006149

Department of Energy

Ohio Field Office
Fernald Closure Project
175 Tri-County Parkway
Springdale, Ohio 45246

JUN 2 6 2006

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

DOE-0142-06

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

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF THE DRAFT CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR THE STREAM CORRIDORS PADDYS RUN AND PILOT PLANT DRAINAGE DITCH

Enclosed for your review is the draft Certification Design Letter and Certification Project Specific Plan for the Stream Corridors Paddys Run and Pilot Plant Drainage Ditch.

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

Sincerely,

Johnny Reising

Johnny W. Reising
Director

Enclosure

cc w/enclosure:
J. Desormeau, OH/FCP
T. Schneider, OEPA-Dayton (three copies of enclosure)
G. Jablonowski, USEPA-V, SRF-5J
M. Cullerton, Tetra Tech
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C. Murphy, Fluor Fernald, Inc./MS1

006149

CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR THE STREAM CORRIDORS PADDYS RUN AND PILOT PLANT DRAINAGE DITCH

FERNALD CLOSURE PROJECT
FERNALD, OHIO

JUNE 2006

U.S. DEPARTMENT OF ENERGY

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REVISION B
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CERTIFICATION DESIGN LETTER AND CERTIFICATION PROJECT SPECIFIC PLAN FOR THE STREAM CORRIDORS PADDYS RUN AND PILOT PLANT DRAINAGE DITCH

Document Number 20820-PSP-0004
Revision B

June 2006

APPROVAL:

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Jyh-Dong Chiou, Project Manager — Date
Environmental Closure Project

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Rich Abitz, Characterization Manager — Date
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Tom Buhrlage, Sampling Manager — Date
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Reinhard Friske, Quality Assurance/Quality Control — Date
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FERNALD CLOSURE PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

ASCOC	area-specific constituent of concern
ASL	Analytical Support Level
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CRDL	contract required detection limit
CU	certification unit
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
EPA	U.S. Environmental Protection Agency
FACTS	Fernald Analytical Computerized Tracking
FAL	Field Activity Log
FCP	Fernald Closure Project
FRL	final remediation level
GPS	Global Positioning System
HWMU	hazardous waste management unit
MDC	minimum detectable concentration
MDL	minimum detectable level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
QA/QC	Quality Assurance/Quality Control
pCi/g	picoCuries per gram
pCi/L	picoCuries per Liter
PPDD	Pilot Plant Drainage Ditch
PR	Paddys Run
PSP	Project Specific Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTIMP	Real-Time Instrumentation Measurement Program
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	Target Analyte List
TAT	Turn-Around-Time
UCL	Upper Confidence Limit
UST	underground storage tank
V/FCN	Variance/Field Change Notice
VSL	Validation Support Level
WAO	Waste Acceptance Organization

EXECUTIVE SUMMARY

This document, as with others recently submitted, represents a combination of the Certification Design Letter (CDL) and Certification Project Specific Plan (PSP) for the Stream Corridors Paddys Run/Pilot Plant Drainage Ditch (PR/PPDD) into one document. This document describes the certification design, sampling, analysis, and validation for the PR/PPDD. Certification demonstrates that area-specific constituents of concern (ASCOCs) meet the risk based final remediation levels. The following information is included:

- The boundaries and a description of the areas to be certified under the guidance of this document;
- A discussion of historical data from the areas proposed for certification;
- A discussion of the ASCOC selection process and list of ASCOCs assigned to the PR/PPDD;
- A presentation of the certification unit (CU) boundaries and proposed sampling strategy;
- Details of certification sampling, analysis, and validation that will take place;
- The analytical requirements and the statistical methodology that will be employed; and
- The proposed schedule for the certification activities.

The scope of this CDL/Certification PSP is limited to the PR/PPDD and the area immediately surrounding/adjacent to these areas, as shown in Figure 1-1. Remediation of this area was completed in June 2006. The Stream Corridors Storm Sewer Outfall Ditch has been submitted for certification under separate documentation.

The certification design presented in this document follows the general approach outlined in Section 3.4 of the Sitewide Excavation Plan (SEP, DOE 1998). The subject areas have been characterized through previous sampling investigations and scanning with real-time equipment as well as physical sampling for non-radiological constituents.

Because the stream corridors carried run-off from virtually every remediation area, the entire list of constituents of concern (COCs) presented in Table 2-7 of the SEP was initially retained and submitted for analysis. The small, isolated occurrences of uranium contamination found along the PPDD during the Predesign Investigation were the only COCs identified as requiring remediation. The PR/PPDD Area consists of 21 CUs as shown in Figure 4-1. Total uranium, thorium-228, thorium-232, radium-226, and radium-228 (the sitewide primary radiological COCs) are considered ASCOCs for all CUs in this area. Upon completion of the certification activities described in this document, a Certification Report will be issued.

1.0 INTRODUCTION

This Certification Design Letter (CDL)/Certification Project Specific Plan (PSP) describes the certification design, sampling, analysis, and validation necessary to demonstrate that soil in Stream Corridors Paddys Run/Pilot Plant Drainage Ditch (PR/PPDD) Area has met the final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). Certification demonstrates that ASCOCs meet the risk based FRLs. The format of this document follows (in general) guidelines presented in the Sitewide Excavation Plan (SEP, DOE 1998) and SEP Addendum (DOE 2001a). Accordingly, it consists of ten sections:

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

2.0 Historical and Precertification Data - Presentation and discussion of historical soil data and presentation of precertification data from the PR/PPDD

3.0 Area-Specific Constituents of Concern - Discussion of selection criteria and ASCOCs for the PR/PPDD

4.0 Certification Design and Sampling Program - Presentation of design, surveying, sampling and analytical methodologies

5.0 Schedule

6.0 Quality Assurance/Quality Control Requirements - Presents the field Quality Control (QC), analytical, and data validation requirements

7.0 Health and Safety

8.0 Disposition of Waste

9.0 Data Management

References

The major remediation actions for this area included excavation of three above-FRL areas located along the PPDD and its immediate surrounding area as well as the removal of three debris fields located within the area. The 20 certifications units (CUs) in this area are clearly defined within this document as shown in Figure 4-1.

1.1 OBJECTIVES

The primary objectives of this document are to:

- Define the boundaries of the areas to be certified under the guidance of this CDL/Certification PSP;
- Define the ASCOC selection process and list the selected PR/PPDD ASCOCs;
- Present the CU boundaries and proposed certification sampling strategy;
- Present the details of certification sampling, analysis and validation that will take place;
- Summarize the analytical requirements and the statistical methodology employed;
- Present maps for acquired real-time precertification data; and
- Present the proposed schedule for the certification activities.

1.2 SCOPE AND AREA DESCRIPTION

The scope of this CDL/Certification PSP includes details of certification sampling, analysis and validation that will take place along PR/PPDD and their immediate surrounding area, an area consisting of approximately 26.3 acres. Figure 1-1 depicts the boundaries, location, and layout of the PR/PPDD. The topography of this area is presented in Figure 1-2.

Just as with other areas, certification of Stream Corridors is being performed in phases based on the required action for each of the defined sections to be found in this area. This document only deals with the PR/PPDD. The Storm Sewer Outfall Ditch has been submitted for certification under separate documentation.

Field activities for the PR/PPDD will be consistent with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ) and Section 3.4 of the SEP. This certification sampling program as discussed in Section 4.0 of this document will be consistent with Data Quality Objectives (DQO) SL-052, Revision 3, which is included as Appendix B. The sampling proposed in this CDL/Certification PSP will begin following approval of this document.

The ASCOCs for the CUs in the PR/PPDD are total uranium, thorium-228, thorium-232, radium-226, and radium-228 [the sitewide primary radiological constituents of concern (COCs)].

1.3 KEY PROJECT PERSONNEL

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

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
Department of Energy (DOE) Contact	Johnny Reising	TBD
Project Manager	Jyh-Dong Chiou	Rich Abitz
Characterization Manager	Rich Abitz	Debbie Brennan
Stream Corridors Characterization Lead	Debbie Brennan	Krista Flaugh
RTIMP Manager	Mike Frank	Dale Seiller
Field Sampling Manager	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton/ Bernie Keinow
WAO Contact	Lawrence Love	Scott Osborn
Laboratory Contact	Paul McSwigan	Amy Meyer
Data Validation Contact	Jim Chambers	Baohe Chen
Field Data Validation Contact	Ervin O'Bryan	Jim Chambers
Data Management Lead	Debbie Brennan	Krista Flaugh
FACTS/SED Database Contact	Larry Harmon	Susan Marsh
Quality Assurance Contact	Reinhard Friske	Darren Wessel
Safety and Health Contact	Garner Powell	Jeff Middaugh

FACTS - Fernald Analytical Computerized Tracking
RTIMP - Real-Time Instrumentation Measurement Program
SED - Sitewide Environmental Database
WAO - Waste Acceptance Organization

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STATE PLANAR COORDINATE SYSTEM 1983

20-JUN-2006

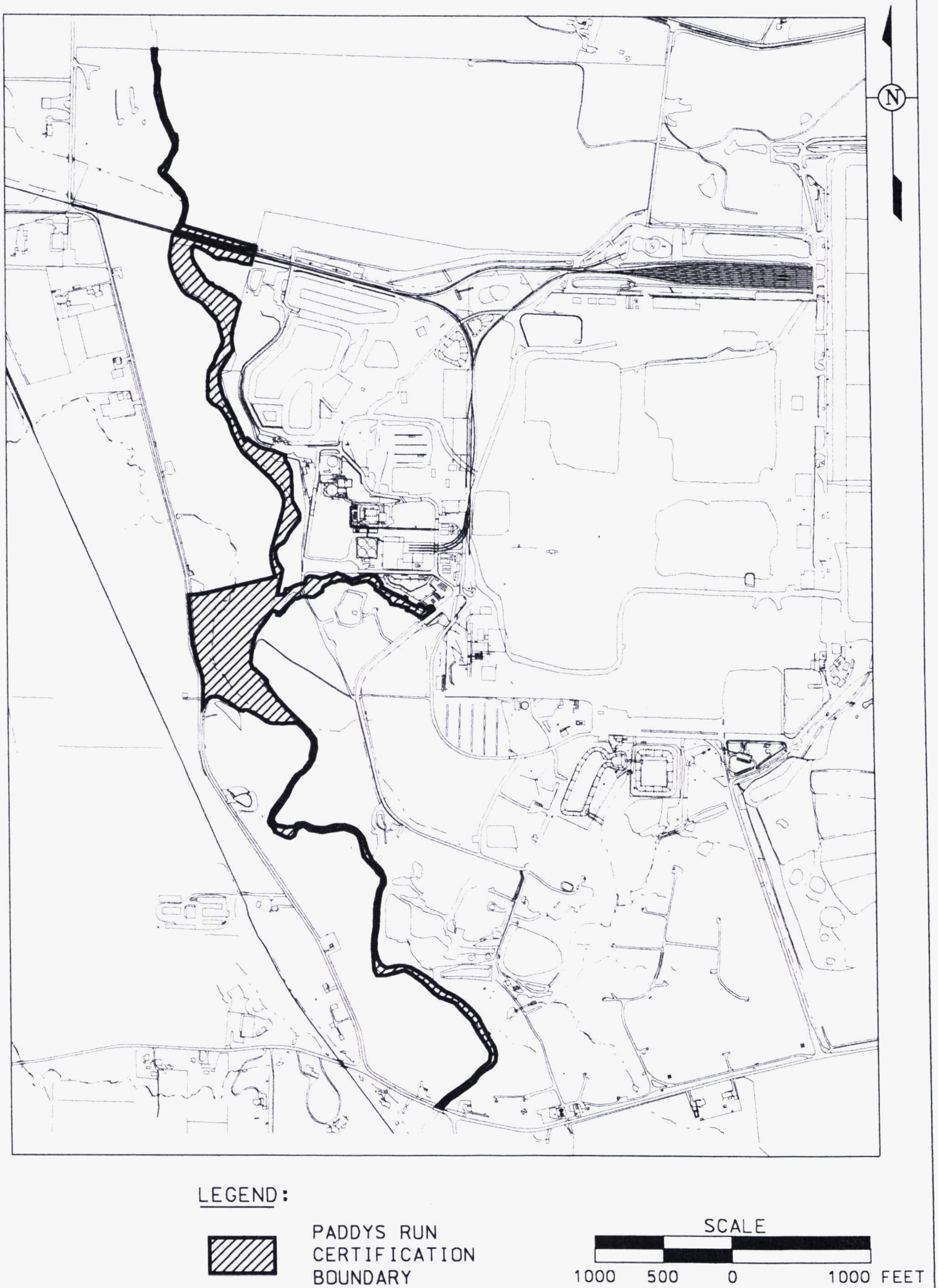

FIGURE 1-1. PADDYS RUN AND PILOT PLANT DRAINAGE DITCH AREA LOCATION MAP

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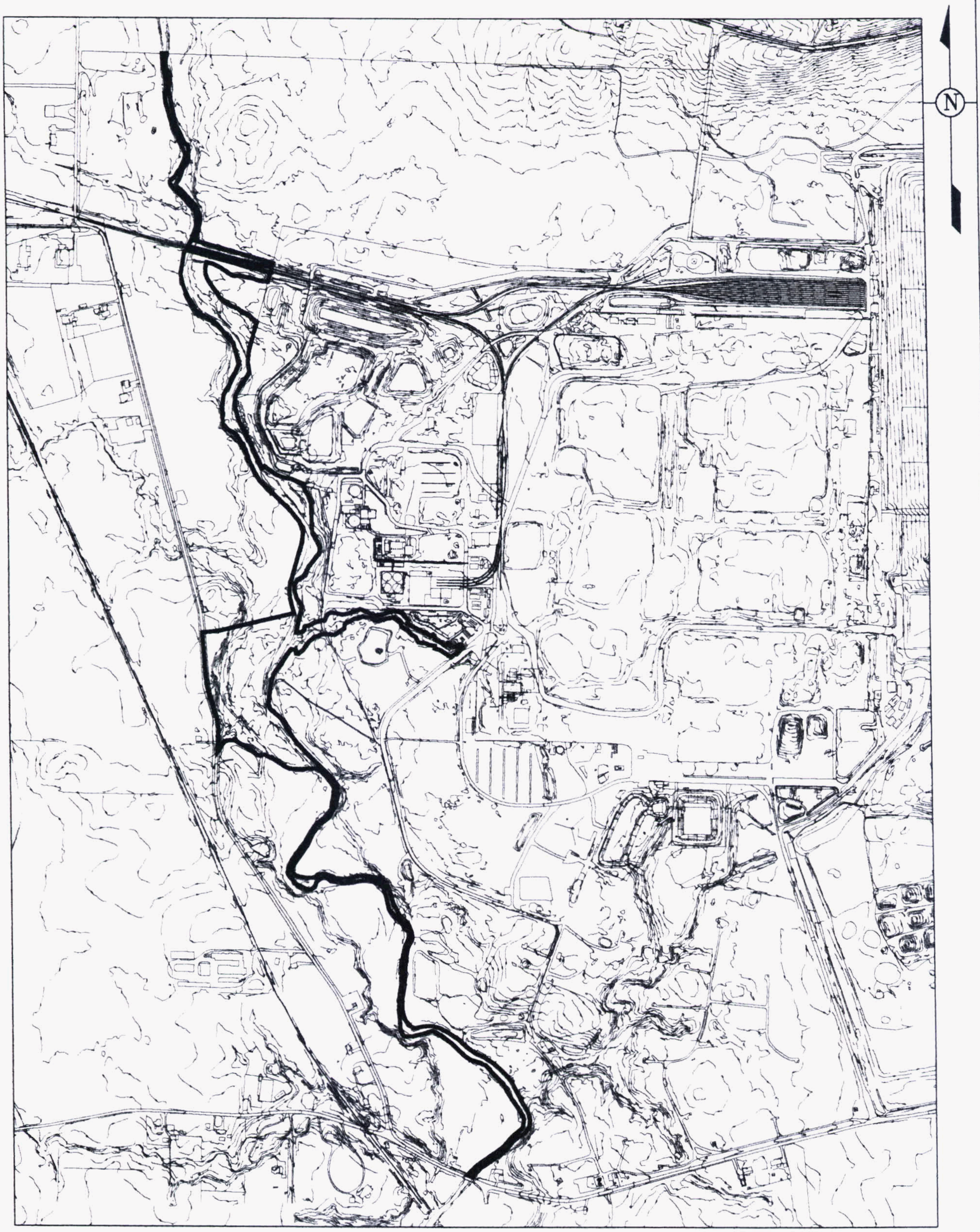
STATE PLANAR COORDINATE SYSTEM 1983

20-JUN-2006



LEGEND:

SCALE

1000 500 0 1000 FEET

FIGURE 1-2. PADDYS RUN/PILOT PLANT DRAINAGE DITCH - TOPOGRAPHY

2.0 HISTORICAL AND PRECERTIFICATION DATA

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

Before initiating the certification process, all historical soil data within the PR/PPDD Area were pulled from the Sitewide Environmental Database (SED). The purpose of gathering real-time scanning and/or physical sampling data within the PR/PPDD is to determine if the area is ready for certification. Characterization data have been collected from the PR/PPDD as part of the sampling activities prescribed by the 20300-PSP-0013, PSP for the Predesign Characterization of Sediments in Paddys Run and Associated Drainage Features (DOE 2004). Real-time scanning data have been collected as specified in 20300-PSP-0008, PSP for Real-Time Scan of Paddys Run Corridor and Associated Drainage Features (DOE 2003). Based on the results of the above activities, three areas were identified that required remediation due to uranium. The data from the activities mentioned above along with the remedial design were presented in the Excavation Plan for Stream Corridors Pilot Plant Drainage Ditch and Paddys Run (DOE 2005a). After completing the excavations as described in that plan as well as removing three debris fields located along Paddys Run, it was determined that no further remedial actions will be required prior to certification activities for PR/PPDD beginning.

2.1 PADDYS RUN/PILOT PLANT DRAINAGE DITCH

2.1.1 Historical, Predesign and Excavation Control

Because of the limited Operable Unit 5 (OU5) Remedial Investigation and Feasibility Study (RI/FS, DOE 1995a and 1995b) data available for the PR/PPDD, extensive characterization was undertaken during predesign. The results of the predesign investigations are presented in the Excavation Plan for Stream Corridors Pilot Plant Drainage Ditch and Paddys Run.

Excavation of the PR/PPDD began in July 2005. Three areas along the PPDD were excavated due to above-FRL contamination of various COCs (see Figure 2-1). Real-Time Measurement Systems controlled all excavations. Also, miscellaneous debris or "discovered" impacted/contaminated material were removed.

2.1.2 Precertification Data

According to guidelines established in Section 3.3.3 of the SEP, precertification activities were conducted to evaluate residual radiological contamination patterns as specified in the Excavation Control PSP for the Stream Corridors (DOE 2005b).

