1.57 U	0.20 J
MDC-C17-6	0.950 -	0.701 -	0.720 -	0.701 -	9.08 -	1.30 U	0.24 J
MDC-C17-7	0.748 -	0.607 -	0.626 -	0.607 -	11.7 -	1.20 U	0.21 J
MDC-C17-8	0.854 -	0.825 -	0.827 -	0.825 -	5.30 -	1.56 U	0.19 J
MDC-C17-9	0.808 -	0.721 -	0.735 -	0.721 -	6.90 -	1.17 U	0.19 J
MDC-C17-11	0.750 -	0.698 -	0.695 -	0.698 -	1.86 J	1.43 U	0.18 J
MDC-C17-12	0.932 -	0.680 -	0.707 -	0.680 -	4.84 -	1.59 U	0.20 J
MDC-C17-12-D	0.868 -	0.688 -	0.684 -	0.688 -	4.26 -	1.57 U	0.21 J
MDC-C17-13	1.14 -	0.965 -	0.968 -	0.965 -	35.2 -	1.43 U	0.21 J
MDC-C17-14	0.892 -	0.707 -	0.705 -	0.707 -	4.63 -	1.39 U	0.31 J
MDC-C17-16	0.874 -	0.729 -	0.702 -	0.729 -	5.52 -	1.17 U	0.20 J
Limit	1.7	1.8	1.7	1.5	20	30	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	pCi/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
Max. Result	1.14	0.965	0.968	0.965	35.2	1.61 U	0.31
Max. >= Limit	No	No	No	No	Yes	No	No
W-statistic Prob. #	--	--	--	--	9.9% (LN)	--	--
Test Procedure	--	--	--	--	Lognormal	--	--
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*	--	--	--	--	8.4	--	--
UCL	--	--	--	--	13.8	--	--
Prob. > Limit	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	pass	--	--
<i>a posteriori</i> Sample Size calculation	--	--	--	--	4 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.

Appendix A
Certification Unit MDC-C18

SampleID	Primary COCs					Secondary COCs		
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Beryllium	Cadmium
MDC-C18-1	0.85 J	0.829 -	0.828 -	0.829 -	12.4 -	0.770 U	0.457 -	0.333 U
MDC-C18-1-D	1.09 J	0.902 -	0.901 -	0.902 -	11.5 -	0.783 U	0.480 -	0.316 U
MDC-C18-3	1.08 J	0.890 -	0.905 -	0.890 -	11.1 -	0.771 U	0.619 -	0.306 U
MDC-C18-4	0.871 J	0.766 -	0.768 -	0.766 -	6.24 -	0.844 U	0.471 -	0.295 U
MDC-C18-5	1.16 J	0.897 -	0.902 -	0.897 -	7.71 -	0.806 U	0.571 -	0.281 U
MDC-C18-6	0.904 J	0.759 -	0.783 -	0.759 -	9.07 -	0.821 U	0.500 -	0.282 U
MDC-C18-8	0.967 J	0.881 -	0.879 -	0.881 -	11.2 -	0.847 U	0.504 -	0.276 U
MDC-C18-10	1.26 J	1.07 -	1.07 -	1.07 -	8.22 -	0.797 U	0.655 -	0.311 U
MDC-C18-11	0.967 J	0.765 -	0.745 -	0.765 -	4.33 J	0.853 U	0.477 -	0.309 U
MDC-C18-12	1.13 J	0.858 -	0.853 -	0.858 -	10.1 -	0.787 U	0.638 -	0.290 U
MDC-C18-13	0.897 J	0.768 -	0.790 -	0.768 -	4.47 -	0.827 U	0.519 -	0.295 U
MDC-C18-14	1.03 J	0.840 -	0.829 -	0.840 -	21.0 -	0.767 U	0.486 -	0.303 U
MDC-C18-16	0.875 J	0.757 -	0.761 -	0.757 -	13.1 -	0.752 U	0.511 -	0.283 U
MDC-C18-17	0.716 J	0.547 -	0.568 -	0.547 -	33.7 -	1.30 -	0.369 -	0.281 J
Limit	1.7	1.8	1.7	1.5	20	30	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	pCi/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
Max. Result	1.26	1.07	1.07	1.07	33.7	1.3	0.655	0.281
Max. >= Limit	No	No	No	No	Yes	No	No	No
W-statistic Prob. #	--	--	--	--	63.6% (LN)	--	--	--
Test Procedure	--	--	--	--	Lognormal	--	--	--
Sample Size	13	13	13	13	13	13	13	13
Nondetects	0	0	0	0	0	12	0	12
% Nondetects	0%	0%	0%	0%	0%	92%	0%	92%
Est. Mean*	--	--	--	--	11.7	--	--	--
UCL	--	--	--	--	16.8	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	pass	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C19

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C19-1	0.949 J	0.843 -	0.864 -	0.843 -	4.21 J
MDC-C19-2	0.829 J	0.679 -	0.676 -	0.679 -	2.99 J
MDC-C19-3	0.755 J	0.741 -	0.732 -	0.741 -	5.45 J
MDC-C19-6	0.801 J	0.778 -	0.766 -	0.778 -	5.99 J
MDC-C19-7	0.699 J	0.668 -	0.658 -	0.668 -	4.15 J
MDC-C19-8	1.06 J	1.03 -	1.03 -	1.03 -	16.1 J
MDC-C19-10	0.949 J	0.877 -	0.844 -	0.877 -	8.07 J
MDC-C19-11	0.899 J	0.671 -	0.614 -	0.671 -	5.05 J
MDC-C19-12	0.874 J	0.852 -	0.837 -	0.852 -	12.0 J
MDC-C19-12-D	0.893 J	0.826 -	0.833 -	0.826 -	6.37 J
MDC-C19-14	1.21 J	1.01 -	1.02 -	1.01 -	5.89 J
MDC-C19-15	0.998 J	0.798 -	0.787 -	0.798 -	10.4 J
MDC-C19-16	1.40 J	1.15 -	1.17 -	1.15 -	23.7 J
MDC-C19-17	0.837 J	0.808 -	0.832 -	0.808 -	7.53 J
Limit	1.7	1.8	1.7	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.40	1.15	1.17	1.15	23.7
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	13	13	13	13	13
Nondetects	0	0	0	0	0
% Nondetects	0%	0%	0%	0%	0%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C20

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C20-2	0.857 -	0.794 -	0.800 -	0.794 -	4.46 J
MDC-C20-3	0.906 -	0.821 -	0.808 -	0.821 -	3.42 U
MDC-C20-4	0.829 -	0.669 -	0.670 -	0.669 -	5.59 -
MDC-C20-5	1.03 -	1.03 -	1.03 -	1.03 -	10.2 -
MDC-C20-6	1.04 -	0.839 -	0.864 -	0.839 -	5.67 J
MDC-C20-7	0.896 -	0.755 -	0.711 -	0.755 -	5.90 J
MDC-C20-9	1.06 -	0.627 -	0.598 -	0.627 -	5.62 U
MDC-C20-9-D	0.937 -	0.764 -	0.653 -	0.764 -	5.30 U
MDC-C20-11	0.960 -	0.752 -	0.763 -	0.752 -	3.71 U
MDC-C20-12	0.935 -	0.849 -	0.816 -	0.849 -	7.78 -
MDC-C20-13	0.997 -	0.892 -	0.875 -	0.892 -	7.79 J
MDC-C20-14	0.950 -	0.797 -	0.798 -	0.797 -	4.58 J
MDC-C20-15	1.02 -	0.803 -	0.764 -	0.803 -	4.03 U
Limit	1.7	1.8	1.7	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.06	1.03	1.03	1.03	10.2
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	12	12	12	12	12
Nondetects	0	0	0	0	4
% Nondetects	0%	0%	0%	0%	33%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C21

SampleID	Primary COCs				
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total
MDC-C21-1	1.50 -	1.32 -	1.28 -	1.32 -	3.57 J
MDC-C21-2	0.996 -	0.778 -	0.783 -	0.778 -	18.4 J
MDC-C21-4	0.956 -	0.820 -	0.842 -	0.820 -	10.9 J
MDC-C21-4-D	0.824 -	0.756 -	0.761 -	0.756 -	9.93 J
MDC-C21-5	0.929 -	0.795 -	0.802 -	0.795 -	6.30 J
MDC-C21-6	0.935 -	0.879 -	0.869 -	0.879 -	4.90 J
MDC-C21-7	0.956 -	0.766 -	0.781 -	0.766 -	5.83 J
MDC-C21-9	0.896 -	0.816 -	0.811 -	0.816 -	23.9 J
MDC-C21-11	1.04 -	0.830 -	0.832 -	0.830 -	11.6 J
MDC-C21-12	1.07 -	0.817 -	0.821 -	0.817 -	9.42 J
MDC-C21-13	1.09 -	0.879 -	0.904 -	0.879 -	5.44 J
MDC-C21-15	1.03 -	0.769 -	0.773 -	0.769 -	7.36 J
MDC-C21-16	1.31 -	0.961 -	0.949 -	0.961 -	10.4 J
MDC-C21-17	1.08 -	1.06 -	1.07 -	1.06 -	12.7 J
Limit	1.7	1.8	1.7	1.5	82
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g
Conf. Level	95%	95%	95%	95%	95%
Max. Result	1.50	1.32	1.28	1.32	23.9
Max. >= Limit	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--
Test Procedure	--	--	--	--	--
Sample Size	13	13	13	13	13
Nondetects	0	0	0	0	0
% Nondetects	0%	0%	0%	0%	0%
Est. Mean*	--	--	--	--	--
UCL	--	--	--	--	--
Prob. > Limit	--	--	--	--	--
Pass / Fail	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C22