Precertification real-time scanning results are presented in Appendix A. The areas within the PR/PPDD not covered by real-time scanning (as shown on the figures in Appendix A) are either areas with steep slopes, dense vegetation, or areas that typically are not free of water. Because of one or more of the above-mentioned conditions, it was not always possible to do real-time analysis. When this occurred, it was so noted on the figures in Appendix A. These areas will be adequately represented during certification sampling as illustrated in Figures 4-2 through 4-9.

3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

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

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

3.1 SELECTION CRITERIA

All of the sitewide primary ASCOCs (total uranium, radium-226, radium-228, thorium-232, and thorium-228) will be retained as ASCOCs for certification. The selection process for retaining secondary ASCOCs for a remediation area is driven by applying a set of decision criteria. A soil contaminant will be retained as a secondary ASCOC if:

- It was retained as an ASCOC in adjacent Fernald Closure Project (FCP) soil remediation areas;
- It is listed as a soil COC in the OU5 ROD, and it is listed as an ASCOC in Table 2-7 of the SEP for the Remediation Area of interest;
- It is listed as a COC for a hazardous waste management unit (HWMU) or underground storage tank (UST) that lie within the certified area boundary;
- Analytical results show that a contaminant is present above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs;
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment; or

- Physical characteristics of the contaminant, such as degradation rate and volatility, indicate it is likely to persist in the soil between time of release and remediation.

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

3.2 ASCOC SELECTION PROCESS

3.2.1 PR/PPDD - ASCOC Selection

Each ASCOC on the Stream Corridors ASCOC list (see Table 3-1) was evaluated for its relevance to the PR/PPDD. Table 3-2 presents the reason for either retaining or eliminating each ASCOC. In summary, uranium was the only COC identified as above-FRL and needing remediation within this area. Therefore, total uranium, radium-226, radium-228, thorium-228, and thorium-232, which are sitewide primary ASCOCs, will be retained as ASCOCs for the PR/PPDD CUs. The list of COCs retained for certification can be found in Table 3-3.

TABLE 3-1
ASCOCs FOR PADDYS RUN/PPDD

Primary COCs	Secondary COCs
Radium-226	1,1-Dichloroethene
Radium-228	Antimony
Thorium-228	Aroclor-1254
Thorium-232	Aroclor-1260
Total Uranium	Arsenic
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(b)fluoranthene
	Benzo(g,h,i)perlene
	Benzo(k)fluoranthene
	Beryllium
	Bromodichloromethane
	Cadmium
	Cesium-137
	Chrysene
	Dibenzo(a,h)anthracene
	Dieldrin
	Fluoranthene
	Fluoride
	Indeno(1,2,3-cd)pyrene
	Lead
	Lead-210
	Manganese
	Molybdenum
	Neptunium-237
	Phenantrene
	Plutonium-238
	Pyrene
	Silver
	Strontium-90
	Technetium-99
	Tetrachloroethene
	Thorium-230
	Trichloroethene

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TABLE 3-2
ASCOC LIST FOR PADDYS RUN/PPDD

Stream Corridors ASCOCs	Retained As ASCOC?	Justification	CUs
PRIMARY ASCOCs			
Radium-226	Yes	Retained as primary ASCOC	All
Radium-228	Yes	Retained as primary ASCOC	All
Thorium-228	Yes	Retained as primary ASCOC	All
Thorium-232	Yes	Retained as primary ASCOC	All
Total Uranium	Yes	Retained as primary ASCOC	All
SECONDARY ASCOCs			
1,1-Dichloroethene	No	No results at or greater than FRL during Predesign	None
Antimony	No	No results at or greater than FRL during Predesign	None
Aroclor-1254	No	No results at or greater than FRL during Predesign	None
Aroclor-1260	No	No results at or greater than FRL during Predesign	None
Arsenic	No	No results above background during Predesign*	None
Benzo(a)anthracene	No	No results at or greater than FRL during Predesign	None
Benzo(a)pyrene	No	No results at or greater than FRL during Predesign	None
Benzo(b)fluoranthene	No	No results at or greater than FRL during Predesign	None
Benzo(g,h,i)perlene	No	No results at or greater than FRL during Predesign	None
Benzo(k)fluoranthene	No	No results at or greater than FRL during Predesign	None
Beryllium	No	No results at or greater than FRL during Predesign	None
Bromodichloromethane	No	No results at or greater than FRL during Predesign	None
Cadmium	No	No results at or greater than FRL during Predesign	None
Cesium-137	No	No results at or greater than FRL during Predesign	None
Chrysene	No	No results at or greater than FRL during Predesign	None
Dibenzo(a,h)anthracene	No	No results at or greater than FRL during Predesign	None
Dieldrin	No	No results at or greater than FRL during Predesign	None
Fluoranthene	No	No results at or greater than FRL during Predesign	None
Fluoride	No	No results at or greater than FRL during Predesign	None
Indeno(1,2,3-cd)pyrene	No	No results at or greater than FRL during Predesign	None
Lead	No	No results at or greater than FRL during Predesign	None
Lead-210	No	No results at or greater than FRL during Predesign	None
Manganese	No	No results at or greater than FRL during Predesign	None
Molybdenum	No	No results at or greater than FRL during Predesign	None
Neptunium-237	No	No results at or greater than FRL during Predesign	None
Phenantrene	No	No results at or greater than FRL during Predesign	None
Plutonium-238	No	No results at or greater than FRL during Predesign	None
Pyrene	No	No results at or greater than FRL during Predesign	None
Silver	No	No results at or greater than FRL during Predesign	None
Strontium-90	No	No results at or greater than FRL during Predesign	None

TABLE 3-2
ASCOC LIST FOR PADDYS RUN/PPDD

Stream Corridors ASCOCs	Retained As ASCOC?	Justification	CUs
SECONDARY ASCOCs (Continued)			
Technetium-99	No	No results at or greater than FRL during Predesign	None
Tetrachloroethene	No	No results at or greater than FRL during Predesign	None
Thorium-230	No	No results at or greater than FRL during Predesign	None
Trichloroethene	No	No results at or greater than FRL during Predesign	None

*Based on the approved Excavation Plan, although Arsenic was present at above-FRL levels in this area, it is consistent with the background levels as identified in the CERCLA/RCRA Background Soil Study (DOE 1993) and it's associated addendum (DOE 2001b). Therefore, Arsenic will not be retained as an ASCOC for this area certification effort.

TABLE 3-3
ASCOC LIST FOR PADDYS RUN/PPDD CERTIFICATION UNITS

ASCOC	MDC	FRL
Total Uranium	8.2 mg/kg	82 mg/kg
Radium-226	0.17 pCi/g	1.7 pCi/g
Radium-228	0.18 pCi/g	1.8 pCi/g
Thorium-228	0.17 pCi/g	1.7 pCi/g
Thorium-232	0.15 pCi/g	1.5 pCi/g

MDC - minimum detectable concentration
mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram

4.0 CERTIFICATION DESIGN AND SAMPLING PROGRAM

4.1 CERTIFICATION DESIGN

The intent of this effort is to certify the soil within the PR/PPDD Area. The certification design for the PR/PPDD (see Figure 4-1) follows the general approach outlined in Section 3.4 of the SEP. The CUs design and sample locations are depicted in Figures 4-2 through 4-10. Twenty-one CUs were designed to represent the PR/PPDD. As discussed in Section 3.0 of this document, the five primary ASCOCs (total uranium, radium-226, radium-228, thorium-228, thorium-232) will be retained in each CU.

Several factors were taken into consideration when determining the boundaries for each CU within the PR/PPDD. Some of these include: historical land use, proximity to other areas of the site, contours of the area to be certified and COC data. Additionally, because the area contained impacted material, it will be comprised of Group 1 CUs to allow for more concentrated sampling and ensure excavation activities and removal of above and below grade structures had no effect on the soil.

4.1.1 Certification Unit Design

The PR/PPDD Area consists of 21 Group 1 CUs that were designed around a combination of former land use, location, shape, and COCs for each area. The PR/PPDD Area encompasses the streambed itself, the banks, areas excavated as part of the remediation process and some areas adjacent to Paddys Run (see Figure 4-1).

4.1.2 Sample Location Design for PR/PPDD

The selection of certification sampling locations was conducted according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were then generated by randomly selecting an easting and northing coordinate within the boundaries of each sub-CU, then testing those locations against the minimum distance criteria of the CU. If the minimum distance criteria were not met, an alternative random location was selected for that sub-CU and all the locations were re-tested. This process continued until all 16 random locations met the minimum distance criteria.

All PR/PPDD sub-CUs and planned certification sampling locations are shown on Figures 4-2 through 4-10. Four of the 16 sample locations in each CU are designated with a "V", indicating archive sample locations. One sample location per CU is designated with a "D", indicating a field duplicate sample location. The sample locations, field duplicate samples, and archive samples are identified in Appendix C.

4.2 SURVEYING

Before certification sampling activities begin, the North American Datum of 1983 (NAD83) State Planar coordinates for each selected sampling location will be surveyed and identified in the field with a flag. All locations will be field verified to ensure no surface obstacles will prevent collection at the planned location. The PR/PPDD CU boundaries are shown on Figure 4-1. Appendix C and Figures 4-2 through 4-10 show the sub-CU boundaries as well as tentative certification sampling locations, all of which meet the minimum distance criterion.

4.3 PHYSICAL SOIL SAMPLE COLLECTION

4.3.1 Sample Collection

Certification samples will be collected according to procedure SMPL-01, Solids Sampling, using 3-inch diameter, 6-inch long, plastic or stainless steel liners. At the discretion of the Field Sampling Lead, samples may be collected using alternative methods specified in SMPL-01, as long as sufficient volume is collected from the appropriate depth to perform the prescribed analyses. If necessary, the soil core shall be divided and placed into the proper sample containers. Samples will be collected from 12 of the 16 sample locations in the CU, including one field duplicate sample. The archive locations will not be collected unless necessary. Thirteen samples from the CU (12 plus one field duplicate) will be submitted for analysis. Upon completion of sample collection, the 0 to 6-inch boreholes will be collapsed and no additional abandonment is necessary.

Quality control requirements will include a duplicate field sample and two container blanks as outlined in Section 6.1, and will be collected per procedure SMPL-21, Collection of Field Quality Control Samples. For the duplicate field sample, twice the soil volume (a second core) will be collected at one location in the CU, and will not be homogenized with the original sample. The location that requires the collection of a duplicate sample is identified in Appendix C. Container blanks will be collected (as specified in Section 6.1) from both the core liner and the end caps that will be used to seal it. All samples will be assigned unique sample identification numbers.

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

- The distance moved must be as small as possible (less than 3 feet);
- It must remain within the boundary of the same CU and sub-CU, and must still meet the minimum distance criterion; and
- If the distance moved is greater than 3 feet, the move must be documented in a Variance/Field Change Notice (V/FCN), considered as significant, which will be approved by the agencies prior to collection.
- Anytime a location is moved, Figures 4-2 through 4-10 should be used to determine the best direction to move the point to adhere to the above guidelines. The Characterization Manager or designee should be contacted when a sample location is moved. All final sampling locations will be documented in the PR/PPDD Certification Report.

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

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

4.3.2 Equipment Decontamination

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

4.3.3 Physical Sample Identification

Each soil certification sample will be assigned a unique sample identification number as *Remediation Area-CU Number/Identifier-Location^Depth Interval-Analysis-QC,* where:

PR	=	Sample collected from Paddys Run
C01	=	Certification sample - 1st of 21 CUs in the PR/PPDD (certification samples representing the 21 CUs from the PR/PPDD will be consecutively numbered C01 through C21).
Location	=	Sample Location number within each CU (1 through 16)
^	=	Separates Location from Depth Interval
Depth Interval	=	(only if needed) Equals twice the bottom depth (in feet) (i.e., "1" = 0.0 to 0.5', "2" = 0.5 to 1.0', etc.)
Analysis	=	"R" indicates radiological analysis and a "V' indications an archive sample.

QC = Quality control sample, if applicable. A "D" indicates a field duplicate sample; "Y" indicates a container blank sample; and "X" indicates a rinsate.

For example, a field duplicate sample taken from the tenth sample location from the 4th CU in Paddys Run for radiological analysis would be identified as PR-C04-10^R-D.

4.4 ANALYTICAL METHODOLOGY

All samples will be prepared for shipment to off-site laboratories per procedure 9501, Shipping Samples to Off-site Laboratories. Samples will only be shipped to off-site laboratories that are listed on the Fluor Fernald Approved Laboratories List. The highest total uranium value in the area from predesign sample boring RTB-1 (44.0 mg/kg), will be used to ship the samples off site.

As soon as the samples arrive at the laboratory where the analysis will take place, all samples should be prepared for analysis (including homogenization), and radiological samples should be sealed to begin the in-growth period for radium analysis. Preliminary gamma data will be expected on a 10-day turnaround time (TAT). A 30-day TAT will be required for the final standard in-growth gamma analysis and data reporting.

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

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

Laboratory analysis of certification samples will be conducted using an approved analytical method, as discussed in Appendix H of the SEP. The Minimum Detectable Level (MDL) is set at 10 percent of the FRL. Analyses will be conducted to either Analytical Support Level (ASL) D or E. All requirements for ASL E are the same as for ASL D except the MDL for the selected analytical method must be at least 10 percent of FRL. All results will be validated to Validation Support Level (VSL) B, and a minimum of 10 percent of the results will be validated to VSL D. The CUs to be validated to VSL D will be PR-C01, PR-C10, and PR-C20. Samples rejected during validation may be re-analyzed, or an alternate sample may be collected and substituted if there is insufficient material available from the initial sample. If any sample fails validation, all data from the laboratory with the rejected result will then be validated to VSL D to determine the integrity of all data from that laboratory. Once data are validated, results will be entered into the SED.

4.5 STATISTICAL ANALYSIS

Once data are entered into the SED, a statistical analysis will be performed to evaluate the pass/fail criteria for each CU. The statistical approach is discussed in Section 3.4.3, Appendix G of the SEP, and Section 3.4.8 of the SEP Addendum.

Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal, the first criterion compares the 95 percent Upper Confidence Limit (UCL) on the mean of each primary COC to its FRL, or the 90 percent UCL on the mean of each secondary ASCOC. On an individual CU basis, any ASCOC with the 95 percent UCL above the FRL results for primary ASCOCs (or 90 percent UCL above the FRL results for secondary COCs) results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate this first criterion. The second criterion is the hotspot criterion, which states that primary or secondary ASCOC results must not exceed two times the FRL. When the given UCL on the mean for each COC is less than its FRL and the hotspot criterion is met, the CU will be considered certified.

In the event that the CU fails certification, the following scenarios will be evaluated: 1) a high variability in the data set, 2) localized contamination, and 3) widespread contamination. Details on the evaluation and responses to these possible outcomes are provided in Section 3.4.5 of the SEP. When the CU within the scope of this CDL has passed certification, a certification report will be issued. The Certification Report will be submitted to the U.S. Environmental Protection Agency (EPA) and the Ohio Environmental Protection Agency (OEPA) to receive acknowledgement that the pertinent operable unit remedial action was completed and the individual CU is certified to be released for interim or final land use. Section 7.4 of the SEP provides additional details and describes the required content of the Certification Reports.

TABLE 4-1
SAMPLING AND ANALYTICAL REQUIREMENTS

TAL	Method	Sample Matrix	ASL	TATs	Preservative	Container[b]	Minimum Mass/Volume
TAL A	Gamma Spec	Solid	D/E[a]	Preliminary gamma 10 days Final gamma 30 days	None	Glass with Teflon-lined lid	500 g (1500 g)[c]
TAL A	Gamma Spec	Liquid (rinsate[d])	D/E[a]	30 days	HNO_3 pH<2	Glass or Polyethylene	4 liters

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

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

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

[d] If "push tubes" are used for sampling, the off-site laboratories will be sent container blanks. If an alternative sample method is used, a rinsate will be collected by the Field Technicians.

ADDITIONAL INFORMATION

Historical data for shipment of these samples is 44 mg/kg total uranium from boring RTB-1.

All data will be validated. The samples to be validated to VSL D will be from CUs PR-C01, PR-C10, and PR-C20.

Approximately 21 rinsates or 2 container blanks for rads will be submitted under this project.

TABLE 4-2
TARGET ANALYTE LISTS

20820-PSP-0004-A
(ASL D/E*)
(260 soil analyses specified in the PSP)

Analyte	FRL	MDL	MDL (water)
Total Uranium	82 mg/kg	8.2 mg/kg	650 pCi/L
Radium-226	1.7 pCi/g	0.17 pCi/g	30 pCi/L
Radium-228	1.8 pCi/g	0.18 pCi/g	30 pCi/L
Thorium-228	1.7 pCi/g	0.17 pCi/g	30 pCi/L
Thorium-232	1.5 pCi/g	0.15 pCi/g	30 pCi/L

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

pCi/L - picoCuries per liter

006149

v:#2fm12#dgn#paddy_026.dgn STATE PLANAR COORDINATE SYSTEM 1983 20-JUN-2006

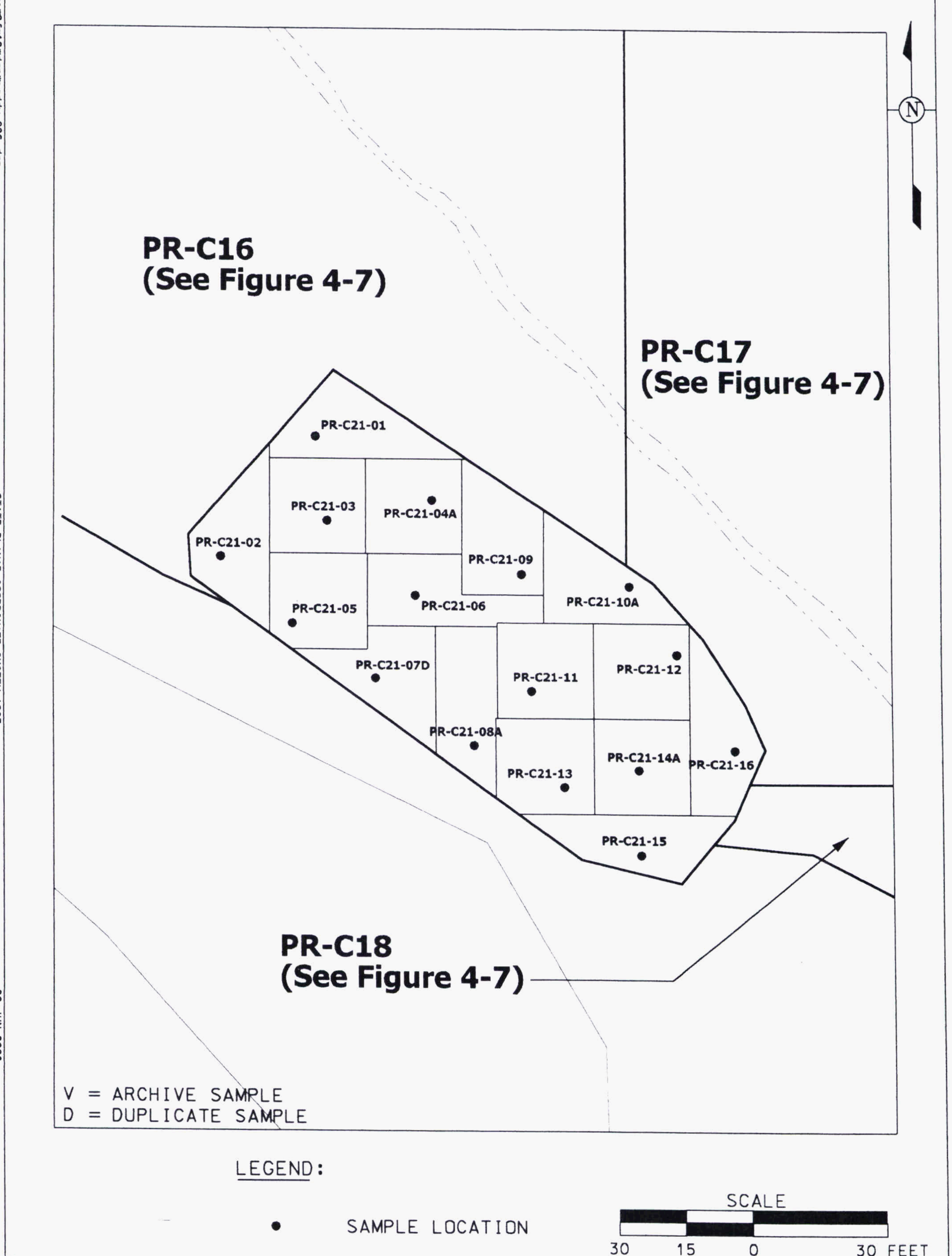

FIGURE 4-10. SUB-CU AND SAMPLE LOCATION MAP FOR THE SOUTHERN OXBOW AREA (#2) - CU PR-C21

5.0 SCHEDULE

The following draft schedule shows key activities for the completion of the work within the scope of this CDL.

Activity	Target Date
Submittal of Certification Design Letter	June 21, 2006
Start of Certification Sampling	July 26, 2006
Complete Field Work	August 2, 2006
Complete Analytical Work	August 9, 2006
Complete Data Validation and Statistical Analysis	August 16, 2006
Submit Certification Report	August 21, 2006*

*Only the date for submittal of the Certification Report is a commitment to the EPA and OEPA. Others dates are internal target completion dates.

6.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

6.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

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

- Field QC requirements include one field duplicate for the CU, as noted in Section 4.3 and identified in Appendix B. The field duplicate sample will be analyzed for the ASCOCs from the CU in which they were collected.

  If "push tubes" are used for sample collection, two container blanks will be collected - one before sample collection begins and one at the conclusion of sample collection. The container blank samples will be analyzed for the primary radiological COCs that are identified in TAL A (see Table 4-2). If an alternate sample collection method is used, one rinsate will be collected at a minimum frequency of one per 20 pieces of equipment reused in the field.

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

- All field data will be validated. A minimum of 10 percent of the laboratory data will be validated to VSL D with the remainder validated to VSL B. The CUs to be validated to VSL D will be PR-C01, PR-C10, and PR-C20. If any result is rejected during validation, the sample will be re-analyzed or an archive location will be sampled and analyzed in its place. If necessary, this change will be documented in a V/FCN.

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

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

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

- Variations from the SCQ methodology are documented in a variance to the PSP, or

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

6.2 PROJECT SPECIFIC PROCEDURES, MANUALS, AND DOCUMENTS

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

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

- 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- SH-1006, Event Investigation and Reporting
- ADM-02, Field Project Prerequisites
- EQT-06, Geoprobe® Model 5400 and Model 6600
- EQT-33, Real-Time Differential Global Positioning System
- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- 9501, Shipping Samples to Off-site Laboratories
- Trimble Pathfinder Pro-XL GPS Operation Manual

6.3 INDEPENDENT ASSESSMENT

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

6.4 IMPLEMENTATION OF CHANGES

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

7.0 HEALTH AND SAFETY

Coordinate with representatives of the Health and Safety and Industrial Hygiene and Construction for requirements to enter this area. Any hazards identified during the project walk-down must be corrected/controlled prior to the start of work. Weekly walk-downs will be conducted throughout the course of the project in accordance with SPR 1-10, Safety Walk-Throughs. All work performed on this project will be performed in accordance with applicable Environmental Services procedures, RM-0020, (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), Flour Fernald work permits, Radiological Work Permit, penetration permits, Construction Traveler, and other applicable permits. The radiological work requirements for activities will be detailed in activity-specific RWPs. Concurrence with applicable safety permits is required by each technician in the performance of their assigned duties.

A safety briefing will be conducted prior to the initiation of field activities. Fluor Fernald managers and supervisors are responsible for ensuring that all field activities comply with the Safety and Health requirements and ensuring compliance with the Work Plan. These briefings will be documented. Personnel who are not documented as having completed these briefings will not participate in the execution of field activities.

Personnel will also be briefed on any health and safety documents (such as Travelers) that may apply to the project work scope. During the course of this project, operators shall maintain a 50-foot buffer zone between equipment and sampling personnel where field conditions and working space permit. When this buffer zone cannot be maintained, sampling personnel must communicate their intentions to move around or near the equipment with the operators through eye contact and verbal communication or hand signals. Additionally, the sampling team will utilize traffic cones or other equipment to designate a safe buffer zone for their needs when the 50-foot boundary is not practical. Additional safety information can be found in 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan. All personnel have stop-work authority for imminent safety hazards or other hazards resulting from noncompliance with the applicable safety and health practices.

All personnel entering the Construction Area will obtain a pre-entry briefing on current activities or hazards that may affect their work from Construction management. Additionally, prior to entry into an excavation area, the Competent Person for Excavation shall be contacted to assure that the daily inspection has been completed and the excavation is safe to enter.

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

8.0 DISPOSITION OF WASTE

During sampling activities, field personnel may generate small amounts of soil, water, and contact waste. Excess soil generated during sample collection will be replaced in the borehole. Contact waste generation will be minimized by limiting contact with sample media, and by only using disposable materials that are necessary. Contact waste will be bagged and brought back to site for disposal in an uncontrolled area dumpster. Generation of decontamination waters will be minimized in the field. Decontamination water that is generated will be allowed to discharge into the streambed.

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

9.0 DATA MANAGEMENT

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

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

Samples will be assigned a unique sample number as explained in Section 4.3 and listed in Appendix C. This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for Analysis form and will be used to identify the samples during analysis, data entry, and data management.

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

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

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

REFERENCES

U.S. Department of Energy, 1993, "CERCLA/RCRA Background Soil Study," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

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

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

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

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

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U.S. Department of Energy, 2001b, "Addendum to the CERCLA/RCRA Background Soil Study," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2003, "Project Specific Plan for Real-Time Scan of Paddys Run Corridor and Associated Drainage Features," Revision 2, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2004, "Project Specific Plan for the Predesign Characterization of Sediments in Paddys Run and Associated Drainage Features," Revision 1, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2005a, "Excavation Plan for Stream Corridors Paddys Run and Pilot Plant Drainage Ditch," Final, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2005b, "Project Specific Plan for the Excavation Control and Precertification of Stream Corridors Paddys Run and Pilot Plant Drainage Ditch," Revision 0, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.

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APPENDIX A

REAL-TIME DATA MAPS FOR STREAM CORRIDORS PADDYS RUN AND STORM SEWER OUTFALL DITCH

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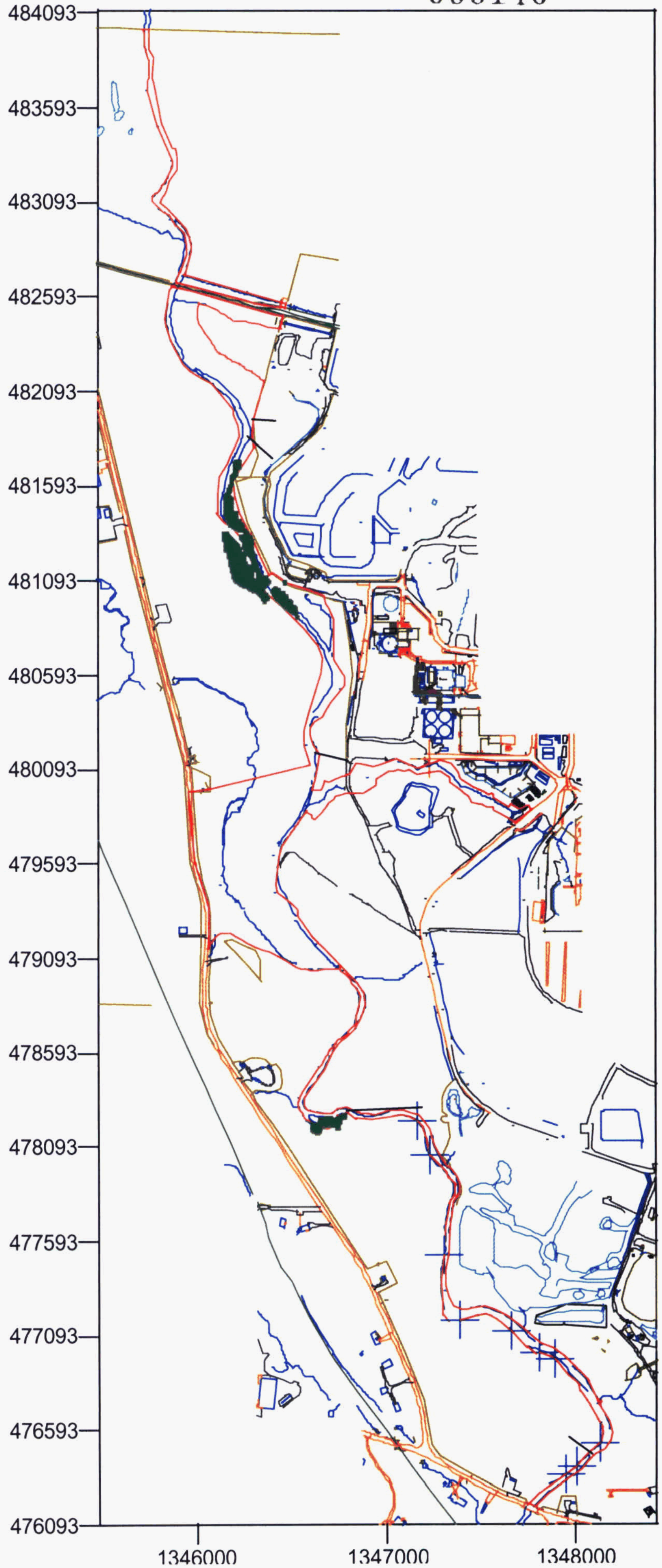
Figure A - 1 Paddys Run/ Pilot Plant Drainage Ditch Phase 1 Total Gross Counts per Second



NaI Data Groups

RSS1_2529_04-11-2006
RSS1_2536_04-13-2006
RSS4_1035_04-14-2006

Measurement Period:

04-11-2006 thru 04-14-2006

NaI Tcps

- 0 to 3000
- 3000 to 5000
- 5000 to 15000
- 15000 to 18000
- 18000 to 99000

RTIMP DWG ID: PR&PPDD_P1_TC.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

Figure A - 2 Paddys Run/ Pilot Plant Drainage Ditch Phase 1 Moisture Corrected Radium-226

HPGe Detector IDs:

30904, 30687, 40743,
31265, 30699, 40227,
31204, 30716

NaI Data Groups

RSS1_2529_04-11-2006
RSS1_2536_04-13-2006
RSS4_1035_04-14-2006

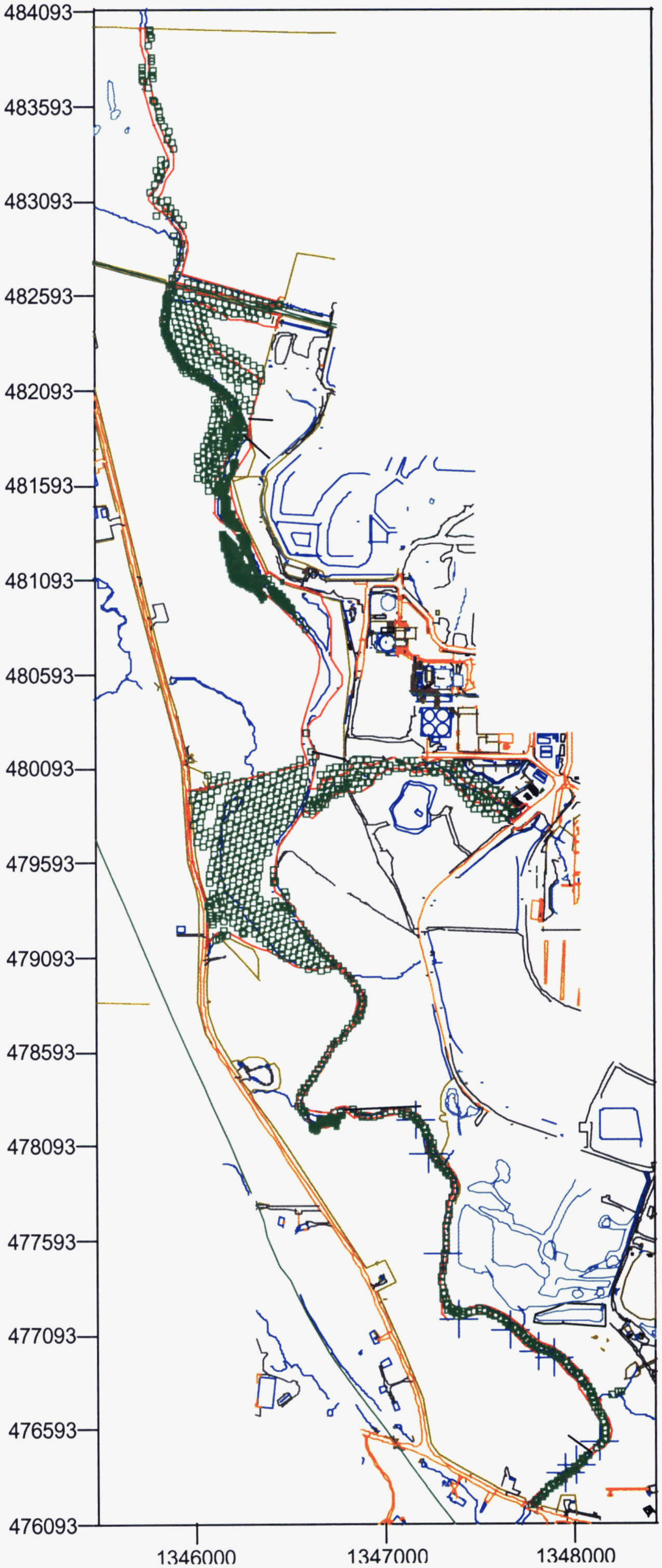
Measurement Period:
09-28-2000 thru 04-14-2006

NaI Ra-226 in pCi/g

- -9999 to 5.1
- 5.1 to 9999

HPGe Ra-226 in pCi/g

- -999 to 5.1
- 5.1 to 999



RTIMP DWG ID: PR&PPDD_P1_RA.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

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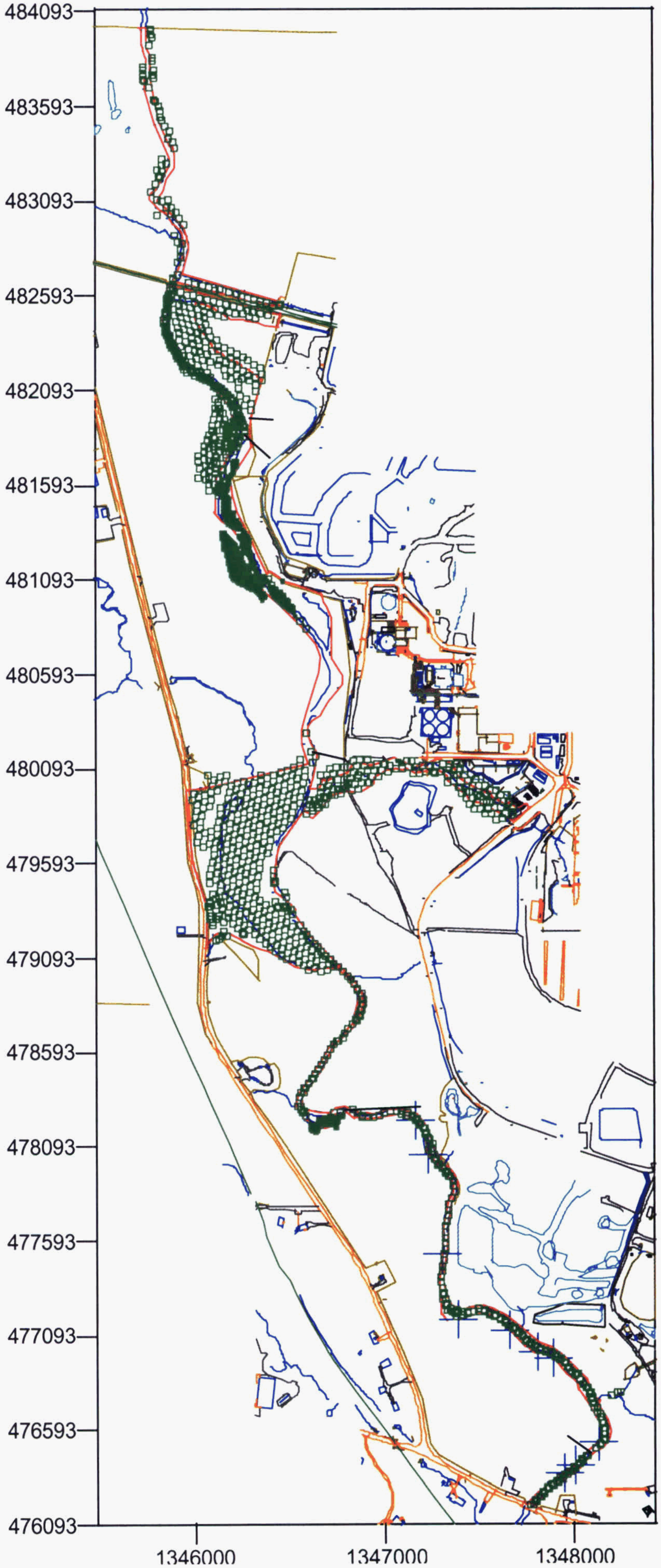
Figure A - 3 Paddys Run/ Pilot Plant Drainage Ditch Phase 1 Moisture Corrected Thorium-232