SampleID	Primary COCs					Secondary COCs		
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead	Aroclor-1254
MDC-C22-1	1.01 -	0.848 -	0.873 -	0.848 -	10.4 -	4.72 -	9.27 J	13 U
MDC-C22-3	1.09 -	0.689 -	0.659 -	0.689 -	12 -	5.82 -	16.6 J	12.4 U
MDC-C22-4	1.16 -	0.983 -	1.02 -	0.983 -	5.56 -	4.99 -	13.6 J	14.3 U
MDC-C22-5	0.917 -	0.656 -	0.641 -	0.656 -	1.99 U	4.74 -	8.19 J	12.2 U
MDC-C22-7	0.878 -	0.661 -	0.668 -	0.661 -	7.24 -	5.05 -	9.07 J	12.3 U
MDC-C22-8	0.958 -	0.822 -	0.809 -	0.822 -	6.76 -	5.55 -	9.94 J	12.1 U
MDC-C22-9	1.44 -	1.21 -	1.29 -	1.21 -	5.26 -	1.23 J	13 J	12.5 U
MDC-C22-10	1.03 -	0.922 -	0.907 -	0.922 -	9.23 -	4.99 -	8.41 J	11.9 U
MDC-C22-12	0.832 -	0.646 -	0.672 -	0.646 -	6.63 J	3.97 -	9.06 J	11.5 U
MDC-C22-14	0.979 -	0.958 -	0.951 -	0.958 -	5.49 J	6.03 -	10.9 J	12.2 U
MDC-C22-15	0.85 -	0.806 -	0.848 -	0.806 -	6.01 J	4.78 -	8.21 J	11.6 U
MDC-C22-16	1.14 -	0.902 -	0.928 -	0.902 -	17 -	9.26 -	13.5 J	53.5 J
MDC-C22-16-D	1.12 -	0.841 -	0.849 -	0.841 -	19.7 -	7.59 -	18 J	36.6 J
Limit	1.7	1.8	1.7	1.5	82	12	400	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
Max. Result	1.44	1.21	1.29	1.21	19.7	9.26	18.0	53.5
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	0	0	1	0	0	11
% Nondetects	0%	0%	0%	0%	8%	0%	0%	92%
Est. Mean*	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C23

SampleID	Primary COCs					Secondary COCs
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99
MDC-C23-1	0.752 J	0.529 J	0.523 J	0.529 J	4.68 J	0.818 U
MDC-C23-2	0.846 J	0.553 J	0.559 J	0.553 J	5.77 J	0.823 U
MDC-C23-4	0.793 J	0.558 J	0.608 J	0.558 J	4.77 J	0.858 U
MDC-C23-5	0.826 -	0.561 -	0.593 -	0.561 -	4.78 J	0.891 U
MDC-C23-6	0.975 J	0.824 J	0.881 J	0.824 J	9.94 J	0.832 U
MDC-C23-7	0.901 J	0.821 J	0.803 J	0.821 J	19.4 J	0.808 U
MDC-C23-9	0.757 J	0.64 J	0.668 J	0.64 J	6.95 J	0.868 U
MDC-C23-9-D	0.871 J	0.905 J	0.906 J	0.905 J	6.13 J	0.834 U
MDC-C23-10	0.701 J	0.561 J	0.57 J	0.561 J	3.67 J	0.844 U
MDC-C23-11	0.788 J	0.538 J	0.546 J	0.538 J	11.2 J	0.793 U
MDC-C23-13	0.857 J	0.863 J	0.893 J	0.863 J	6.94 J	0.952 U
MDC-C23-15	0.786 J	0.705 J	0.695 J	0.705 J	3.65 J	0.856 U
MDC-C23-16	0.885 J	0.684 J	0.705 J	0.684 J	5.43 J	0.8 U
Limit	1.7	1.8	1.7	1.5	20	30
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	pCi/g
Conf. Level	95%	95%	95%	95%	95%	90%
Max. Result	0.975	0.905	0.906	0.905	19.4	0.952 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	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C27

SampleID	Primary COCs					Secondary COCs								
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Arsenic	Cadmium	Mercury	Molybdenum	Lead	Silver	Benzo(a)anthracene
MDC-C27-U06-1	1.11 J	0.78 J	0.766 J	0.78 J	4.03 U	0.891 U	0.71 U	4.91 -	0.295 J	0.0201 U	1.71 -	8.94 J	0.666 U	36.9 U
MDC-C27-U06-1-D	0.939 J	0.792 J	0.806 J	0.792 J	3.14 U	0.998 U	0.682 U	4.33 -	0.267 U	0.0237 U	1.79 -	8.84 J	0.64 U	36.5 U
MDC-C27-U06-2	0.93 J	0.707 J	0.69 J	0.707 J	2.77 U	0.917 U	0.676 U	3.93 -	0.264 U	0.0104 U	1.85 -	8.46 J	0.633 U	37.4 U
MDC-C27-U06-3	1.03 J	0.813 J	0.825 J	0.813 J	2.94 U	0.883 U	0.71 U	3.99 -	0.277 U	0.0176 U	1.36 -	8.28 J	0.665 U	36.6 U
MDC-C27-U06-4	0.814 J	0.675 J	0.688 J	0.675 J	2.83 U	0.846 U	0.626 U	3.43 -	0.244 U	0.0117 U	1.44 -	8.21 J	0.587 U	36.2 U
MDC-C27-U06-5	0.776 J	0.644 J	0.651 J	0.644 J	2.71 U	0.854 U	0.534 U	4.01 -	0.235 J	0.0171 U	1.79 -	8.78 J	0.5 U	38.7 U
MDC-C27-U06-6	0.894 J	0.675 J	0.669 J	0.675 J	3.18 U	0.844 U	0.568 U	2.74 -	0.222 U	0.0146 U	1.4 -	7.03 J	0.533 U	37.4 U
MDC-C27-U06-7	0.796 J	0.62 J	0.641 J	0.62 J	2.6 U	0.871 U	0.628 U	3.62 -	0.245 U	0.0205 U	2.18 -	8.63 J	0.589 U	38.7 U
MDC-C27-U06-8	0.793 J	0.627 J	0.661 J	0.627 J	5.33 J	0.804 U	0.578 U	3.57 -	0.226 U	0.0161 U	1.81 -	8.2 J	0.542 U	39.9 U
Limit	1.7	1.8	1.7	1.5	82	30	96	12	82	7.5	2900	400	29000	20000
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	pCi/g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.11	0.813	0.825	0.813	5.33	0.998 U	0.71 U	4.91	0.295	0.0237 U	2.18	8.94	0.666 U	39.9 U
Max. > Limit	No	No	No	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sample Size	800%	800%	800%	800%	800%	800%	8	8	8	8	8	8	8	8
Nondetects	0	0	0	0	7	8	8	0	6	8	0	0	8	8
% Nondetects	0%	0%	0%	0%	88%	100%	100%	0%	75%	100%	0%	0%	100%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C27

SampleID	Secondary COCs									
	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
MDC-C27-U06-1	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U	36.9 U
MDC-C27-U06-1-D	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U	36.5 U
MDC-C27-U06-2	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
MDC-C27-U06-3	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U
MDC-C27-U06-4	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U	36.2 U
MDC-C27-U06-5	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U
MDC-C27-U06-6	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
MDC-C27-U06-7	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	38.7 U	52.5 J	58.1 J	43.2 J	48.2 J
MDC-C27-U06-8	39.9 U	39.9 U	39.9 U	39.9 U	39.9 U	39.9 U	39.9 U	59.5 J	39.9 U	39.9 U
Limit	2000	20000	200000	1000 (BTV)	2000000	2000	10000 (BTV)	20000	5000 (BTV)	10000 (BTV)
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	39.9 U	39.9 U	39.9 U	39.9 U	39.9 U	39.9 U	52.5	59.5	43.2	48.2
Max. > Limit	No	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	8
Nondetects	8	8	8	8	8	8	7	6	7	7
% Nondetects	100%	100%	100%	100%	100%	100%	88%	75%	88%	88%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C27

SampleID	Secondary COCs								
	1,1,1-Trichloroethane	1,1-Dichloroethene	Benzene	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	Trichloroethene	Xylenes, Total
MDC-C27-U06-1	1 U	1 U	1 U	1 U	5.2 U	1 U	1 U	1 U	1 U
MDC-C27-U06-1-D	0.9 U	0.9 U	0.9 U	0.9 U	4.5 U	0.9 U	0.9 U	0.9 U	0.9 U
MDC-C27-U06-2	1.1 U	1.1 U	1.1 U	1.1 U	5.4 U	1.1 U	1.1 U	1.1 U	1.1 U
MDC-C27-U06-3	0.9 U	3.1 J	0.9 U	0.9 U	4.4 U	0.9 U	0.9 U	0.9 U	0.9 U
MDC-C27-U06-4	0.9 U	0.9 U	0.9 U	0.9 U	4.6 U	0.9 U	0.9 U	0.9 U	0.9 U
MDC-C27-U06-5	1 U	1.5 J	1 U	1 U	5.1 U	1 U	1 U	1 U	1 U
MDC-C27-U06-6	0.9 U	1.3 J	0.9 U	0.9 U	4.5 U	0.9 U	0.9 U	0.9 U	0.9 U
MDC-C27-U06-7	0.9 U	2.9 J	0.9 U	0.9 U	4.7 U	0.9 U	0.9 U	0.9 U	0.9 U
MDC-C27-U06-8	1 U	1 U	1 U	1 U	5.2 U	1 U	1 U	1 U	1 U
Limit	4300	410	850000	5100000	37000	3600	100000000	25000	920000000
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.1 U	3.1	1.1 U	1.1 U	5.4 U	1.1 U	1.1 U	1.1 U	1.1 U
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	8	4	8	8	8	8	8	8	8
% Nondetects	100%	50%	100%	100%	100%	100%	100%	100%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C28

SampleID	Primary COCs					Secondary COCs			
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Cadmium	Lead	1,1,1-Trichloroethane
MDC-C28-H36-1	0.785 J	0.682 -	0.684 J	0.682 -	6.29 -	0.824 U	0.17 J	9.7 J	0.90 U
MDC-C28-H36-2	0.830 J	0.712 -	0.727 J	0.712 -	4.11 -	0.855 U	0.20 J	9.3 J	1.1 U
MDC-C28-H36-3	0.878 J	0.724 -	0.765 J	0.724 -	4.16 -	0.840 U	0.17 J	7.9 J	1.1 U
MDC-C28-H36-3-D	0.785 J	0.658 -	0.641 J	0.658 -	5.16 -	0.858 U	0.20 J	8.7 J	1.0 U
MDC-C28-H36-4	0.853 J	0.688 -	0.735 J	0.688 -	3.70 -	0.838 U	0.20 J	9.3 J	0.90 U
MDC-C28-H36-5	0.842 J	0.649 -	0.633 J	0.649 -	4.66 -	0.832 U	0.20 J	9.1 J	1.0 U
MDC-C28-H36-6	0.759 J	0.667 -	0.680 J	0.667 -	4.52 -	0.795 U	0.15 J	7.8 J	0.80 U
MDC-C28-H36-7	0.870 J	0.670 -	0.638 J	0.670 -		1.58 -	0.22 J	13.3 J	0.80 U
MDC-C28-H36-7C					7.76 J				
MDC-C28-H36-8	0.876 J	0.601 -	0.602 J	0.601 -	11.8 -	0.823 U	0.17 J	7.8 J	0.90 U
Limit	1.7	1.8	1.7	1.5	20	30	82	400	4300
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	0.878	0.724	0.765	0.724	11.8	1.58	0.22	13.3	1.1 U
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	0	7	0	0	8
% Nondetects	0%	0%	0%	0%	0%	88%	0%	0%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C29

SampleID	Primary COCs					Secondary COCs						
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Barium	Beryllium	Chromium	Lead	Mercury	Aroclor-1254
MDC-C29-H48-1	0.801 -	0.704 -	0.716 -	0.704 -	2.18 J	0.851 U	57.5 -	0.348 J	9.49 J	9.19 U	0.0164 U	12.3 U
MDC-C29-H48-2	0.856 -	0.66 -	0.658 -	0.66 -	4.16 J	0.933 U	57.7 -	0.353 J	9.26 J	8.69 U	0.0038 U	11.1 U
MDC-C29-H48-3	0.772 -	0.576 -	0.573 -	0.576 -	4.52 J	0.927 U	44.7 -	0.313 J	9.5 J	9.18 U	0.0117 U	10.8 U
MDC-C29-H48-4	0.793 -	0.625 -	0.616 -	0.625 -	4.22 J	0.882 U	56.7 -	0.381 J	10.3 J	10.4 U	0.0151 U	11 U
MDC-C29-H48-5	0.761 -	0.56 -	0.544 -	0.56 -	1.69 U	0.927 U	46.8 -	0.283 J	8.78 J	8.48 U	0.0159 U	11.4 U
MDC-C29-H48-6	0.873 -	0.724 -	0.787 -	0.724 -	3.1 J	0.797 U	52.9 -	0.293 J	8.2 J	10.1 U	0.0152 U	11.6 U
MDC-C29-H48-7	0.841 -	0.623 -	0.631 -	0.623 -	2.89 J	0.943 U	43.5 -	0.31 J	9.68 J	9.97 U	0.0127 U	11.2 U
MDC-C29-H48-7-D	0.774 -	0.661 -	0.646 -	0.661 -	3.97 J	0.846 U	53.8 -	0.354 J	9.53 J	8.38 U	0.0171 U	15.3 -
MDC-C29-H48-8	0.932 -	0.872 -	0.882 -	0.872 -	5.07 J	0.812 U	31.3 -	0.322 J	9.29 J	7.95 U	0.0192 U	11.2 U
Limit	1.7	1.8	1.7	1.5	20	30	68000	1.5	300	400	7.5	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	µg/g	pCi/g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%
Max. Result	0.93	0.872	0.882	0.872	5.07	0.943 U	57.70	0.38	10.30	10.4 U	0.0192 U	15.3
Max. >= Limit	No	No	No	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	8	8	8
Nondetects	0	0	0	0	1	8	0	0	0	8	8	7
% Nondetects	0%	0%	0%	0%	13%	100%	0%	0%	0%	100%	100%	88%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C31

SampleID	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Technetium-99	Antimony	Arsenic	Barium	Beryllium	Cadmium	Mercury	Molybdenum	Lead	Silver	Aroclor-1254
MDCN-C31-1	0.953 J	0.756 -	0.747 J	0.756 -	3.3 U	0.805 U	0.641 U	4.73 -	58.3 J	0.567 J	0.323 J	0.0157 U	1.98 -	8.38 J	0.601 U	5.3 J
MDCN-C31-2	0.948 J	0.81 -	0.844 J	0.81 -	2.78 U	0.818 U	0.643 U	4.18 -	47.9 J	0.674 J	0.251 U	0.0145 U	1.44 -	8.39 J	0.603 U	3.8 U
MDCN-C31-3	0.79 J	0.544 -	0.564 J	0.544 -	2.06 U	0.828 U	0.6 U	2.66 -	51.1 J	0.321 J	0.234 U	0.13 J	1.66 -	6.19 J	0.563 U	3.7 U
MDCN-C31-4	0.866 J	0.663 -	0.657 J	0.663 -	4.08 J	0.824 U	0.656 U	3.53 -	41.3 J	0.361 J	0.256 U	0.0168 U	1.84 -	6.3 J	0.615 U	3.8 U
MDCN-C31-5	0.672 J	0.491 -	0.523 J	0.491 -	2.11 U	0.805 U	0.689 U	4.32 -	34.7 J	0.524 J	0.269 U	0.0194 U	1.51 -	7.51 J	0.646 U	3.7 U
MDCN-C31-6	0.828 J	0.742 -	0.745 J	0.742 -	3.8 U	1.01 U	0.708 U	2.85 -	36.2 J	0.272 J	0.277 U	0.0216 U	1.28 J	5.92 J	0.664 U	4 U
MDCN-C31-7	1.06 J	0.786 -	0.851 J	0.786 -	4.92 J	0.857 U	0.695 U	3.97 -	39.1 J	0.495 J	0.272 U	0.0245 U	2.21 -	7.9 J	0.652 U	3.7 U
MDCN-C31-8	0.872 J	0.702 -	0.7 J	0.702 -	3.48 U	0.822 U	0.567 U	4.1 -	58.2 J	0.516 J	0.221 U	0.0257 U	1.77 -	7.59 J	0.531 U	3.9 U
MDCN-C31-8-D	0.982 J	0.739 -	0.701 J	0.739 -	3.35 U	0.856 U	0.659 U	3.18 -	37.1 J	0.329 J	0.258 U	0.0194 U	1.37 -	6.81 J	0.618 U	3.8 U
MDCN-C31-9	0.815 J	0.86 -	0.848 J	0.86 -	7 J	0.866 J	0.658 U	3.69 -	33.4 J	0.655 J	0.257 U	0.0235 U	1.32 -	7.64 J	0.617 U	3.8 U
MDCN-C31-10	0.991 J	0.829 -	0.863 J	0.829 -	3.97 J	0.802 U	0.657 U	0.853 J	79.9 J	0.722 J	0.257 U	0.0327 U	1.02 J	9.87 J	0.616 U	3.7 U
Limit	1.7	1.8	1.7	1.5	82	30	96	12	68000	1.5	82	7.5	2900	400	29000	130
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	pCi/g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1.06	0.86	0.863	0.86	7	0.866	0.708 U	4.73	79.9	0.722	0.323	0.13	2.21	9.87	0.664 U	5.3
Max. > Limit	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sample Size	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Nondetects	0	0	0	0	6	10	10	0	0	0	9	9	0	0	10	9
% Nondetects	0%	0%	0%	0%	60%	100%	100%	0%	0%	0%	90%	90%	0%	0%	100%	90%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C31