HPGe Detector IDs:

30904, 30687, 40743, 31265, 30699, 40227, 31204, 30716

NaI Data Groups

RSS1_2529_04-11-2006
RSS1_2536_04-13-2006
RSS4_1035_04-14-2006

Measurement Period:

09-28-2000 thru 04-14-2006

NaI Th-232 in pCi/g

- -9999 to 4.5
- 4.5 to 9999

HPGe Th-232 in pCi/g

- -999 to 4.5
- 4.5 to 999

RTIMP DWG ID: PR&PPDD_P1_TH.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

Figure A - 4 Paddys Run/ Pilot Plant Drainage Ditch Phase 1 Moisture Corrected Total Uranium

HPGe Detector IDs:

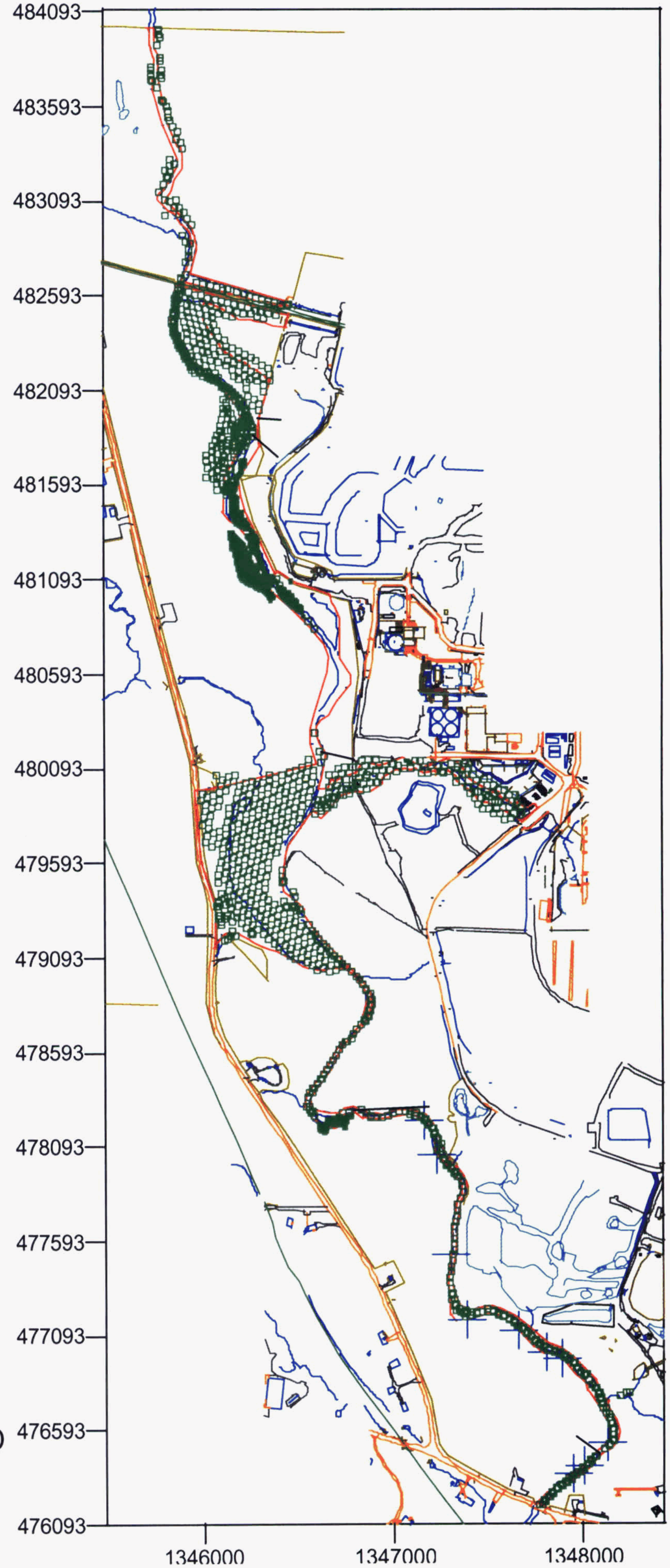
30904, 30687, 40743,
31265, 30699, 40227,
31204, 30716

NaI Data Groups

RSS1_2529_04-11-2006
RSS1_2536_04-13-2006
RSS4_1035_04-14-2006

Measurement Period:

09-28-2000 thru 04-14-2006



NaI TU in ppm

- -9999 to 246
- 246 to 9999

HPGe TU in ppm

- -999 to 82
- 82 to 246
- 246 to 999

RTIMP DWG ID: PR&PPDD_P1_TU.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

000149

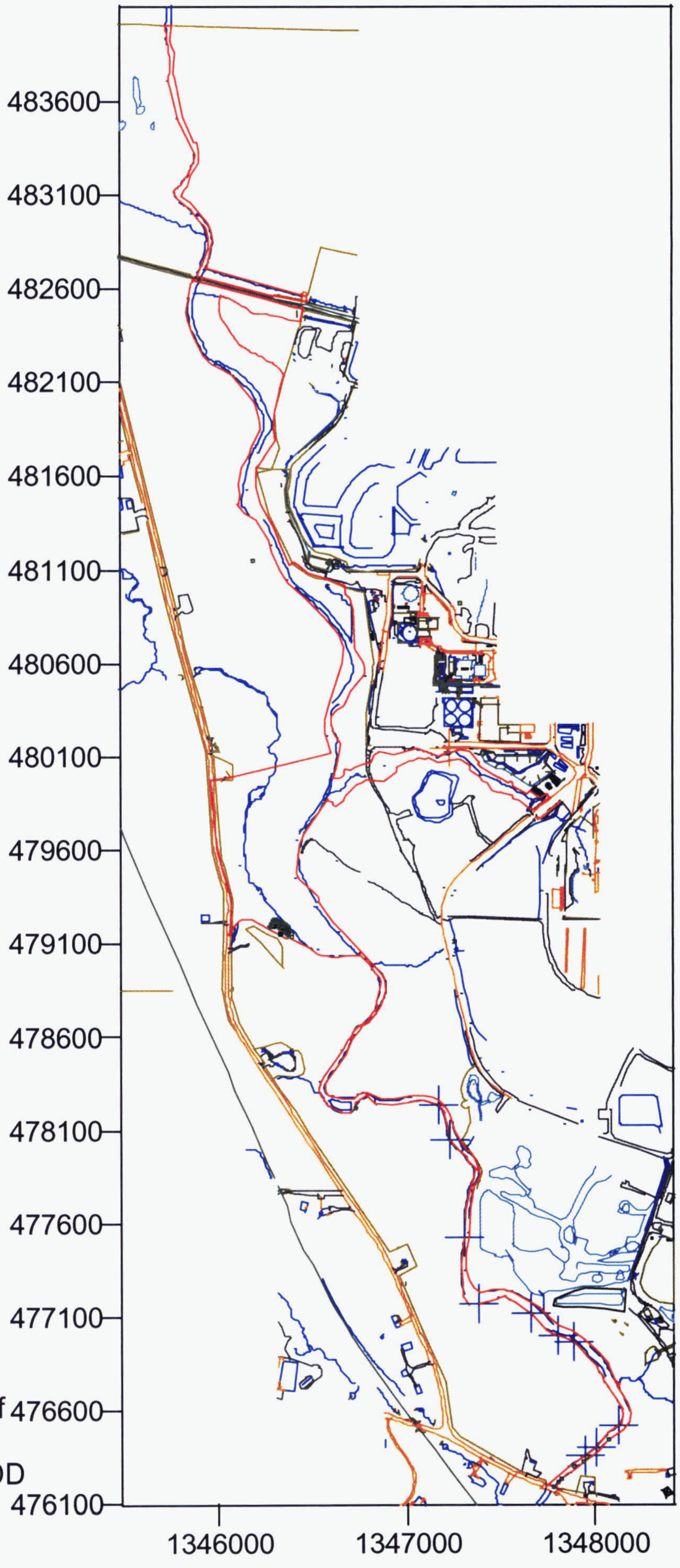
Figure A - 5 Paddys Run/ Pilot Plant Drainage Ditch Phase 2 Moisture Corrected Radium-226

HPGe Detector IDs:

30904, 30687, 40743,
31265, 30699, 40227,
31204, 30716

Measurement Period:

03-03-2005 thru 04-14-2006



Radium-226 in pCi/g

- -999 to 5.1
- 5.1 to 999

RTIMP DWG ID: PR&PPDD_P2_RA.srf
Project ID: CDL&Certification PSP for
Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

006149

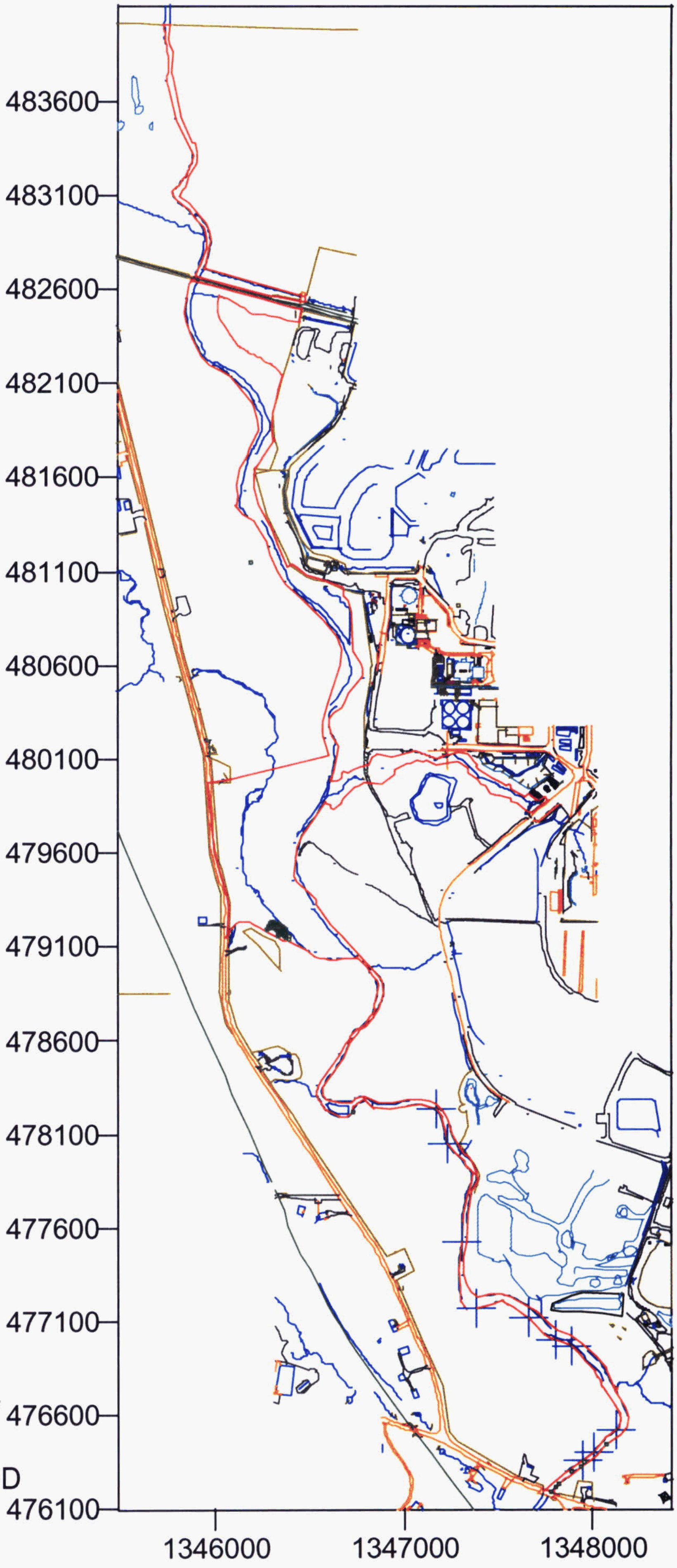
Figure A - 6 Paddys Run/ Pilot Plant Drainage Ditch Phase 2 Moisture Corrected Thorium-232

HPGe Detector IDs:

30904, 30687, 40743, 31265, 30699, 40227, 31204, 30716

Measurement Period:

03-03-2005 thru 04-14-2006



Thorium-232 in pCi/g

- -999 to 4.5
- 4.5 to 999

RTIMP DWG ID: PR&PPDD_P2_TH.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

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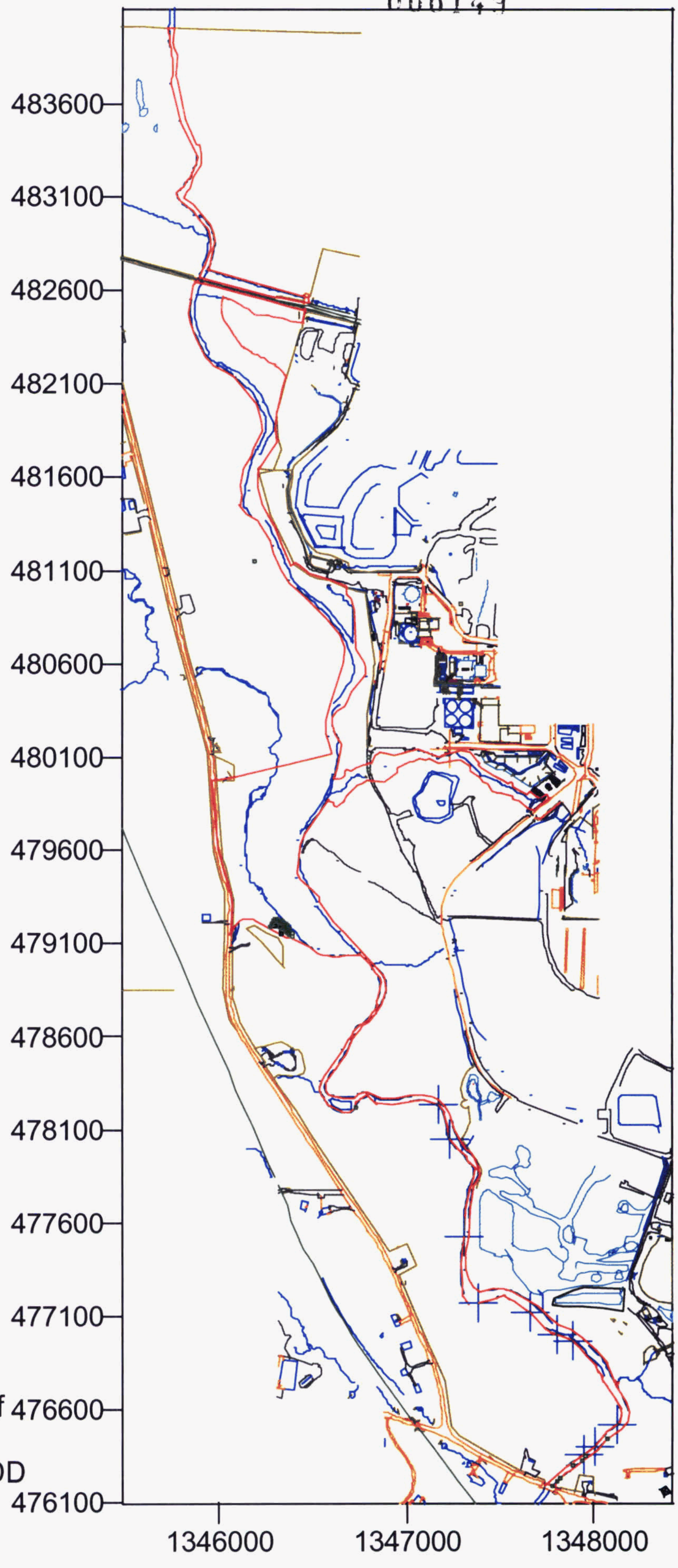
Figure A - 7 Paddys Run/ Pilot Plant Drainage Ditch Phase 2 Moisture Corrected Total Uranium

HPGe Detector IDs:

30904, 30687, 40743, 31265, 30699, 40227, 31204, 30716

Measurement Period:

03-03-2005 thru 04-14-2006



Total Uranium in ppm

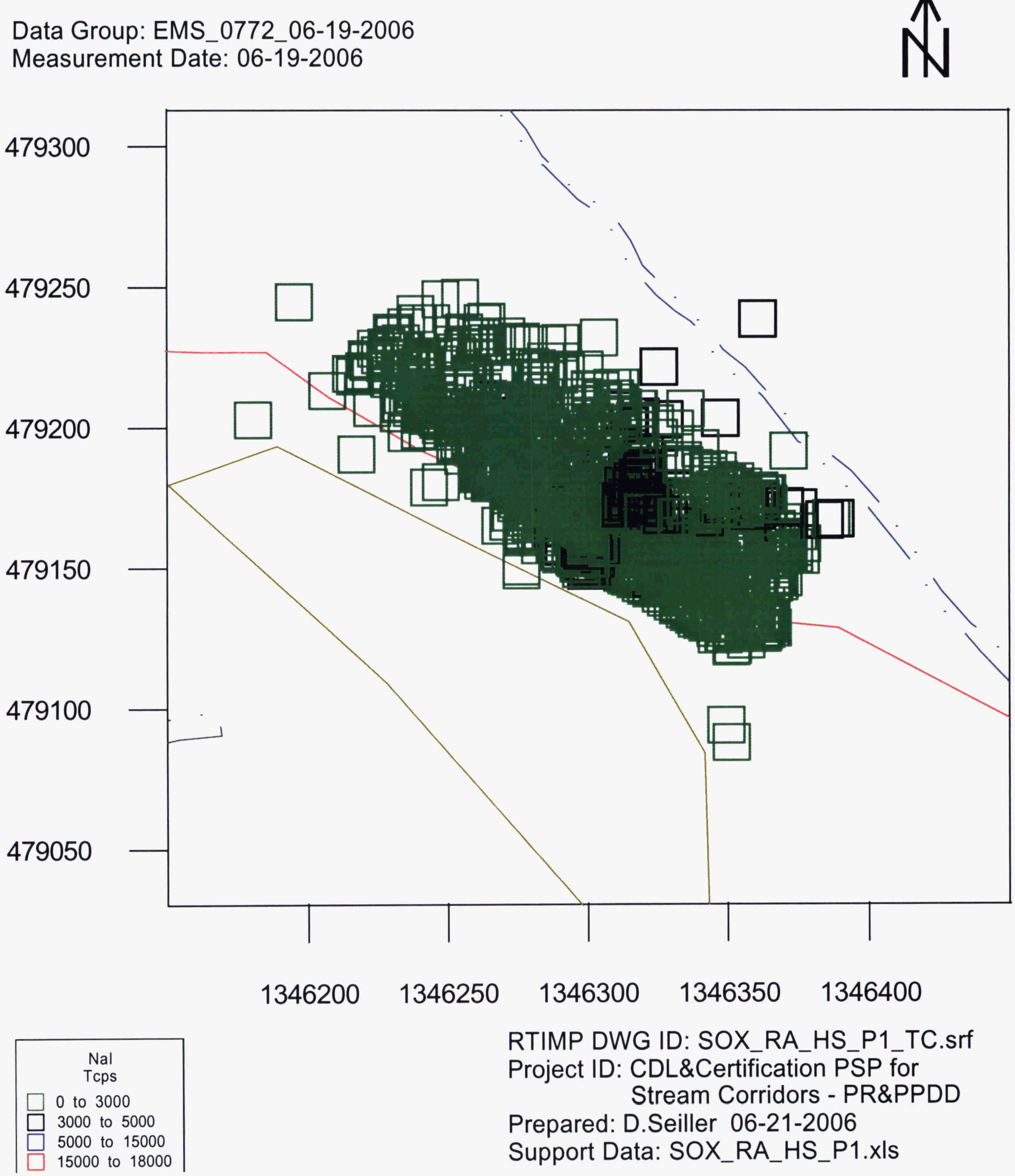
- -999 to 82
- 82 to 246
- 246 to 999

RTIMP DWG ID: PR&PPDD_P2_TU.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 04-17-2006
Support Data: PR&PPDD_P1.xls

006149

Figure A - 8 Southern Oxbow, Former Radium Hotspot Precertification, Phase 1, Total Counts per Second

Data Group: EMS_0772_06-19-2006
Measurement Date: 06-19-2006

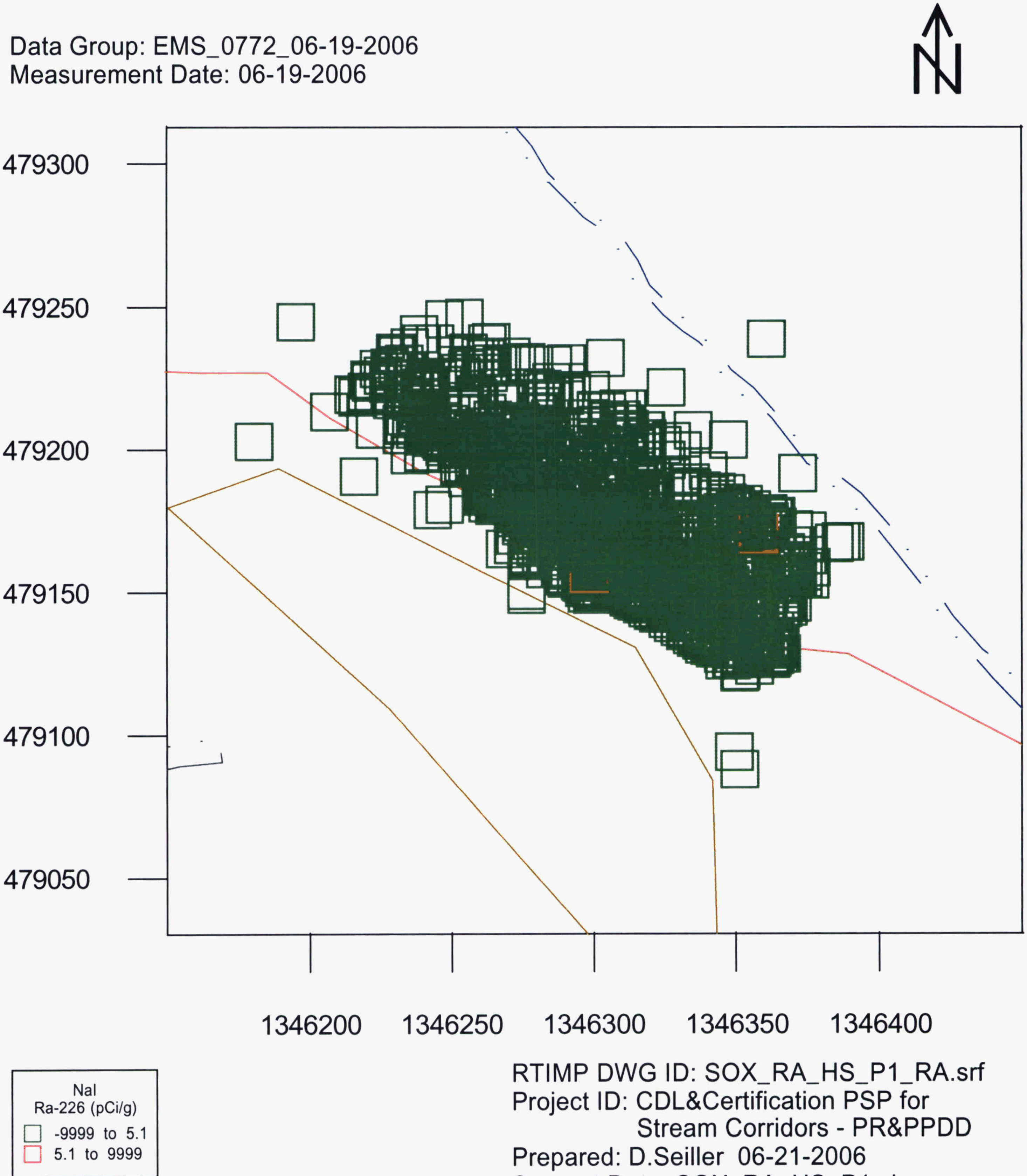


RTIMP DWG ID: SOX_RA_HS_P1_TC.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P1.xls

006149

Figure A - 9 Southern Oxbow, Former Radium Hotspot Precertification, Phase 1, Radium-226

Data Group: EMS_0772_06-19-2006
Measurement Date: 06-19-2006

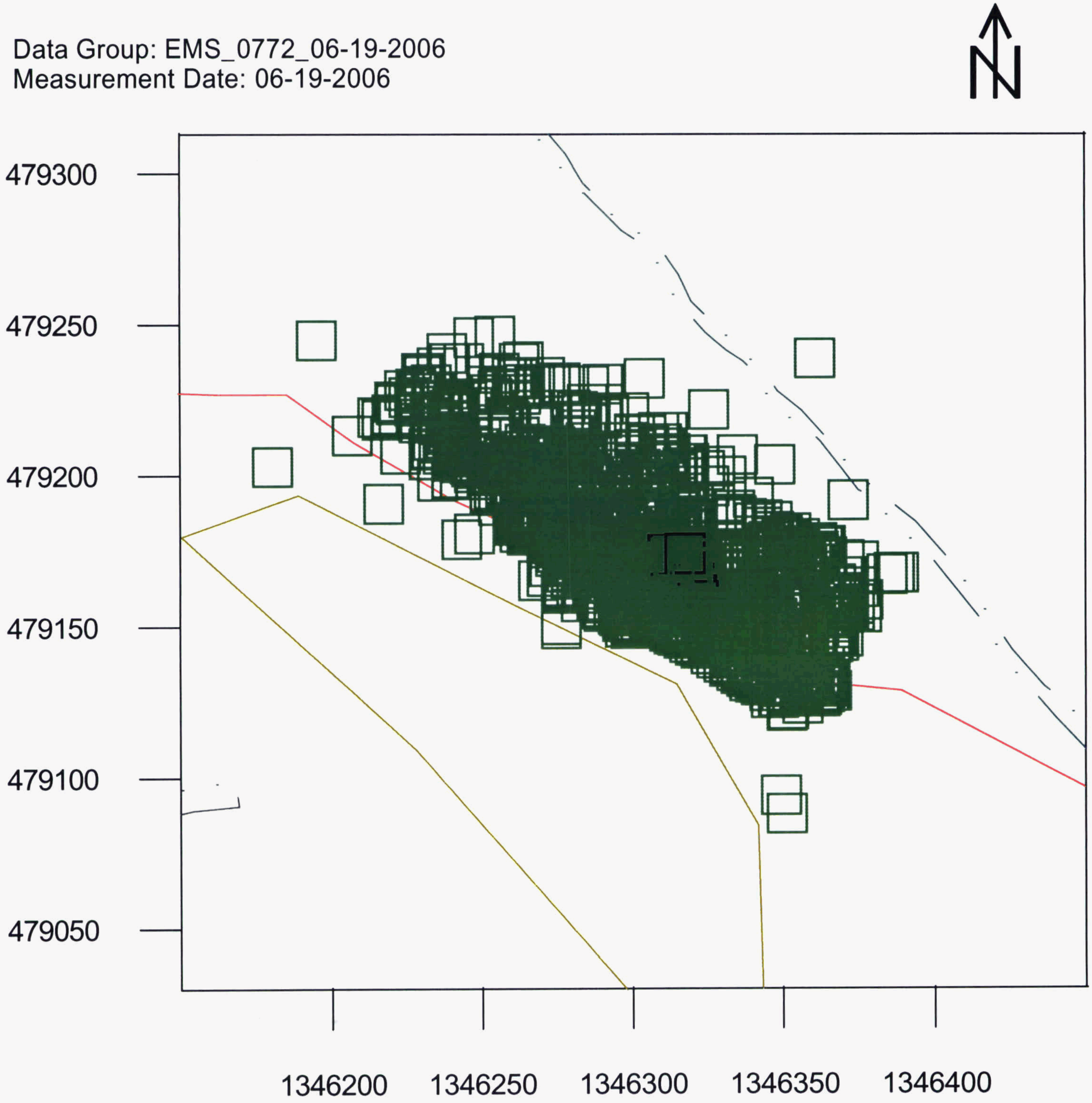


RTIMP DWG ID: SOX_RA_HS_P1_RA.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P1.xls

006149

Figure A - 10 Southern Oxbow, Former Radium Hotspot Precertification, Phase 1, Total Uranium

Data Group: EMS_0772_06-19-2006
Measurement Date: 06-19-2006



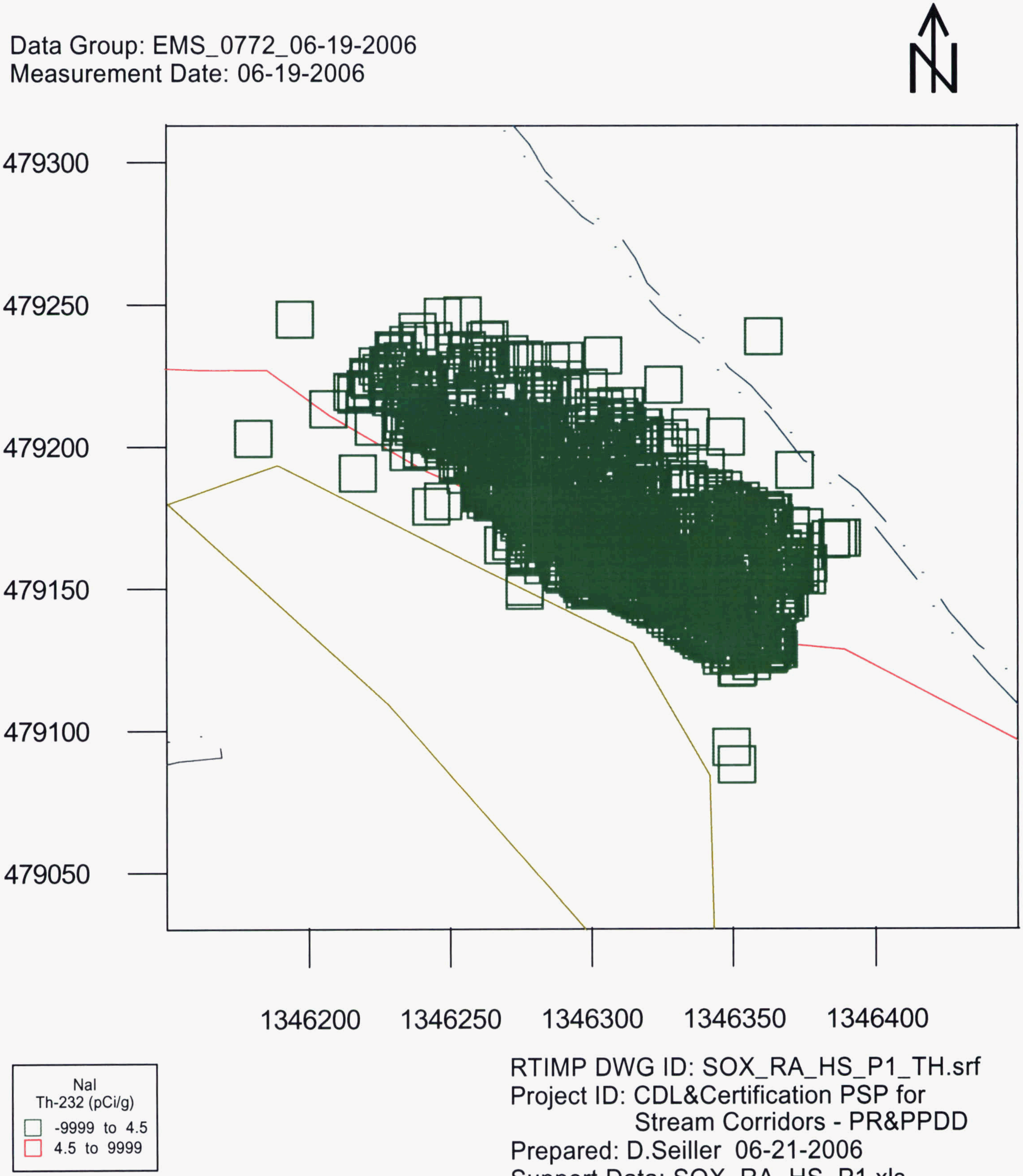
NaI
TU (ppm)
-9999 to 246
246 to 875
875 to 9999

RTIMP DWG ID: SOX_RA_HS_P1_TU.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P1.xls

006149

Figure A - 11 Southern Oxbow, Former Radium Hotspot Precertification, Phase 1, Thorium-232

Data Group: EMS_0772_06-19-2006
Measurement Date: 06-19-2006



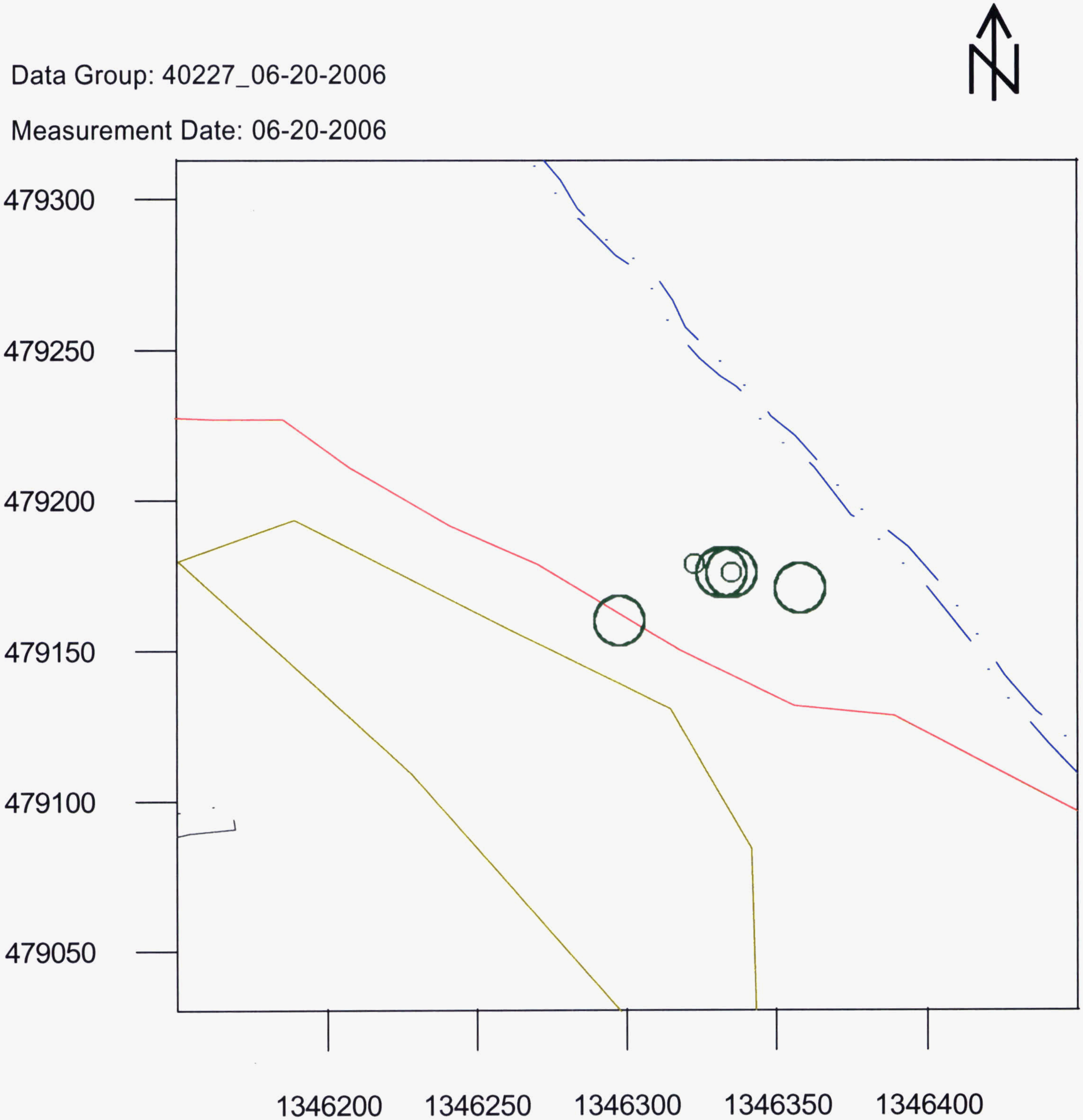
RTIMP DWG ID: SOX_RA_HS_P1_TH.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P1.xls

006142

Figure A - 12 Southern Oxbow, Former Radium Hotspot PreCertification Phase 2, Radium-226