SampleID	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene
MDCN-C31-1	4.1 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U	41 U
MDCN-C31-2	3.8 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U	38 U
MDCN-C31-3	3.7 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U	37.3 U
MDCN-C31-4	3.8 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	44.6 J	37.5 U	96 J	37.5 U
MDCN-C31-5	3.7 U	37 U	37 U	37 U	37 U	37 U	37 U	37 U	37 U	37 U
MDCN-C31-6	4 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	39.8 U	41.7 J	39.8 U
MDCN-C31-7	3.7 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U	36.6 U
MDCN-C31-8	3.9 U	866 J	589 J	874 J	276 J	252 J	716 J	38.8 U	2080 J	293 J
MDCN-C31-8-D	3.8 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U	37.5 U
MDCN-C31-9	3.8 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U	37.6 U
MDCN-C31-10	3.7 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U	37.4 U
Limit	130	20000	2000	20000	200000	1000 (BTV)	2000000	2000	10000 (BTV)	20000
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	4.1 U	866	589	874	276	252	716	41 U	2080	293
Max. > Limit	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--
Sample Size	10	10	10	10	10	10	10	10	10	10
Nondetects	10	9	9	9	9	9	8	10	7	9
% Nondetects	100%	90%	90%	90%	90%	90%	80%	100%	70%	90%
Est. Mean*	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C31

SampleID	Phenanthrene	Pyrene	1,1,1-Trichloroethane	1,1-Dichloroethene	Benzene	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	Trichloroethene	Xylenes, Total
MDCN-C31-1	41 U	41 U	0.9 U	0.9 U	0.9 U	0.9 U	4.7 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-2	38 U	38 U	0.9 U	0.9 U	0.9 U	0.9 U	4.7 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-3	37.3 U	37.3 U	0.9 U	0.9 U	0.9 U	0.9 U	4.6 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-4	53.6 J	71.5 J	0.8 U	0.8 U	0.8 U	0.8 U	4.1 U	0.8 U	0.8 U	0.8 U	0.8 U
MDCN-C31-5	37 U	37 U	0.8 U	0.8 U	0.8 U	0.8 U	4 U	0.8 U	0.8 U	0.8 U	0.8 U
MDCN-C31-6	39.8 U	39.8 U	0.9 U	0.9 U	0.9 U	0.9 U	4.5 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-7	36.6 U	36.6 U	0.9 U	0.9 U	0.9 U	0.9 U	4.7 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-8	1640 J	1370 J	1 U	1 U	1 U	1 U	4.8 U	1 U	1 U	1 U	1 U
MDCN-C31-8-D	37.5 U	37.5 U	0.9 U	0.9 U	0.9 U	0.9 U	4.5 U	0.9 U	0.9 U	0.9 U	0.9 U
MDCN-C31-9	37.6 U	37.6 U	0.8 U	0.8 U	0.8 U	0.8 U	4.3 U	0.8 U	0.8 U	0.8 U	0.8 U
MDCN-C31-10	37.4 U	37.4 U	0.9 U	0.9 U	0.9 U	0.9 U	4.5 U	0.9 U	0.9 U	0.9 U	0.9 U
Limit	5000 (BTV)	10000 (BTV)	4300	410	850000	5100000	37000	3600	100000000	25000	920000000
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Conf. Level	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Max. Result	1640	1370	1 U	1 U	1 U	1 U	4.8 U	1 U	1 U	1 U	1 U
Max. > Limit	No	No	No	No	No	No	No	No	No	No	No
W-statistic Prob. #	--	--	--	--	--	--	--	--	--	--	--
Test Procedure	--	--	--	--	--	--	--	--	--	--	--
Sample Size	10	10	10	10	10	10	10	10	10	10	10
Nondetects	8	8	10	10	10	10	10	10	10	10	10
% Nondetects	80%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Est. Mean*	--	--	--	--	--	--	--	--	--	--	--
UCL	--	--	--	--	--	--	--	--	--	--	--
Prob. > Limit	--	--	--	--	--	--	--	--	--	--	--
Pass / Fail	--	--	--	--	--	--	--	--	--	--	--
<i>a posteriori</i> 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.

Appendix A
Certification Unit MDC-C32

SampleID	pH
MDC-C32-H11-1	7.95 J
MDC-C32-H11-2	7.89 J
MDC-C32-H11-2-D	7.84 J
MDC-C32-H11-3	7.86 J
MDC-C32-H11-4	8.20 J
MDC-C32-H11-5	8.11 J
MDC-C32-H11-6	7.89 J
MDC-C32-H11-7	7.62 J
MDC-C32-H11-8	8.05 J
Units	SU

These data are for presentation purposes only since there is no guidance for comparison.

APPENDIX B

**VARIANCE/FIELD CHANGE NOTICES FOR THE AREA 6
FORMER PRODUCTION AREA AND MAIN DRAINAGE
CORRIDOR AREA CERTIFICATION DESIGN LETTER
AND CERTIFICATION PROJECT SPECIFIC PLAN**

**VARIANCE/FIELD CHANGE NOTICE LOG FOR CERTIFICATION DESIGN LETTER
AND CERTIFICATION PROJECT SPECIFIC PLAN FOR AREA 6 FORMER PRODUCTION AREA
AND MAIN DRAINAGE CORRIDOR AREA**

Variance No.	Variance Date	Variance Description	Significant? (Y or N)	Date Signed	Date Distributed	EPA/OEPA Approval
Revision A						
20810-PSP-0010-01	1/19/06	Documents the collection of two grab soil samples for total uranium (TAL Z) to delineate an above-FRL sampling location in CU 28 (sub-CU MDC-C28-H36-7).	Y	1/26/06	1/26/06	1/23/06
20810-PSP-0010-02	2/1/06	Documents the collection of the archive samples in CU 31 due to the fact that the southern end of the CU is continuously underwater because of poor weather conditions.	N	2/1/06	2/7/06	N/A
20810-PSP-0010-03	2/1/06	Documents the collection of a grab soil sample for total uranium (TAL Z) from 3x FRL excavated area in CU 28 (sub-CU MDC-C28-H36-7).	Y	2/8/06	2/9/06	2/3/06
20810-PSP-0010-04	2/16/06	Documents the correction of CU 15's sample IDs listed in Appendix C of the CDL/PSP.	N	3/3/06	3/6/06	N/A
20810-PSP-0010-05	2/17/06	Documents the collection of three grab compost samples for TAL A from the Area 6 FPA/MDC (Area 6C) where the compost from the OSDF was spread.	N	2/22/06	3/6/06	N/A
20810-PSP-0010-06	2/27/06	Documents the choice of analytical methods to analyze the samples collected under V/FCN 20810-PSP-0010-03.	N	2/28/06	3/9/06	N/A
20810-PSP-0010-07	3/20/06	Documents the collection of eight grab soil samples for pH (TAL A1) from CU 32 (HWMU 11).	Y	3/22/06	3/27/06	N/A

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **YES**

V/F: 20810-PSP-0010-01

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 3

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 1/19/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of two grab soil samples for total uranium (TAL Z) to delineate an above-FRL sampling location in CU 28 (sub-CU MDC-C28-H36-7). See Figure 1 for sampling locations.

The Sampling and Analytical Requirements are listed in Attachment 1. The sample IDs, and their associated northing and easting are listed below.

Location	Sample ID	Northing	Easting
MDC-C28-H36-7A	MDC-C28-H36-7A^R	480696.65	1350135.25
MDC-C28-H36-7B	MDC-C28-H36-7B^R	480686.65	1350135.25

Field sketch required: No

Surveying required: Yes, Surveyors will survey these sample points prior to sampling

Field QC samples required: No

Field data validation: Yes

Analytical data validation: Yes, VSL B

Data package requirements: COAs within 24 hrs. Full ASL D/E data package within 7 days.

The highest total uranium result for this area is 69.9 mg/kg from boring MDC-C28-H36-7.