Data Group: 40227_06-20-2006

Measurement Date: 06-20-2006



HPGe
RA-226 (pCi/g)
-9999 to 5.1
5.1 to 928

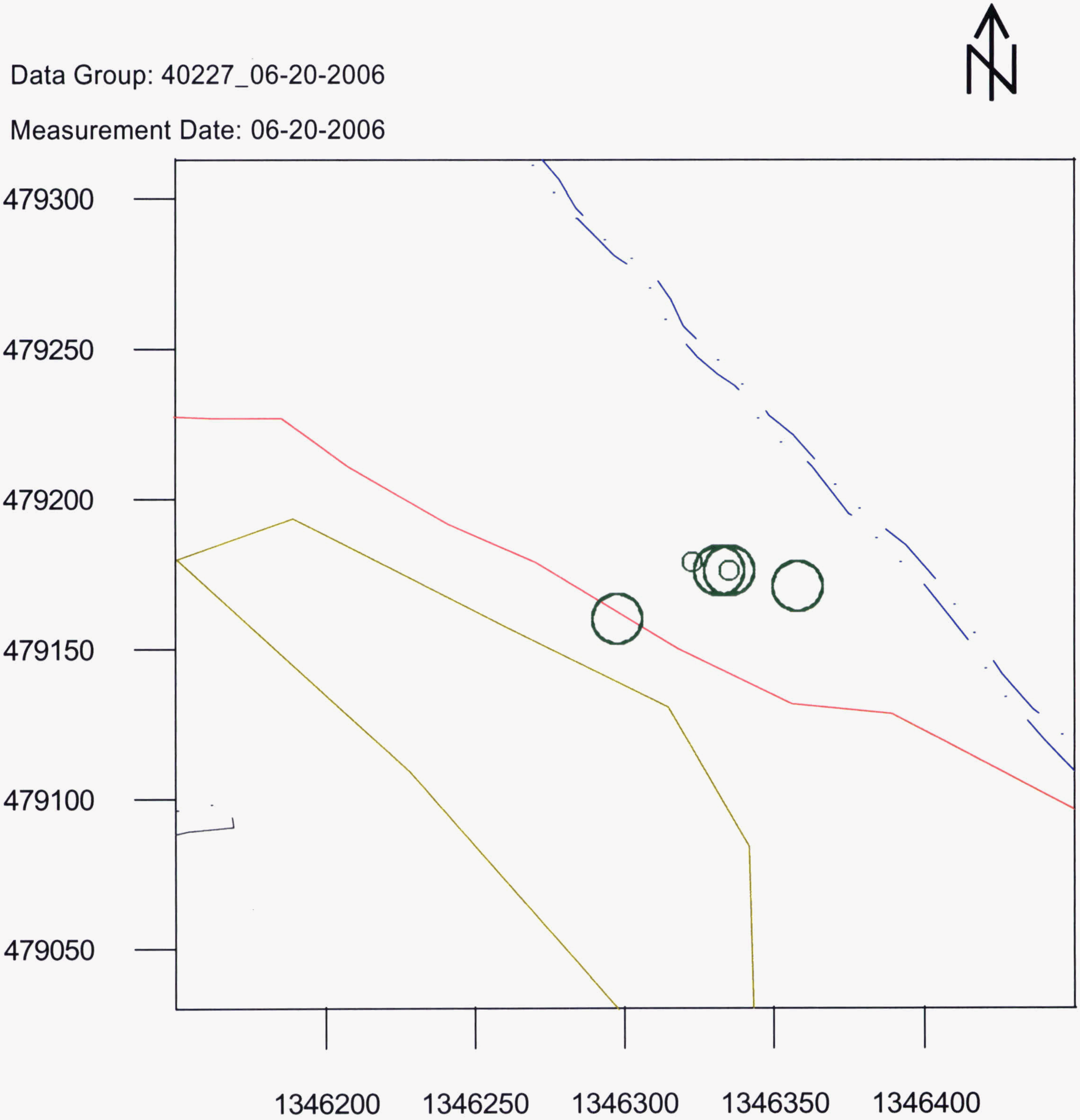
RTIMP DWG ID: SOX_RA_HS_P2_RA.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P2.xls

006149

Figure A - 13 Southern Oxbow, Former Radium Hotspot PreCertification Phase 2, Total Uranium

Data Group: 40227_06-20-2006

Measurement Date: 06-20-2006

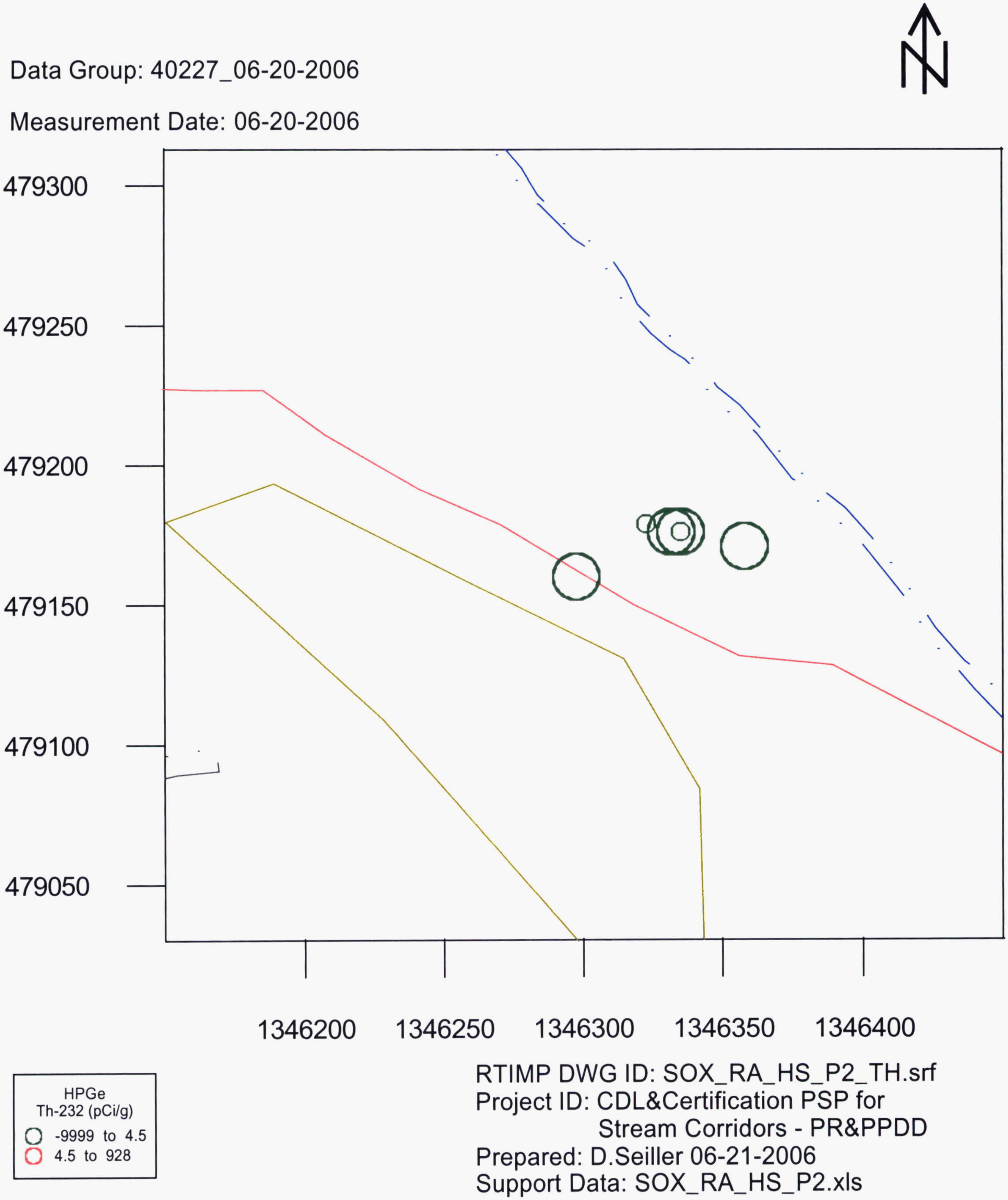


HPGe
Total U (ppm)
-9999 to 246
246 to 928
928 to 9999

RTIMP DWG ID: SOX_RA_HS_P2_TU.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P2.xls

006149

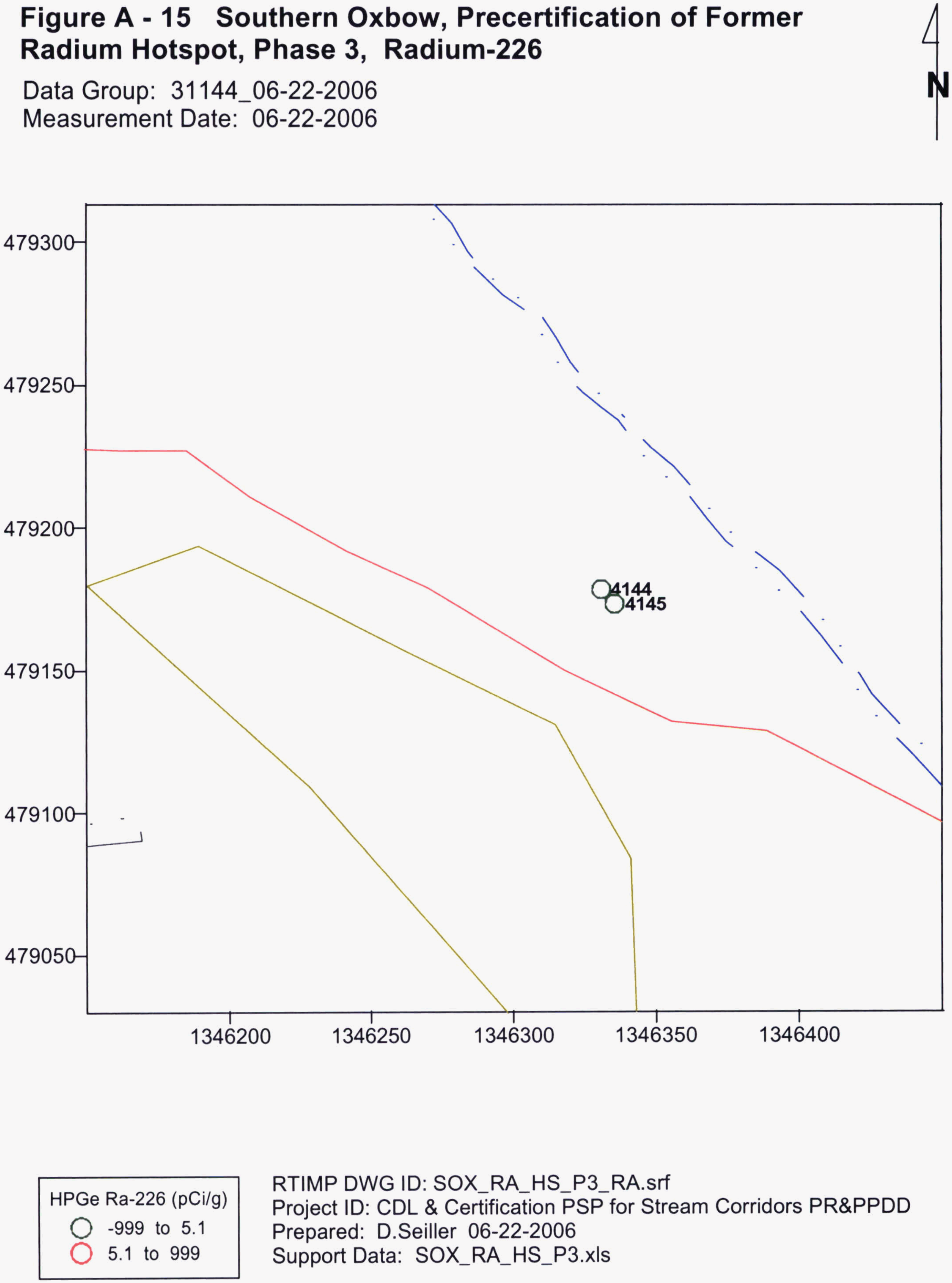
Figure A - 14 Southern Oxbow, Former Radium Hotspot PreCertification Phase 2, Thorium-232



RTIMP DWG ID: SOX_RA_HS_P2_TH.srf
Project ID: CDL&Certification PSP for Stream Corridors - PR&PPDD
Prepared: D.Seiller 06-21-2006
Support Data: SOX_RA_HS_P2.xls

Figure A - 15 Southern Oxbow, Precertification of Former Radium Hotspot, Phase 3, Radium-226

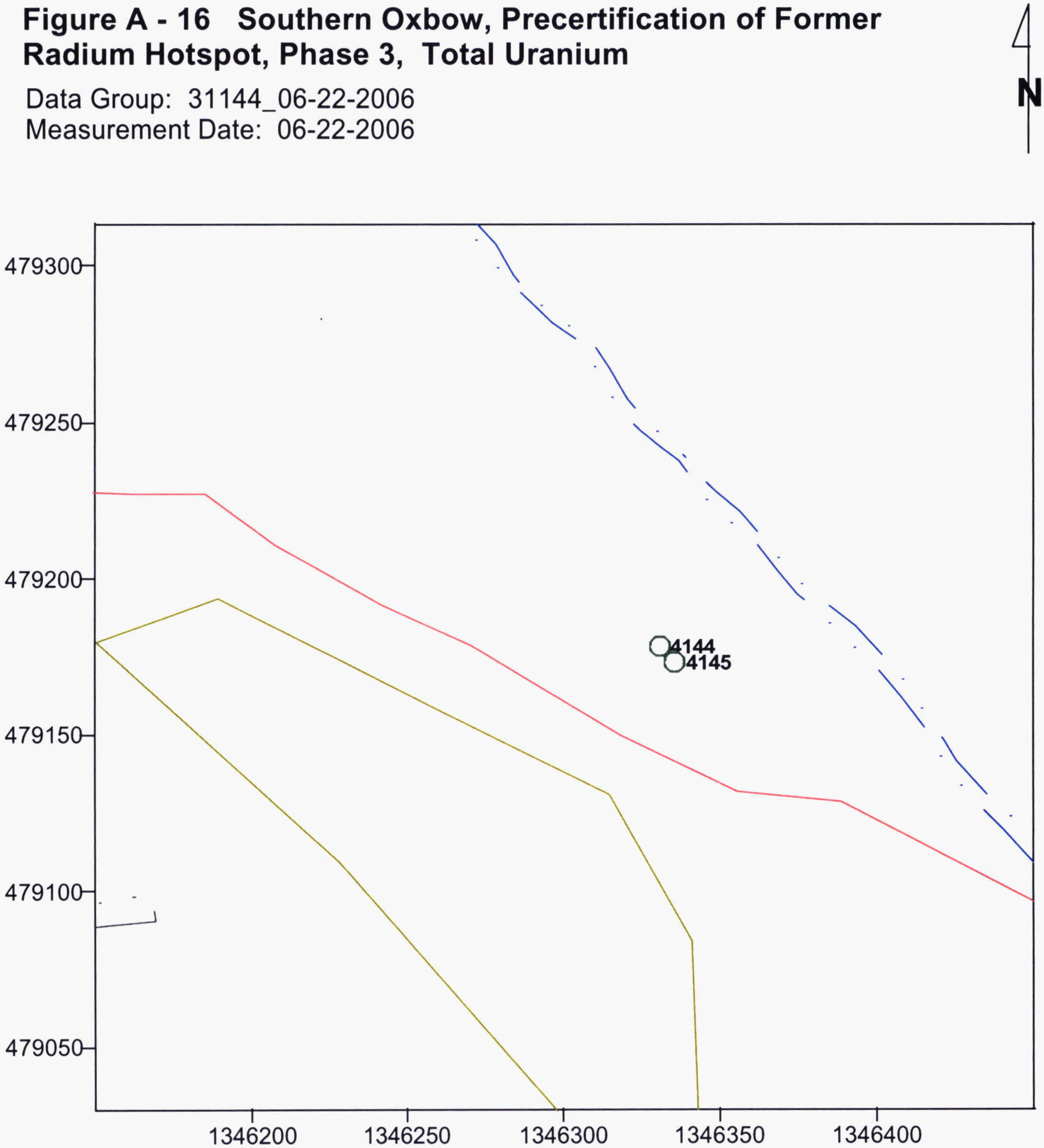
Data Group: 31144_06-22-2006
Measurement Date: 06-22-2006



RTIMP DWG ID: SOX_RA_HS_P3_RA.srf
Project ID: CDL & Certification PSP for Stream Corridors PR&PPDD
Prepared: D.Seiller 06-22-2006
Support Data: SOX_RA_HS_P3.xls

Figure A - 16 Southern Oxbow, Precertification of Former Radium Hotspot, Phase 3, Total Uranium

Data Group: 31144_06-22-2006
Measurement Date: 06-22-2006

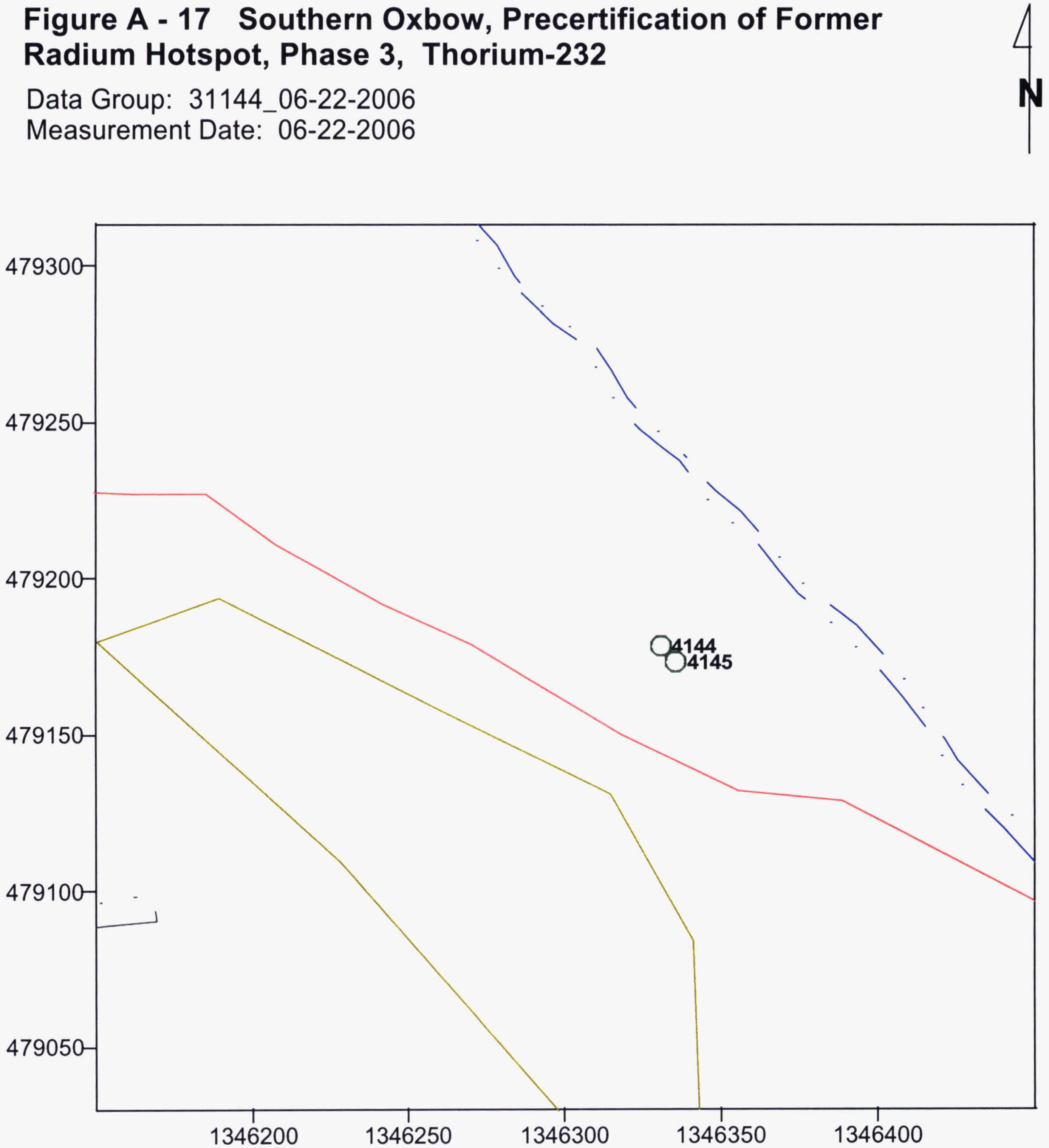


HPGe TU (ppm)
- -999 to 246
- 246 to 928
- 928 to 999

RTIMP DWG ID: SOX_RA_HS_P3_TU.srf
Project ID: CDL & Certification PSP for Stream Corridors PR&PPDD
Prepared: D.Seiller 06-22-2006
Support Data: SOX_RA_HS_P3.xls

Figure A - 17 Southern Oxbow, Precertification of Former Radium Hotspot, Phase 3, Thorium-232

Data Group: 31144_06-22-2006
Measurement Date: 06-22-2006



HPGe Th-232 (pCi/g)
-999 to 4.5
4.5 to 999

RTIMP DWG ID: SOX_RA_HS_P3_TH.srf
Project ID: CDL & Certification PSP for Stream Corridors PR&PPDD
Prepared: D.Seiller 06-22-2006
Support Data: SOX_RA_HS_P3.xls

000149

APPENDIX B

DATA QUALITY OBJECTIVES SL-052, REV. 3

006149

Control Number ___________

Fernald Environmental Management Project

Data Quality Objectives

Title: Sitewide Certification Sampling and Analysis

Number: SL-052

Revision: 3

Effective Date: March 13, 2000

Contact Name: Mike Rolfes

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

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

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

DATA QUALITY OBJECTIVES
Sitewide Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team

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

Conceptual Model of the Site

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

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

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

1.0 Statement of Problem

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

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

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

Project Constraints: Certification sampling and analytical testing must be performed with existing manpower, materials and equipment to support the certification effort. Remediation areas are prioritized for certification sampling and analysis according to the date required for initiation of sequential construction activities in those areas. Fluor Daniel Fernald (FDF) and DOE must demonstrate post-remedial compliance with the CU-specific COC FRLs to release the designated Remediation Area for planned interim grading, eventual restoration under the Natural Resources Restoration Plan (NRRP), and other final land use activities.

2.0 Identify the Decision

Decision

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

Possible Results

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

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

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

3.0 Inputs That Affect the Decision

Required Information

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

Source of Information

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

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

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

4.0 The Boundaries of the Situation

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

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

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

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

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

5.0 Decision Rule

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

Parameters of Interest

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

Action Levels

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

Decision Rules

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

6.0 Limits on Decision Errors

Types of Decision Errors and Consequences

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

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

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

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

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

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

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

7.0 Design for Obtaining Quality Data

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

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

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

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

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

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

Laboratory Analysis

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

Validation

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

8.0 Use of Data to Test Null Hypothesis

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

Data Quality Objectives
Sitewide Certification Sampling and Analysis

1A. Task Description:

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

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

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

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

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

---

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

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

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

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

---

5. Site Information (Description):

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

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

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

* As identified in the area certification PSP

6.B. Equipment Selection and SCQ Reference:

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

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

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

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

Background samples: OU5 RI

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

---

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

8A. Field Quality Control Samples:

Trip Blanks	☒[1]	Container Blanks	☒
Field Blanks	☒[2]	Duplicate Samples	☒
Equipment Rinsate Blanks	☒	Split Samples	☒[3]
Preservative Blanks	☐	Performance Evaluation Samples	☐
Other (specify) ____________			

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

8B. Laboratory Quality Control Samples:

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

---

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

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

APPENDIX C

STREAM CORRIDORS PADDYS RUN AND STORM SEWER OUTFALL DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C01	01-1	0.0 - 0.5'	PR-C01-1^R	A	483921.23	1345747.15
	01-2D	0.0 - 0.5'	PR-C01-2^R PR-C01-2^R-D	A	483852.56	1345765.84
	01-3V	0.0 - 0.5'	PR-C01-3^V	archive	483728.66	1345757.69
	01-4	0.0 - 0.5'	PR-C01-4^R	A	483682.07	1345766.04
	01-5	0.0 - 0.5'	PR-C01-5^R	A	483610.28	1345784.53
	01-6	0.0 - 0.5'	PR-C01-6^R	A	483529.91	1345811.84
	01-7V	0.0 - 0.5'	PR-C01-7^V	archive	483467.18	1345822.6
	01-8	0.0 - 0.5'	PR-C01-8^R	A	483384.35	1345852.62
	01-9V	0.0 - 0.5'	PR-C01-9^V	archive	483357.06	1345880.87
	01-10	0.0 - 0.5'	PR-C01-10^R	A	483246.61	1345884.17
	01-11	0.0 - 0.5'	PR-C01-11^R	A	483144.15	1345840.12
	01-12	0.0 - 0.5'	PR-C01-12^R	A	483095.38	1345794.97
	01-13	0.0 - 0.5'	PR-C01-13^R	A	483055.31	1345832.23
	01-14	0.0 - 0.5'	PR-C01-14^R	A	482950.49	1345924.24
	01-15V	0.0 - 0.5'	PR-C01-15^V	archive	482906.04	1345960.28
	01-16	0.0 - 0.5'	PR-C01-16^R	A	482742.76	1345946.96
C02	02-1V	0.0 - 0.5'	PR-C02-1^V	archive	482674.38	1345901.62
	02-2	0.0 - 0.5'	PR-C02-2^R	A	482696.33	1345964.63
	02-3	0.0 - 0.5'	PR-C02-3^R	A	482648.78	1345988.5
	02-4	0.0 - 0.5'	PR-C02-4^R	A	482679.21	1346024.64
	02-5	0.0 - 0.5'	PR-C02-5^R	A	482648	1346055.07
	02-6V	0.0 - 0.5'	PR-C02-6^V	archive	482646.42	1346095.2
	02-7	0.0 - 0.5'	PR-C02-7^R	A	482624.42	1346117.86
	02-8V	0.0 - 0.5'	PR-C02-8^V	archive	482637.63	1346151.91
	02-9	0.0 - 0.5'	PR-C02-9^R	A	482607.02	1346180.09
	02-10D	0.0 - 0.5'	PR-C02-10^R PR-C02-10^R-D	A	482615.91	1346225.7
	02-11	0.0 - 0.5'	PR-C02-11^R	A	482612.82	1346262.8
	02-12	0.0 - 0.5'	PR-C02-12^R	A	482588.08	1346297.77
	02-13	0.0 - 0.5'	PR-C02-13^R	A	482562.95	1346322.51
	02-14	0.0 - 0.5'	PR-C02-14^R	A	482581.89	1346364.25
	02-15V	0.0 - 0.5'	PR-C02-15^V	archive	482560.88	1346395.84
	02-16	0.0 - 0.5'	PR-C02-16^R	A	482546.8	1346454.87

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C03	03-1	0.0 - 0.5'	PR-C03-1^R	A	482585.52	1345867.26
	03-2	0.0 - 0.5'	PR-C03-2^R	A	482620.74	1345898.08
	03-3V	0.0 - 0.5'	PR-C03-3^V	archive	482573.1	1345945.3
	03-4D	0.0 - 0.5'	PR-C03-4^R	A	482591.16	1345979.18
			PR-C03-4^R-D			
	03-5V	0.0 - 0.5'	PR-C03-5^V	archive	482568.77	1346056.07
	03-6	0.0 - 0.5'	PR-C03-6^R	A	482540.62	1346087.14
	03-7	0.0 - 0.5'	PR-C03-7^R	A	482525.58	1346133.55
	03-8	0.0 - 0.5'	PR-C03-8^R	A	482541.78	1346163.86
	03-9	0.0 - 0.5'	PR-C03-9^R	A	482542.4	1346189.81
	03-10	0.0 - 0.5'	PR-C03-10^R	A	482485.43	1346226.08
	03-11V	0.0 - 0.5'	PR-C03-11^V	archive	482517.61	1346251.41
	03-12	0.0 - 0.5'	PR-C03-12^R	A	482481.61	1346303.57
	03-13	0.0 - 0.5'	PR-C03-13^R	A	482475.22	1346336.29
	03-14V	0.0 - 0.5'	PR-C03-14^V	archive	482500.51	1346354.97
	03-15	0.0 - 0.5'	PR-C03-15^R	A	482445.22	1346389.37
	03-16	0.0 - 0.5'	PR-C03-16^R	A	482431.23	1346437.13
C04	04-1	0.0 - 0.5'	PR-C04-1^R	A	482535.11	1345903.1
	04-2	0.0 - 0.5'	PR-C04-2^R	A	482555.14	1345963.71
	04-3D	0.0 - 0.5'	PR-C04-3^R	A	482503.88	1345846.98
			PR-C04-3^R-D			
	04-4V	0.0 - 0.5'	PR-C04-4^V	archive	482488.72	1345988.92
	04-5	0.0 - 0.5'	PR-C04-5^R	A	482420.39	1345862.73
	04-6	0.0 - 0.5'	PR-C04-6^R	A	482435.87	1345927.34
	04-7	0.0 - 0.5'	PR-C04-7^R	A	482455.9	1345980.07
	04-8V	0.0 - 0.5'	PR-C04-8^V	archive	482383.89	1346040.79
	04-9V	0.0 - 0.5'	PR-C04-9^V	archive	482377.45	1345907.43
	04-10	0.0 - 0.5'	PR-C04-10^R	A	482364.65	1345945.85
	04-11	0.0 - 0.5'	PR-C04-11^R	A	482306.22	1345952.52
	04-12	0.0 - 0.5'	PR-C04-12^R	A	482298.04	1346001.73
	04-13	0.0 - 0.5'	PR-C04-13^R	A	482340.67	1346054.71
	04-14	0.0 - 0.5'	PR-C04-14^R	A	482256.6	1345938
	04-15V	0.0 - 0.5'	PR-C04-15^V	archive	482265.49	1346042.56
	04-16	0.0 - 0.5'	PR-C04-16^R	A	482252.66	1346149.68

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CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C05	05-1	0.0 - 0.5'	PR-C05-1^R	A	482201.39	1345984.79
	05-2	0.0 - 0.5'	PR-C05-2^R	A	482210.21	1346048.08
	05-3V	0.0 - 0.5'	PR-C05-3^V	archive	482230.26	1346150.92
	05-4	0.0 - 0.5'	PR-C05-4^R	A	482221.47	1346224.58
	05-5	0.0 - 0.5'	PR-C05-5^R	A	482167.07	1346063.05
	05-6	0.0 - 0.5'	PR-C05-6^R	A	482160.62	1346127.85
	05-7V	0.0 - 0.5'	PR-C05-7^V	archive	482178.26	1346243.43
	05-8	0.0 - 0.5'	PR-C05-8^R	A	482187.88	1346277.04
	05-9D	0.0 - 0.5'	PR-C05-9^R	A	482115.47	1346110.63
			PR-C05-9^R-D			
	05-10	0.0 - 0.5'	PR-C05-10^R	A	482103.82	1346215.81
	05-11	0.0 - 0.5'	PR-C05-11^R	A	482139.85	1346243.7
	05-12V	0.0 - 0.5'	PR-C05-12^V	archive	482130.27	1346340.05
	05-13	0.0 - 0.5'	PR-C05-13^R	A	482056.59	1346179.49
	05-14	0.0 - 0.5'	PR-C05-14^R	A	482025.38	1346206.23
	05-15V	0.0 - 0.5'	PR-C05-15^V	archive	482071.83	1346289.03
	05-16	0.0 - 0.5'	PR-C05-16^R	A	482086.25	1346322.27
C06	06-1V	0.0 - 0.5'	PR-C06-1^V	archive	481984.57	1346218.62
	06-2	0.0 - 0.5'	PR-C06-2^R	A	481987.59	1346307.74
	06-3	0.0 - 0.5'	PR-C06-3^R	A	481938.97	1346275.69
	06-4	0.0 - 0.5'	PR-C06-4^R	A	481894.83	1346299.14
	06-5	0.0 - 0.5'	PR-C06-5^R	A	481827.75	1346240.96
	06-6V	0.0 - 0.5'	PR-C06-6^V	archive	481793.3	1346251.12
	06-7	0.0 - 0.5'	PR-C06-7^R	A	481760.47	1346199.79
	06-8	0.0 - 0.5'	PR-C06-8^R	A	481695.65	1346227.61
	06-9V	0.0 - 0.5'	PR-C06-9^V	archive	481670.82	1346178.86
	06-10	0.0 - 0.5'	PR-C06-10^R	A	481632.4	1346168.84
	06-11	0.0 - 0.5'	PR-C06-11^R	A	481554.78	1346190.22
	06-12	0.0 - 0.5'	PR-C06-12^R	A	481529.15	1346127.5
	06-13D	0.0 - 0.5'	PR-C06-13^R	A	481480.32	1346122.93
			PR-C06-13^R-D			
	06-14V	0.0 - 0.5'	PR-C06-14^V	archive	481457.09	1346166.73
	06-15	0.0 - 0.5'	PR-C06-15^R	A	481414.66	1346233.51
	06-16	0.0 - 0.5'	PR-C06-16^R	A	481389.1	1346180

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PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C07	07-1	0.0 - 0.5'	PR-C07-1^R	A	481334.3	1346281.37
	07-2V	0.0 - 0.5'	PR-C07-2^V	archive	481277.09	1346289.9
	07-3	0.0 - 0.5'	PR-C07-3^R	A	481185.86	1346327.19
	07-4	0.0 - 0.5'	PR-C07-4^R	A	481095.43	1346351.45
	07-5	0.0 - 0.5'	PR-C07-5^R	A	481109.05	1346413.12
	07-6V	0.0 - 0.5'	PR-C07-6^V	archive	481059.77	1346396.73
	07-7D	0.0 - 0.5'	PR-C07-7^R PR-C07-7^R-D	A	481063.46	1346479.08
	07-8	0.0 - 0.5'	PR-C07-8^R	A	481023.42	1346425.79
	07-9	0.0 - 0.5'	PR-C07-9^R	A	480987.43	1346489.96
	07-10	0.0 - 0.5'	PR-C07-10^R	A	481026.65	1346511.97
	07-11V	0.0 - 0.5'	PR-C07-11^V	archive	481005.06	1346562.64
	07-12	0.0 - 0.5'	PR-C07-12^R	A	480990.67	1346634.78
	07-13	0.0 - 0.5'	PR-C07-13^R	A	480913.8	1346517.72
	07-14	0.0 - 0.5'	PR-C07-14^R	A	480942.36	1346560.37
	07-15	0.0 - 0.5'	PR-C07-15^R	A	480923.44	1346613.8
	07-16V	0.0 - 0.5'	PR-C07-16^V	archive	480910.66	1346686.3
C08	08-1	0.0 - 0.5'	PR-C08-1^R	A	480889.83	1346619.51
	08-2V	0.0 - 0.5'	PR-C08-2^V	archive	480890.64	1346664.24
	08-3	0.0 - 0.5'	PR-C08-3^R	A	480834.12	1346595.84
	08-4	0.0 - 0.5'	PR-C08-4^R	A	480844.16	1346708.76
	08-5D	0.0 - 0.5'	PR-C08-5^R PR-C08-5^R-D	A	480808.2	1346653.56
	08-6V	0.0 - 0.5'	PR-C08-6^V	archive	480748.53	1346720.22
	08-7	0.0 - 0.5'	PR-C08-7^R	A	480702.95	1346677.8
	08-8	0.0 - 0.5'	PR-C08-8^R	A	480637.72	1346679.24
	08-9	0.0 - 0.5'	PR-C08-9^R	A	480580.92	1346701.62
	08-10	0.0 - 0.5'	PR-C08-10^R	A	480576.93	1346738.5
	08-11	0.0 - 0.5'	PR-C08-11^R	A	480532.42	1346672.07
	08-12V	0.0 - 0.5'	PR-C08-12^V	archive	480545.71	1346711.45
	08-13	0.0 - 0.5'	PR-C08-13^R	A	480494.29	1346680.38
	08-14	0.0 - 0.5'	PR-C08-14^R	A	480463.75	1346695
	08-15V	0.0 - 0.5'	PR-C08-15^V	archive	480433.63	1346625.77
	08-16	0.0 - 0.5'	PR-C08-16^R	A	480355.19	1346589.01

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CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C09	09-1V	0.0 - 0.5'	PR-C09-1^V	archive	480297.56	1346583.71
	09-2	0.0 - 0.5'	PR-C09-2^R	A	480216.73	1346593.41
	09-3	0.0 - 0.5'	PR-C09-3^R	A	480151.11	1346620.2
	09-4	0.0 - 0.5'	PR-C09-4^R	A	480055.87	1346621.6
	09-5V	0.0 - 0.5'	PR-C09-5^V	archive	480092.65	1346530.09
	09-6	0.0 - 0.5'	PR-C09-6^R	A	480013.42	1346528.62
	09-7	0.0 - 0.5'	PR-C09-7^R	A	480017.44	1346582.5
	09-8D	0.0 - 0.5'	PR-C09-8^R	A	479987.8	1346504.72
			PR-C09-8^R-D			
	09-9	0.0 - 0.5'	PR-C09-9^R	A	479973.41	1346569.54
	09-10V	0.0 - 0.5'	PR-C09-10^V	archive	479922.97	1346510.44
	09-11	0.0 - 0.5'	PR-C09-11^R	A	479942.2	1346578.67
	09-12	0.0 - 0.5'	PR-C09-12^R	A	479933.82	1346678.66
	09-13	0.0 - 0.5'	PR-C09-13^R	A	480031.31	1346747.16
	09-14V	0.0 - 0.5'	PR-C09-14^V	archive	479983.87	1346726.36
	09-15	0.0 - 0.5'	PR-C09-15^R	A	480047.92	1346806.96
	09-16	0.0 - 0.5'	PR-C09-16^R	A	479985.49	1346798.93
C10	10-1	0.0 - 0.5'	PR-C10-1^R	A	480095.98	1346923.05
	10-2	0.0 - 0.5'	PR-C10-2^R	A	480075.18	1346958.64
	10-3	0.0 - 0.5'	PR-C10-3^R	A	480038.19	1346885.01
	10-4V	0.0 - 0.5'	PR-C10-4^V	archive	479990.6	1346874.69
	10-5D	0.0 - 0.5'	PR-C10-5^R	A	480097.25	1347006.53
			PR-C10-5^R-D			
	10-6	0.0 - 0.5'	PR-C10-6^R	A	480105.64	1347112.34
	10-7	0.0 - 0.5'	PR-C10-7^R	A	480072.85	1347179.7
	10-8V	0.0 - 0.5'	PR-C10-8^V	archive	480123.3	1347257.11
	10-9	0.0 - 0.5'	PR-C10-9^R	A	480091.3	1347322.9
	10-10V	0.0 - 0.5'	PR-C10-10^V	archive	480012.89	1347388.55
	10-11	0.0 - 0.5'	PR-C10-11^R	A	479968.08	1347424.55
	10-12	0.0 - 0.5'	PR-C10-12^R	A	479931.54	1347492.02
	10-13	0.0 - 0.5'	PR-C10-13^R	A	479952.11	1347537
	10-14V	0.0 - 0.5'	PR-C10-14^V	archive	479866.74	1347610.67
	10-15	0.0 - 0.5'	PR-C10-15^R	A	479837.7	1347660.2
	10-16	0.0 - 0.5'	PR-C10-16^R	A	479872.14	1347725.18