Justification:

A >3x FRL sample result was detected in this sub-CU, which requires delineation. Two previously collected below FRL samples are being used as bounding samples. These newly collected samples will serve as the other two bounding sample locations. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 1/19/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE R. Hiske <i>R. Hiske</i>	1/19/06	X	PROJECT MANAGER J.D. Chou <i>J.D. Chou</i>	1/19/05
X	DATA QUALITY MANAGEMENT <i>1/19/06</i>		X	CHARACTERIZATION MANAGER F. Miller <i>F. Miller</i>	1/26/06
X	ANALYTICAL CUSTOMER SUPPORT WAO <i>Amy Weizer</i>	1/19/06	X	RTIMP Manager <i>Tom Sublage</i>	1/23/05

VARIANCE/FCN APPROVED [X] YES [] NO

REVISION REQUIRED: [] YES [x] NO

DISTRIBUTION

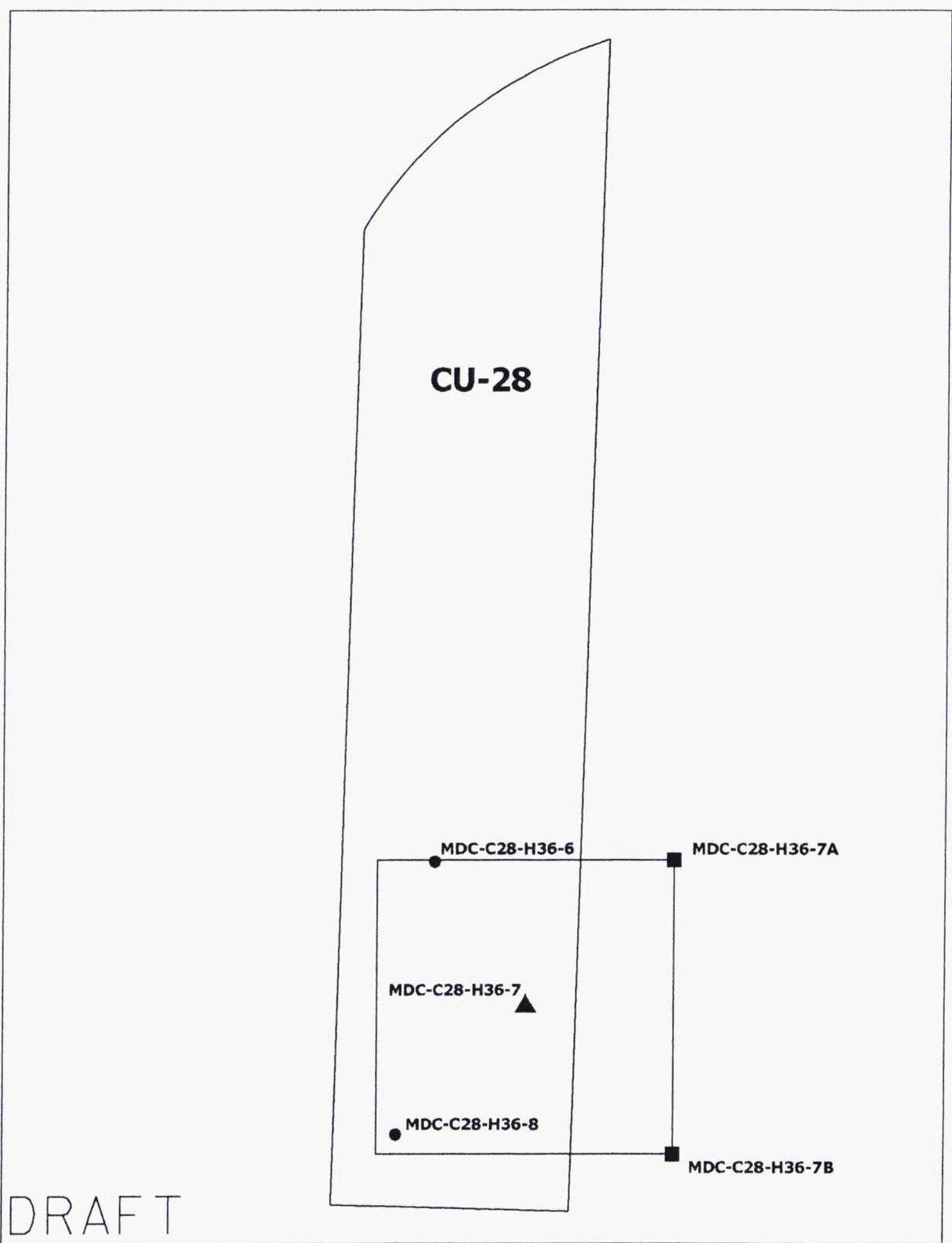
PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	CHARACTERIZATION MANAGER: Frank Miller	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

TAL 20810-PSP-0010-Z

Component	MDL
Total uranium	2.0 mg/kg

SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Sample Matrix	TAT	ASL	Preservative	Holding Time	Container	Sample Volume/Mass
TAL Z	Solid	24 hr	D/E	None	12 months	Appropriate Plastic or Glass	300 g



DRAFT

LEGEND:

- ▲ > 3x FRL SAMPLE
- SAMPLING LOCATION
- PREVIOUSLY SAMPLED LOCATION

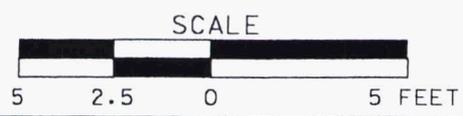


FIGURE 1.



State of Ohio Environmental Protection Agency

Southwest District

1 East Fifth Street
Dayton, Ohio 45402-2911

TEL: (937)285-6357 FAX: (937)285-6249
www.epa.state.oh.us

Bob Taft, Governor
Bruce Johnson, Lt. Governor
Joseph P. Koncelik, Director

MEMO

TO: J.D. Chiou, Fluor Fernald

FROM: Donna Bohannon, Ohio EPA/OFFO

DATE: January 23, 2006

SUBJECT: *V/FCN: 20810-PSP-0010-01 CDL & Certification PSP For A6 FPA & MDC Area*

This V/FCN documents the collection of two soil samples from CU28/sub-CU MDC-C28-H36-7 for total uranium, where a result greater than three times the FRL was found in this sub-CU. The two sample locations are bounding samples and will be used to delineate the hot spot. Ohio EPA approves of this variance.

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **NO**

V/F: 20810-PSP-0010-02

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 4

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 2/01/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of the archive samples in CU 31 due to the fact that the southern end of the CU is continuously underwater because of poor weather conditions. Additionally, the duplicate sample location was changed from sub-CU 12 to sub-CU 8 because sub-CU 12 is currently underwater. The sample IDs were incorrectly listed in the plan for CU 31. All of these sample IDs including the one listed below have been corrected and are in Attachment 1. See revised Figures 4-12A and 4-12B (attached) for the change in location identifiers.

The following archive and duplicate locations and sample identifiers have been changed (see Attachment 1 for the full list):

Previous Location ID	Current Location ID	Previous Sample ID(s)	Current Sample ID
31-2V	31-2	MDCN-C31-2V	MDCN-C31-2^RMP
			MDCN-C31-2^L
31-7V	31-7	MDCN-C31-7V	MDCN-C31-7^RMP
			MDCN-C31-7^L
31-8	31-8D	MDCN-C31-8	MDCN-C31-8^RMP
			MDCN-C31-8^L
			MDCN-C31-8^RMP-D
			MDCN-C31-8^L-D
31-9V	31-9	MDCN-C31-9V	MDCN-C31-9^RMP
			MDCN-C31-9^L
31-12D	31-12	MDCN-C31-12	MDCN-C31-12^RMP
		MDCN-C31-12D	MDCN-C31-12^L
31-13V	31-13	MDCN-C31-13V	MDCN-C31-13^RMP
			MDCN-C31-13^L

Justification:

Sampling locations in southern end of CU 31 are currently underwater (locations 11 through 16). In order to collect a sufficient number samples from this CU for statistical analysis, the archive samples are being collected. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 2/1/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE R. Fiske <i>R. Fiske</i>	2/1/06	X	PROJECT MANAGER J.D. Chou <i>J.D. Chou</i>	2/1/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER F. Miller <i>F. Miller</i>	2/1/06
X	ANALYTICAL CUSTOMER SUPPORT WAO <i>Paul B. McWhorter</i>	2/1/06	X	RTIMP Manager <i>T. Burbridge</i>	2/1/06
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:

CU	Location	Depth	Sample ID	TAL	North-83	East-83
31	31-1	0"-6"	MDCN-C31-1^RMP	CWY	481740.6	1349265
			MDCN-C31-1^L	X		
	31-2	0"-6"	MDCN-C31-2^RMP	CWY	481680.3	1349252
			MDCN-C31-2^L	X		
	31-3	0"-6"	MDCN-C31-3^RMP	CWY	481497.7	1349256
			MDCN-C31-3^L	X		
	31-4	0"-6"	MDCN-C31-4^RMP	CWY	481404.9	1349245
			MDCN-C31-4^L	X		
	31-5	0"-6"	MDCN-C31-5^RMP	CWY	481347.1	1349255
			MDCN-C31-5^L	X		
	31-6	0"-6"	MDCN-C31-6^RMP	CWY	481178.7	1349244
			MDCN-C31-6^L	X		
	31-7	0"-6"	MDCN-C31-7^RMP	CWY	481064.3	1349248
			MDCN-C31-7^L	X		
	31-8D	0"-6"	MDCN-C31-8^RMP	CWY	481005	1349234
			MDCN-C31-8^L	X		
			MDCN-C31-8^RMP-D	CWY		
			MDCN-C31-8^L-D	X		
	31-9	0"-6"	MDCN-C31-9^RMP	CWY	480916.8	1349243
			MDCN-C31-9^L	X		
	31-10	0"-6"	MDCN-C31-10^RMP	CWY	480755.4	1349229
			MDCN-C31-10^L	X		
	31-11	0"-6"	MDCN-C31-11^RMP	CWY	480700.5	1349237
			MDCN-C31-11^L	X		
	31-12	0"-6"	MDCN-C31-12^RMP	CWY	480621.1	1349228
			MDCN-C31-12^L	X		
	31-13	0"-6"	MDCN-C31-13^RMP	CWY	480450	1349232
			MDCN-C31-13^L	X		
	31-14	0"-6"	MDCN-C31-14^RMP	CWY	480340.2	1349219
			MDCN-C31-14^L	X		
	31-15	0"-6"	MDCN-C31-15^RMP	CWY	480273	1349212
			MDCN-C31-15^L	X		
31-16	0"-6"	MDCN-C31-16^RMP	CWY	480152.2	1349221	
		MDCN-C31-16^L	X			

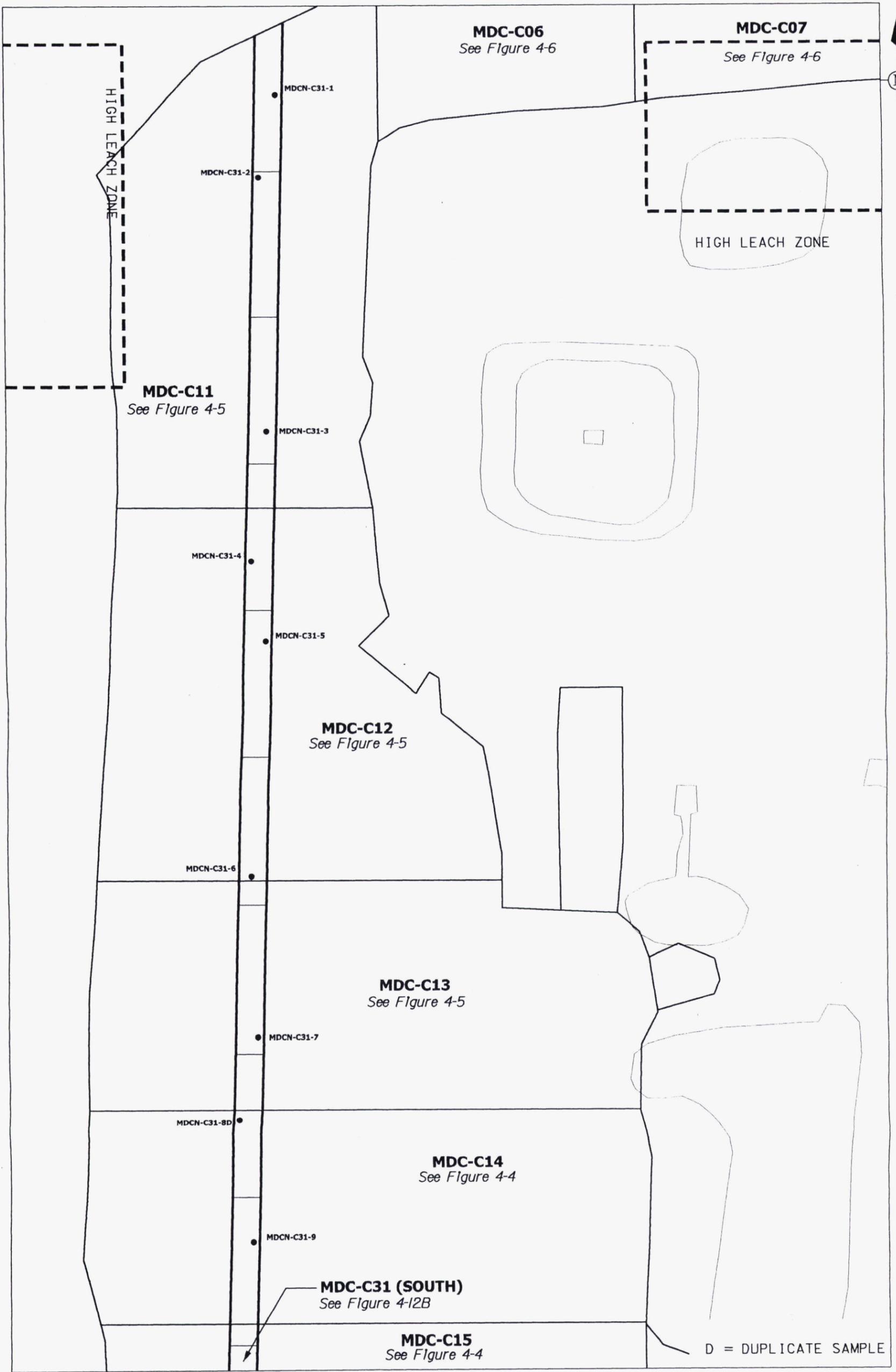
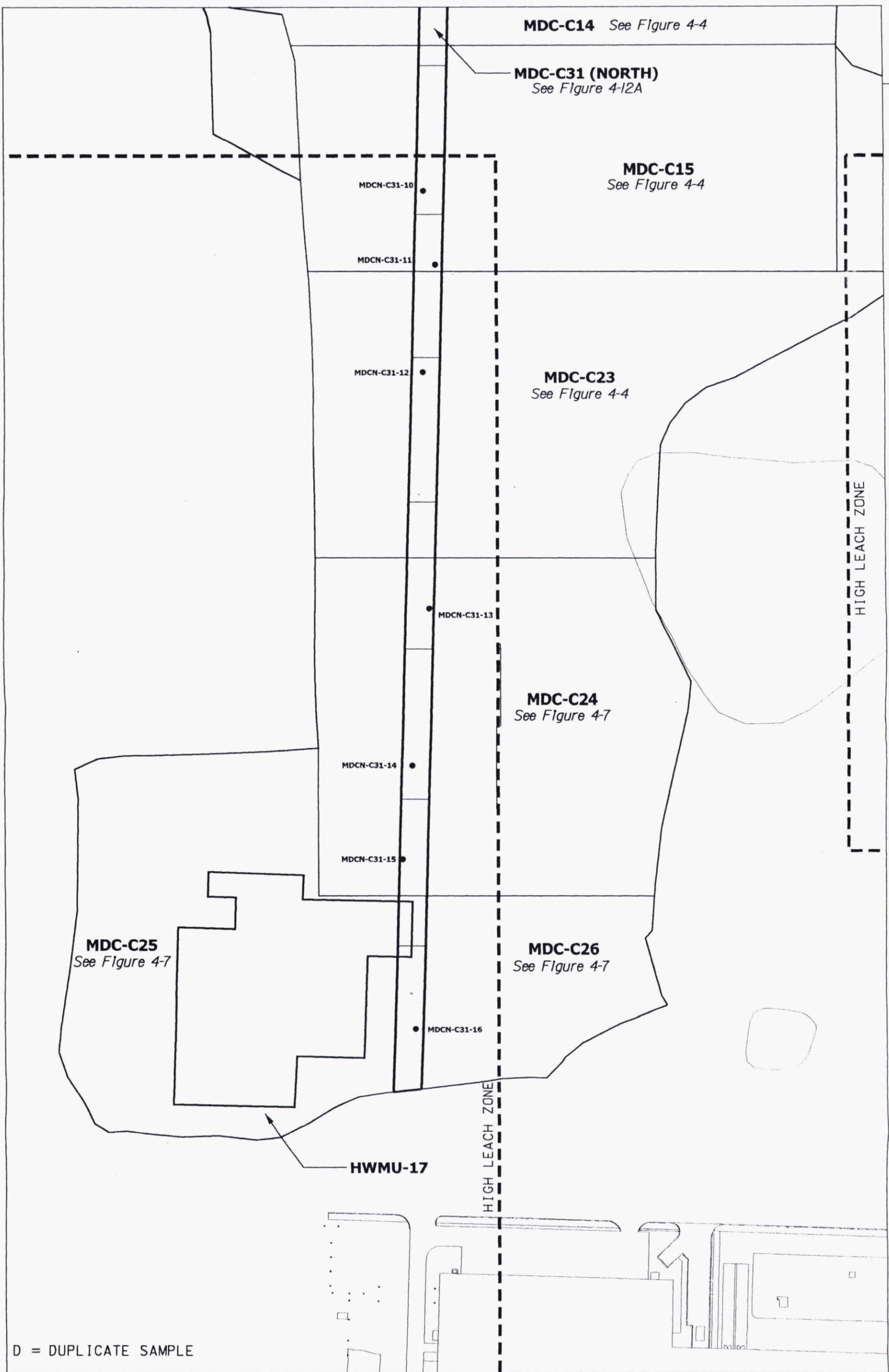


FIGURE 4-12A. CERTIFICATION SAMPLING LOCATIONS FOR THE NORTHERN HALF OF CU31



D = DUPLICATE SAMPLE

LEGEND:

● SAMPLE LOCATION

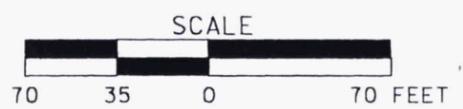


FIGURE 4-12B. CERTIFICATION SAMPLING LOCATIONS FOR THE SOUTHERN HALF OF CU31

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **YES**

V/F: 20810-PSP-0010-03

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 3

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 2/03/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of a grab soil sample for total uranium (TAL Z) from a 3xFRL excavated area in CU 28 (sub-CU MDC-C28-H36-7). The excavated area is approximately 10 feet by 10 feet and is two feet deep.

One sample has been randomly located and will be collected from the floor of the excavation in this sub-CU. This point meets the minimum distance criteria. The sample ID is MDC-C28-H36-7C^R and the coordinates are Northing and Easting (see Figure 1). The Sampling and Analytical Requirements are listed in Attachment 1.

^ ^
480690.74 1350127.12

- Field sketch required: Yes
- Surveying required: Yes, Surveyors will survey this sample point
- Field QC samples required: No
- Field data validation: Yes
- Analytical data validation: Yes, VSL B
- Data package requirements: COAs within 24 hrs. Full ASL D/E data package within 7 days.

The highest total uranium result for this area is 30.8 mg/kg from boring A4B-C06-H49-7.

Justification:

A 3xFRL sample result for total uranium was detected in sub-CU MDC-C28-H36-7. This area was bound under V/FCN 20810-PSP-0010-01 was excavated to remove the elevated uranium soil. This newly collected sample will replace the previously collected uranium sample and will be used in the statistical analysis of this CU. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 2/03/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE: R. Friske <i>R. Friske</i>	2/6/06	X	PROJECT MANAGER: J.D. Chuou <i>J.D. Chuou</i>	2/3/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER: F. Miller <i>Frank Miller</i>	2/3/06
X	ANALYTICAL CUSTOMER SUPPORT <i>Paul S. Medwigen</i>	2/3/06		RTIMP Manager	
	WAO		X	Sampling Manager: T. Buhage <i>T. Buhage</i>	2/3/06

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:

TAL 20810-PSP-0010-Z

Component	MDL
Total uranium	2.0 mg/kg

SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Sample Matrix	TAT	ASL	Preservative	Holding Time	Container	Sample Volume/Mass
TAL Z	Solid	24 hr	D/E	None	12 months	Appropriate Plastic or Glass	300 g



State of Ohio Environmental Protection Agency

Southwest District

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Bob Taft, Governor
Bruce Johnson, Lt. Governor
Joseph P. Koncelik, Director

MEMO

TO: J.D. Chiou, Fluor Fernald

FROM: Donna Bohannon, Ohio EPA/OFFO

DATE: February 3, 2006

SUBJECT: *V/FCN: 20810-PSP-0010-03 CDL & Certification PSP For A6 FPA & MDC Area*

This V/FCN documents the collection of one soil sample from the floor of an excavated 10 X 10 ft area with a depth of 2 feet, from CU28/sub-CU MDC-C28-H36-7 for total uranium. The original sample reported a result greater than three times the FRL, which in turn was bound through VFCN 20810-PSP-0010-01 and excavated to remove the contamination. The proposed grab sample, MDC-C28-H36-7C^R, will be collected from the floor of the excavation and the result will be used in the statistical analysis of CU28. Ohio EPA approves of this variance.

Q:\ou5\A6\CDL&CertPSPA6FPA&MDCVFCN2.wpd

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **NO**

V/F: 20810-PSP-0010-04

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 2

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 2/16/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the correction of CU 15's sample IDs listed in Appendix C of the CDL/PSP. See Attachment 1 for the correct list of sample IDs for CU 15.

Justification:

CU 15's sample IDs were inadvertently designated as having semi-volatile organic compounds (SVOCs) associated with them ("S" designation in sample ID). However, SVOCs were neither required nor collected in CU 15. Therefore, the "S" designation is being removed from the CU 15 sample IDs. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 2/16/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE <i>[Signature]</i>	2/27/06	X	PROJECT MANAGER J.D. Chou <i>[Signature]</i>	2/16/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER Frank Miller <i>[Signature]</i>	2/16/06
X	ANALYTICAL CUSTOMER SUPPORT <i>[Signature]</i>	2/22/06		RTIMP Manager	
	WAO		X	Sampling Manager Tom Sulek <i>[Signature]</i>	3/3/06

VARIANCE/FCN APPROVED YES NO

REVISION REQUIRED: YES NO

DISTRIBUTION

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

ATTACHMENT 1
CU 5 SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth	Sample ID	TAL	North-83	East-83
15	15-1V	0"-6"	MDC-C15-1^V	Archive	480828.16	1349174.14
	15-2	0"-6"	MDC-C15-2^RMP	BLP	480816.64	1349210.63
	15-3	0"-6"	MDC-C15-3^RMP	BLP	480727.85	1349152.14
	15-4	0"-6"	MDC-C15-4^RMP	BLP	480748.84	1349202.22
	15-5	0"-6"	MDC-C15-5^RMP	BLP	480827.83	1349273.33
	15-6D	0"-6"	MDC-C15-6^RMP	BLP	480821.64	1349327.15
			MDC-C15-6^RMP-D			
	15-7V	0"-6"	MDC-C15-7^V	Archive	480718.39	1349253.08
	15-8	0"-6"	MDC-C15-8^RMP	BLP	480708.94	1349324.91
	15-9	0"-6"	MDC-C15-9^RMP	BLP	480791.53	1349351.01
	15-10	0"-6"	MDC-C15-10^RMP	BLP	480847.81	1349425.79
	15-11V	0"-6"	MDC-C15-11^V	Archive	480722.11	1349364.26
	15-12	0"-6"	MDC-C15-12^RMP	BLP	480747.32	1349419.21
	15-13	0"-6"	MDC-C15-13^RMP	BLP	480827.17	1349472.56
	15-14V	0"-6"	MDC-C15-14^V	Archive	480803.18	1349510.1
	15-15	0"-6"	MDC-C15-15^RMP	BLP	480721	1349471.26
	15-16	0"-6"	MDC-C15-16^RMP	BLP	480753.01	1349506.1
	15-17	0"-6"	MDC-C15-17^RMP	BLP	480808.75	1349107.27
15-18	0"-6"	MDC-C15-18^RMP	BLP	480854.19	1349113.47	

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **NO**

V/F: 20810-PSP-0010-05

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 1

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 2/17/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the collection of three grab compost samples for TAL A from the Area 6 FPA/MDC (Area 6C) where the compost from the OSDF was spread. The first sample (FPA-COMPOST-1^R) shall be collected from the location that Real-Time is performing their HPGe Phase 2 verification location. The remaining two samples (FPA-COMPOST-2^R and FPA-COMPOST-3^R) shall be field located at representative spacing of the area based on the field lead's professional judgment.

- Field sketch required: Yes
- Surveying required: Yes, Surveyors will survey the sampling locations.
- Field QC samples required: No
- Field data validation: Yes
- Analytical data validation: Yes, VSL D
- Data package requirements: 10-day PEDD, Full ASL D/E data package within 30 days.

The highest total uranium result for this area is 14.4 mg/kg from boring MDC-C07-12.

Justification:

The compost was used in the OSDF to try to keep the underlying ground from freezing. Permission was given by the Agencies to remove this compost from the OSDF, spread it in a certified in progress area, perform real-time scans, and collect physical samples of the compost. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 2/17/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE <i>[Signature]</i>		X	PROJECT MANAGER JD Chou <i>[Signature]</i>	2/21/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER F Miller <i>[Signature]</i>	2/17/06
X	ANALYTICAL CUSTOMER SUPPORT <i>[Signature]</i>	2/21/06		RTIMP Manager	
	WAO		X	Sampling Manager T. Hurlage <i>[Signature]</i>	2/21/06
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

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **NO**

V/F: 20810-PSP-0010-06

WBS NO.: PROJECT/DOCUMENT/ECDC #20600-PSP-0017 REV 0 ^{20810-PSP-0010 Rev 0} 2/2 3/7/06

Page: 1 of 1

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 2/9/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance documents the choice of analytical methods to analyze the samples collected under V/FCN 20810-PSP-0010-03. The choice of analytical methods is Gamma Spectroscopy or ICP/MS.

Justification:

Either method is an acceptable SCQ method. The choice for ICP/MS was inadvertently omitted from the PSP.

REQUESTED BY: Greg Lupton

Date: 2/27/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE / Triske <i>[Signature]</i>	3/7/04	X	PROJECT MANAGER / JD Ch... <i>[Signature]</i>	2/28/06
	DATA QUALITY MANAGEMENT		X	CHARACTERIZATION MANAGER / Miller <i>[Signature]</i>	2/27/06
X	ANALYTICAL CUSTOMER SUPPORT WAG <i>[Signature]</i>	2/27/06		R/IMP Manager	
				Sampling Manager / Buhrhage	

VARIANCE/FCN APPROVED YES NO

REVISION REQUIRED: YES NO

DISTRIBUTION

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

VARIANCE / FIELD CHANGE NOTICE

Significant?
(Yes or No): **YES**

V/F: 20810-PSP-0010-07

WBS NO.: PROJECT/DOCUMENT/ECDC #20810-PSP-0010 REV 0

Page: 1 of 3

PROJECT TITLE: Certification Design Letter And Certification Project Specific Plan For Area 6 Former Production Area And Main Drainage Corridor Area

Date: 3/21/06

VARIANCE / FIELD CHANGE NOTICE (Include justification):

This Variance/Field Change Notice (V/FCN) documents the addition of a certification unit to this plan to cover an omitted Hazardous Waste Management Unit (HWMU 11, Tank Farm Sump). This variance also provides the direction for the collection of eight grab soil samples for pH (TAL A1) from CU 32 (HWMU 11).

The Sampling Location Information, Sampling and Analytical Requirements, and TAL A1 (soil pH) are listed in Attachment 1. See Figure 1 for sampling locations. Sampling locations will be surveyed prior to sample collection.

Justification:

HWMU 11 was originally omitted from this effort due to the fact that the single constituent of concern for this HWMU is pH. There is no General Cleanup Number (GCN) in the Draft Closure Plan Review Guidance for RCRA Facilities (OEPA 2004) by the OEPA DHWM that is used to satisfy HWMU closure. In order to provide information that may be used to close HWMU 11 (Tank Farm Sump), soil pH samples are required. Per Section 4.3 of the PSP, the changes to the PSP will be documented with a V/FCN.

REQUESTED BY: Greg Lupton

Date: 3/21/06

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE R. Frick <i>Richard Sheper</i> DATA QUALITY MANAGEMENT	3/24/06	X	PROJECT MANAGER J.D. Chou <i>J.D. Chou</i>	3/22/06
			X	CHARACTERIZATION MANAGER Frank Miller <i>Frank Miller</i>	3/21/06
X	ANALYTICAL CUSTOMER SUPPORT <i>Paul J. McGurgan</i> WAO	3/21/06	X	RTIMP Manager <i>Tom Buhlert</i>	3/22/06
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:

Sample Location Information, Sampling and Analytical Requirements, and TALs

CU	Location	Depth	Sample ID	TAL	North-83	East-83
32	32-1	0"-6"	MDC-C32-H11-1^PH	A1	481085.49	1349333.08
	32-2D	0"-6"	MDC-C32-H11-2^PH	A1	481051.96	1349379.56
			MDC-C32-H11-2^PH-D			
	32-3	0"-6"	MDC-C32-H11-3^PH	A1	481083.94	1349449.42
	32-4	0"-6"	MDC-C32-H11-4^PH	A1	481066.35	1349416.36
	32-5	0"-6"	MDC-C32-H11-5^PH	A1	481017.98	1349301.44
	32-6	0"-6"	MDC-C32-H11-6^PH	A1	480989.58	1349360.48
	32-7	0"-6"	MDC-C32-H11-7^PH	A1	481025.71	1349419.08
32-8	0"-6"	MDC-C32-H11-8^PH	A1	480977.46	1349455.86	

20810-PSP-0010-A1

(9 soil samples, analysis specified in V/FCN)

TAL	Analyte	Method	Matrix	ASL	TAT	Preservative	Container	Minimum Mass/Volume
A1	pH	9045d	Soil	B	7 days	none	Glass	4 oz

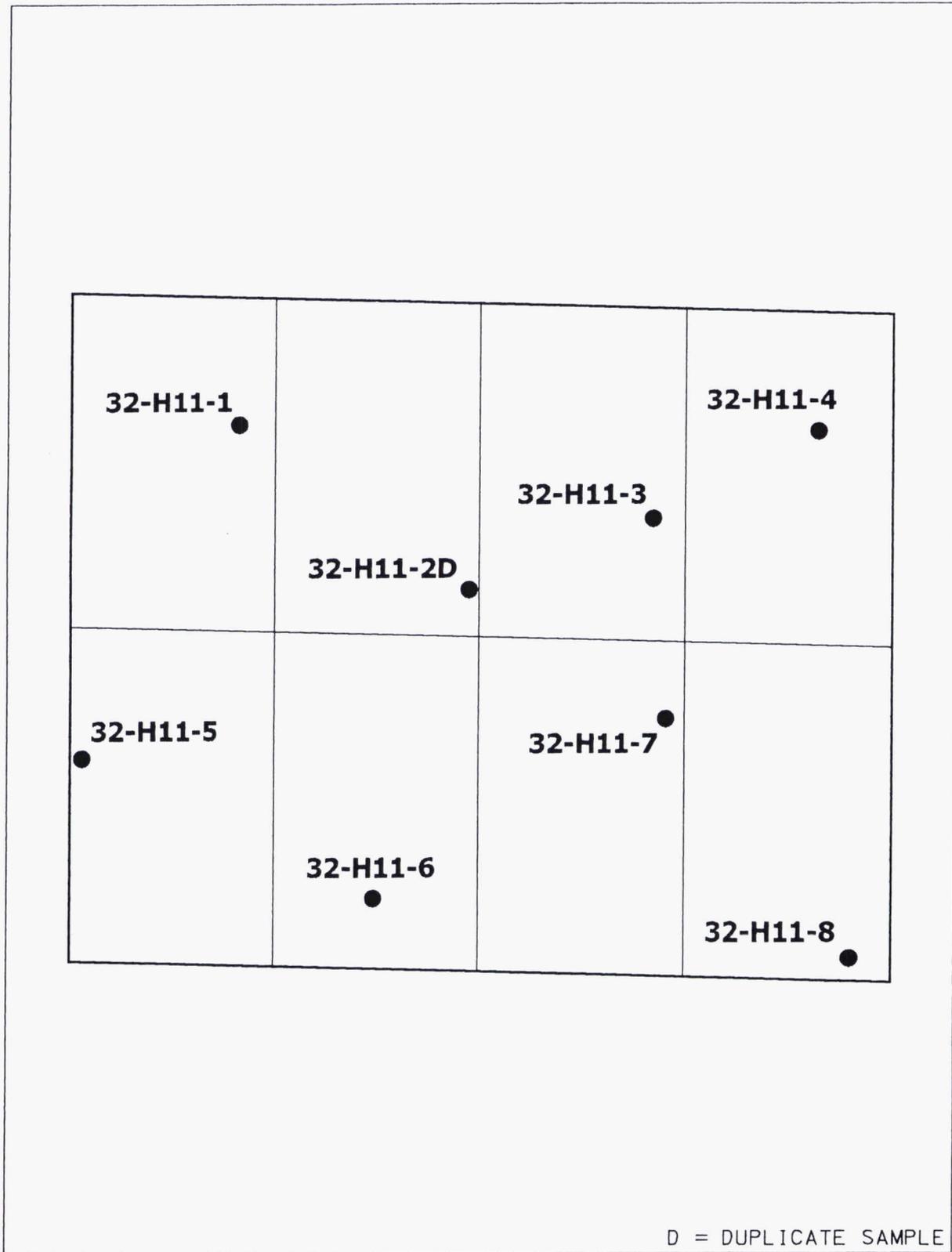
Special Instructions (SPL/Lab):

Analytical Data Validation: Yes

Data Package Requirement – ASL B

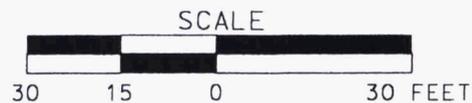
The highest total uranium result for the area is 9.37 mg/kg from boring MDC-C14-8.

N



LEGEND:

● SAMPLE LOCATION



DRAFT

FIGURE 1. CU-32 (HWMU-11 - TANK FARM SUMP) CERTIFICATION SAMPLES

MEMORANDUM

To: J. D. Chiou, Fluor Fernald
From: Tom Ontko, Ohio EPA, DHWM
Re: V/FCN 20810-PSP-0010-07
Date: March 24, 2006

This VCN changes the sampling and analysis Plan of the Certification Design Letter and Certification Project Specific Plan for Area 6 Former Production Area and Main Drainage Corridor Area. This is considered a significant change.

This change adds 8 sampling locations in CU 32 for the purpose of demonstrating closure of HWMU 11, the Tank Farm Sump. The locations are to be sampled for soil pH.

The Division of Hazardous Waste Management concurs with this change.