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CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C11	11-1	0.0 - 0.5'	PR-C11-1^R	A	480053.38	1346364.58
	11-2	0.0 - 0.5'	PR-C11-2^R	A	479997.29	1346133.69
	11-3V	0.0 - 0.5'	PR-C11-3^V	archive	480006.91	1346207.96
	11-4	0.0 - 0.5'	PR-C11-4^R	A	479994.04	1346282.73
	11-5	0.0 - 0.5'	PR-C11-5^R	A	480006.16	1346368.98
	11-6V	0.0 - 0.5'	PR-C11-6^V	archive	480002.17	1346403.24
	11-7	0.0 - 0.5'	PR-C11-7^R	A	480027.81	1346466.35
	11-8	0.0 - 0.5'	PR-C11-8^R	A	479935.76	1346447.36
	11-9	0.0 - 0.5'	PR-C11-9^R	A	479964.44	1346017.04
	11-10	0.0 - 0.5'	PR-C11-10^R	A	479923.63	1346052.96
	11-11V	0.0 - 0.5'	PR-C11-11^V	archive	479915.65	1346114.46
	11-12D	0.0 - 0.5'	PR-C11-12^R PR-C11-12^R-D	A	479942.08	1346180.27
	11-13	0.0 - 0.5'	PR-C11-13^R	A	479971.71	1346238.31
	11-14	0.0 - 0.5'	PR-C11-14^R	A	479938.91	1346290.75
	11-15V	0.0 - 0.5'	PR-C11-15^V	archive	479961.33	1346333.07
	11-16	0.0 - 0.5'	PR-C11-16^R	A	479938.94	1346391.65
C12	12-1	0.0 - 0.5'	PR-C12-1^R	A	479872.4	1346028.38
	12-2	0.0 - 0.5'	PR-C12-2^R	A	479897.22	1346055.76
	12-3	0.0 - 0.5'	PR-C12-3^R	A	479823.44	1345999.29
	12-4V	0.0 - 0.5'	PR-C12-4^V	archive	479814	1346098.98
	12-5	0.0 - 0.5'	PR-C12-5^R	A	479879.64	1346159.91
	12-6V	0.0 - 0.5'	PR-C12-6^V	archive	479861.26	1346245.21
	12-7	0.0 - 0.5'	PR-C12-7^R	A	479808.42	1346171.08
	12-8D	0.0 - 0.5'	PR-C12-8^R PR-C12-8^R-D	A	479831.66	1346264.7
	12-9V	0.0 - 0.5'	PR-C12-9^V	archive	479801.17	1346029.36
	12-10	0.0 - 0.5'	PR-C12-10^R	A	479765.97	1346079.16
	12-11	0.0 - 0.5'	PR-C12-11^R	A	479702.34	1346048.23
	12-12	0.0 - 0.5'	PR-C12-12^R	A	479701.15	1346104.42
	12-13	0.0 - 0.5'	PR-C12-13^R	A	479776.42	1346153.48
	12-14V	0.0 - 0.5'	PR-C12-14^V	archive	479758.81	1346208.72
	12-15	0.0 - 0.5'	PR-C12-15^R	A	479705.97	1346172.3
	12-16	0.0 - 0.5'	PR-C12-16^R	A	479729.4	1346247.48

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CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C13	13-1V	0.0 - 0.5'	PR-C13-1^V	archive	479882.89	1346304.69
	13-2D	0.0 - 0.5'	PR-C13-2^R	A	479892.25	1346358.39
			PR-C13-2^R-D			
	13-3	0.0 - 0.5'	PR-C13-3^R	A	479833.27	1346302.49
	13-4	0.0 - 0.5'	PR-C13-4^R	A	479810.88	1346364.54
	13-5	0.0 - 0.5'	PR-C13-5^R	A	479858.11	1346386.92
	13-6	0.0 - 0.5'	PR-C13-6^R	A	479891.75	1346466.64
	13-7V	0.0 - 0.5'	PR-C13-7^V	archive	479876.2	1346514.88
	13-8	0.0 - 0.5'	PR-C13-8^R	A	479884.8	1346588.1
	13-9	0.0 - 0.5'	PR-C13-9^R	A	479863.79	1346639.28
	13-10	0.0 - 0.5'	PR-C13-10^R	A	479817.33	1346510.12
	13-11V	0.0 - 0.5'	PR-C13-11^V	archive	479801.08	1346452.25
	13-12	0.0 - 0.5'	PR-C13-12^R	A	479816.49	1346399.64
	13-13V	0.0 - 0.5'	PR-C13-13^V	archive	479727.11	1346292.33
	13-14	0.0 - 0.5'	PR-C13-14^R	A	479756.45	1346332.29
	13-15	0.0 - 0.5'	PR-C13-15^R	A	479741.27	1346419.91
	13-16	0.0 - 0.5'	PR-C13-16^R	A	479736.86	1346464.29
C14	14-1	0.0 - 0.5'	PR-C14-1^R	A	479649.91	1346046.11
	14-2V	0.0 - 0.5'	PR-C14-2^V	archive	479634.72	1346090.87
	14-3	0.0 - 0.5'	PR-C14-3^R	A	479596.65	1346018.2
	14-4D	0.0 - 0.5'	PR-C14-4^R	A	479581.89	1346090.23
			PR-C14-4^R-D			
	14-5	0.0 - 0.5'	PR-C14-5^R	A	479661.14	1346121.71
	14-6V	0.0 - 0.5'	PR-C14-6^V	archive	479680.37	1346210.94
	14-7	0.0 - 0.5'	PR-C14-7^R	A	479602.72	1346159.72
	14-8	0.0 - 0.5'	PR-C14-8^R	A	479571.52	1346184.82
	14-9V	0.0 - 0.5'	PR-C14-9^V	archive	479534.15	1346039.41
	14-10	0.0 - 0.5'	PR-C14-10^R	A	479533	1346091.57
	14-11	0.0 - 0.5'	PR-C14-11^R	A	479456.16	1346060.62
	14-12	0.0 - 0.5'	PR-C14-12^R	A	479446.64	1346102.29
	14-13	0.0 - 0.5'	PR-C14-13^R	A	479499.48	1346147.4
	14-14	0.0 - 0.5'	PR-C14-14^R	A	479528.31	1346214.72
	14-15	0.0 - 0.5'	PR-C14-15^R	A	479432.25	1346167.98
	14-16V	0.0 - 0.5'	PR-C14-16^V	archive	479458.6	1346207.93

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C15	15-1	0.0 - 0.5'	PR-C15-1^R	A	479646.77	1346246.02
	15-2	0.0 - 0.5'	PR-C15-2^R	A	479653.2	1346320.78
	15-3V	0.0 - 0.5'	PR-C15-3^V	archive	479595.56	1346270.91
	15-4	0.0 - 0.5'	PR-C15-4^R	A	479579.59	1346307.95
	15-5	0.0 - 0.5'	PR-C15-5^R	A	479674.77	1346373.87
	15-6	0.0 - 0.5'	PR-C15-6^R	A	479658.83	1346421.49
	15-7V	0.0 - 0.5'	PR-C15-7^V	archive	479566.4	1346375.01
	15-8D	0.0 - 0.5'	PR-C15-8^R PR-C15-8^R-D	A	479617.22	1346430.92
	15-9V	0.0 - 0.5'	PR-C15-9^V	archive	479496.31	1346248.17
	15-10	0.0 - 0.5'	PR-C15-10^R	A	479522.82	1346303.94
	15-11	0.0 - 0.5'	PR-C15-11^R	A	479452.29	1346242.03
	15-12	0.0 - 0.5'	PR-C15-12^R	A	479423.04	1346302.22
	15-13	0.0 - 0.5'	PR-C15-13^R	A	479493.94	1346353.14
	15-14	0.0 - 0.5'	PR-C15-14^R	A	479535.57	1346389.99
	15-15	0.0 - 0.5'	PR-C15-15^R	A	479452.73	1346371.45
	15-16V	0.0 - 0.5'	PR-C15-16^V	archive	479445.94	1346414.86
C16	16-1V	0.0 - 0.5'	PR-C16-1^V	archive	479371.41	1346100.89
	16-2	0.0 - 0.5'	PR-C16-2^R	A	479390.07	1346181.56
	16-3	0.0 - 0.5'	PR-C16-3^R	A	479334.59	1346086.54
	16-4	0.0 - 0.5'	PR-C16-4^R	A	479326.5	1346162.13
	16-5	0.0 - 0.5'	PR-C16-5^R	A	479382.61	1346238.31
	16-6	0.0 - 0.5'	PR-C16-6^R	A	479367.7	1346338.48
	16-7V	0.0 - 0.5'	PR-C16-7^V	archive	479340.18	1346216.38
	16-8	0.0 - 0.5'	PR-C16-8^R	A	479316.26	1346332.24
	16-9	0.0 - 0.5'	PR-C16-9^R	A	479288.17	1346090.46
	16-10V	0.0 - 0.5'	PR-C16-10^V	archive	479276.2	1346204.97
	16-11	0.0 - 0.5'	PR-C16-11^R	A	479213.74	1346092.02
	16-12	0.0 - 0.5'	PR-C16-12^R	A	479244.17	1346170.05
	16-13	0.0 - 0.5'	PR-C16-13^R	A	479272.52	1346246.76
	16-14D	0.0 - 0.5'	PR-C16-14^R PR-C16-14^R-D	A	479296.5	1346300.88
	16-15V	0.0 - 0.5'	PR-C16-15^V	archive	479212.55	1346233.82
	16-16	0.0 - 0.5'	PR-C16-16^R	A	479237.06	1346324.1

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C17	17-1	0.0 - 0.5'	PR-C17-1^R	A	479378.7	1346378.33
	17-2	0.0 - 0.5'	PR-C17-2^R	A	479391.79	1346437.35
	17-3V	0.0 - 0.5'	PR-C17-3^V	archive	479359.1	1346500.97
	17-4	0.0 - 0.5'	PR-C17-4^R	A	479309.12	1346534.5
	17-5	0.0 - 0.5'	PR-C17-5^R	A	479289.14	1346359.97
	17-6V	0.0 - 0.5'	PR-C17-6^V	archive	479327.49	1346431.36
	17-7	0.0 - 0.5'	PR-C17-7^R	A	479297.1	1346489.17
	17-8	0.0 - 0.5'	PR-C17-8^R	A	479226.07	1346373.15
	17-9	0.0 - 0.5'	PR-C17-9^R	A	479226.65	1346421.02
	17-10V	0.0 - 0.5'	PR-C17-10^V	archive	479219.87	1346493.48
	17-11	0.0 - 0.5'	PR-C17-11^R	A	479245.9	1346579.73
	17-12	0.0 - 0.5'	PR-C17-12^R	A	479186.69	1346621.32
	17-13V	0.0 - 0.5'	PR-C17-13^V	archive	479191.79	1347373.57
	17-14	0.0 - 0.5'	PR-C17-14^R	A	479183.2	1346434.48
	17-15D	0.0 - 0.5'	PR-C17-15^R PR-C17-15^R-D	A	479151.44	1346495.06
	17-16	0.0 - 0.5'	PR-C17-16^R	A	479190.66	1346568.04
C18	18-1	0.0-0.5’	PR-C18-1^R	A	479129.01	1346446.78
	18-2V	0.0-0.5’	PR-C18-2^V	archive	479130.45	1346507.28
	18-3	0.0-0.5’	PR-C18-3^R	A	479118.15	1346577.15
	18-4	0.0-0.5’	PR-C18-4^R	A	479088.24	1346604.43
	18-5D	0.0-0.5’	PR-C18-5^R PR-C18-5^R-D	A	479112.28	1346683.59
	18-6	0.0-0.5’	PR-C18-6^R	A	479070.23	1346529.71
	18-7	0.0-0.5’	PR-C18-7^R	A	479044.14	1346645.27
	18-8V	0.0-0.5’	PR-C18-8^V	archive	479047.46	1346704.8
	18-9	0.0-0.5’	PR-C18-9^R	A	478959.46	1346836.15
	18-10V	0.0-0.5’	PR-C18-10^V	archive	478827.67	1346867.96
	18-11	0.0-0.5’	PR-C18-11^R	A	478666.51	1346767.66
	18-12	0.0-0.5’	PR-C18-12^R	A	478467.99	1346642.6
	18-13	0.0-0.5’	PR-C18-13^R	A	478336.71	1346561.46
	18-14	0.0-0.5’	PR-C18-14^R	A	478269.43	1346568.47
	18-15	0.0-0.5’	PR-C18-15^R	A	478232.73	1346621.2
	18-16V	0.0-0.5’	PR-C18-16^V	archive	478252.71	1346699.9

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C19	19-1	0.0-0.5'	PR-C19-1^R	A	478287.16	1346806.54
	19-2	0.0-0.5'	PR-C19-2^R	A	478253.95	1346857.79
	19-3	0.0-0.5'	PR-C19-3^R	A	478244.79	1346961.66
	19-4V	0.0-0.5'	PR-C19-4^V	archive	478248.85	1347135.87
	19-5	0.0-0.5'	PR-C19-5^R	A	478172.85	1347224.75
	19-6	0.0-0.5'	PR-C19-6^R	A	478040	1347255.32
	19-7	0.0-0.5'	PR-C19-7^R	A	477946.58	1347342.13
	19-8V	0.0-0.5'	PR-C19-8^V	archive	477827.94	1347361.6
	19-9D	0.0-0.5'	PR-C19-9^R	A	477635.84	1347315.36
			PR-C19-9^R-D			
	19-10V	0.0-0.5'	PR-C19-10^V	archive	477507.79	1347319.8
	19-11	0.0-0.5'	PR-C19-11^R	A	477373.33	1347308.77
	19-12	0.0-0.5'	PR-C19-12^R	A	477249.28	1347328.95
	19-13	0.0-0.5'	PR-C19-13^R	A	477217.28	1347366.08
	19-14V	0.0-0.5'	PR-C19-14^V	archive	477210.89	1347408.95
	19-15	0.0-0.5'	PR-C19-15^R	A	477230.36	1347487.44
	19-16	0.0-0.5'	PR-C19-16^R	A	477198.95	1347614.93
C20	20-1D	0.0-0.5'	PR-C20-1^R	A	477153.33	1347617.82
			PR-C20-1^R-D			
	20-2	0.0-0.5'	PR-C20-2^R	A	477090.14	1347746.91
	20-3	0.0-0.5'	PR-C20-3^R	A	477044	1347738.21
	20-4V	0.0-0.5'	PR-C20-4^V	archive	477017.33	1347846.54
	20-5	0.0-0.5'	PR-C20-5^R	A	476983.75	1347921.06
	20-6	0.0-0.5'	PR-C20-6^R	A	476936.55	1347962.38
	20-7V	0.0-0.5'	PR-C20-7^V	archive	476876.27	1347978.09
	20-8	0.0-0.5'	PR-C20-8^R	A	476811.72	1348039.9
	20-9	0.0-0.5'	PR-C20-9^R	A	476765.31	1348085.85
	20-10	0.0-0.5'	PR-C20-10^R	A	476721.15	1348096.74
	20-11V	0.0-0.5'	PR-C20-11^V	archive	476627.39	1348141.16
	20-12	0.0-0.5'	PR-C20-12^R	A	476568.45	1348147.4
	20-13	0.0-0.5'	PR-C20-13^R	A	476468.84	1348073.52
	20-14	0.0-0.5'	PR-C20-14^R	A	476419.55	1348049.06
	20-15V	0.0-0.5'	PR-C20-15^V	archive	476332.28	1347935.47
	20-16	0.0-0.5'	PR-C20-16^R	A	476221.97	1347797.53

APPENDIX C
PADDYS RUN AND THE PILOT PLANT DRAINAGE DITCH CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
C21	21-1	0.0-0.5'	PR-C21-1^R	A	479223.88	1346276.05
	21-2	0.0-0.5'	PR-C21-2^R	A	479196.14	1346254.52
	21-3	0.0-0.5'	PR-C21-3^R	A	479204.49	1346278.72
	21-4V	0.0-0.5'	PR-C21-4^V	archive	479209.29	1346302.5
	21-5	0.0-0.5'	PR-C21-5^R	A	479180.92	1346270.79
	21-6	0.0-0.5'	PR-C21-6^R	A	479187.38	1346298.74
	21-7D	0.0-0.5'	PR-C21-7^R	A	479168.4	1346289.56
			PR-C21-7^R-D			
	21-8V	0.0-0.5'	PR-C21-8^V	archive	479153.02	1346312.04
	21-9	0.0-0.5'	PR-C21-9^R	A	479192.39	1346322.94
	21-10V	0.0-0.5'	PR-C21-10^V	archive	479189.7	1346347.5
	21-11	0.0-0.5'	PR-C21-11^R	A	479165.53	1346325.18
	21-12	0.0-0.5'	PR-C21-12^R	A	479174.09	1346358.34
	21-13	0.0-0.5'	PR-C21-13^R	A	479143.63	1346332.48
	21-14V	0.0-0.5'	PR-C21-14^V	archive	479147.59	1346349.58
	21-15	0.0-0.5'	PR-C21-15^R	A	479127.98	1346350
	21-16	0.0-0.5'	PR-C21-16^R	A	479152.18	1346371.27

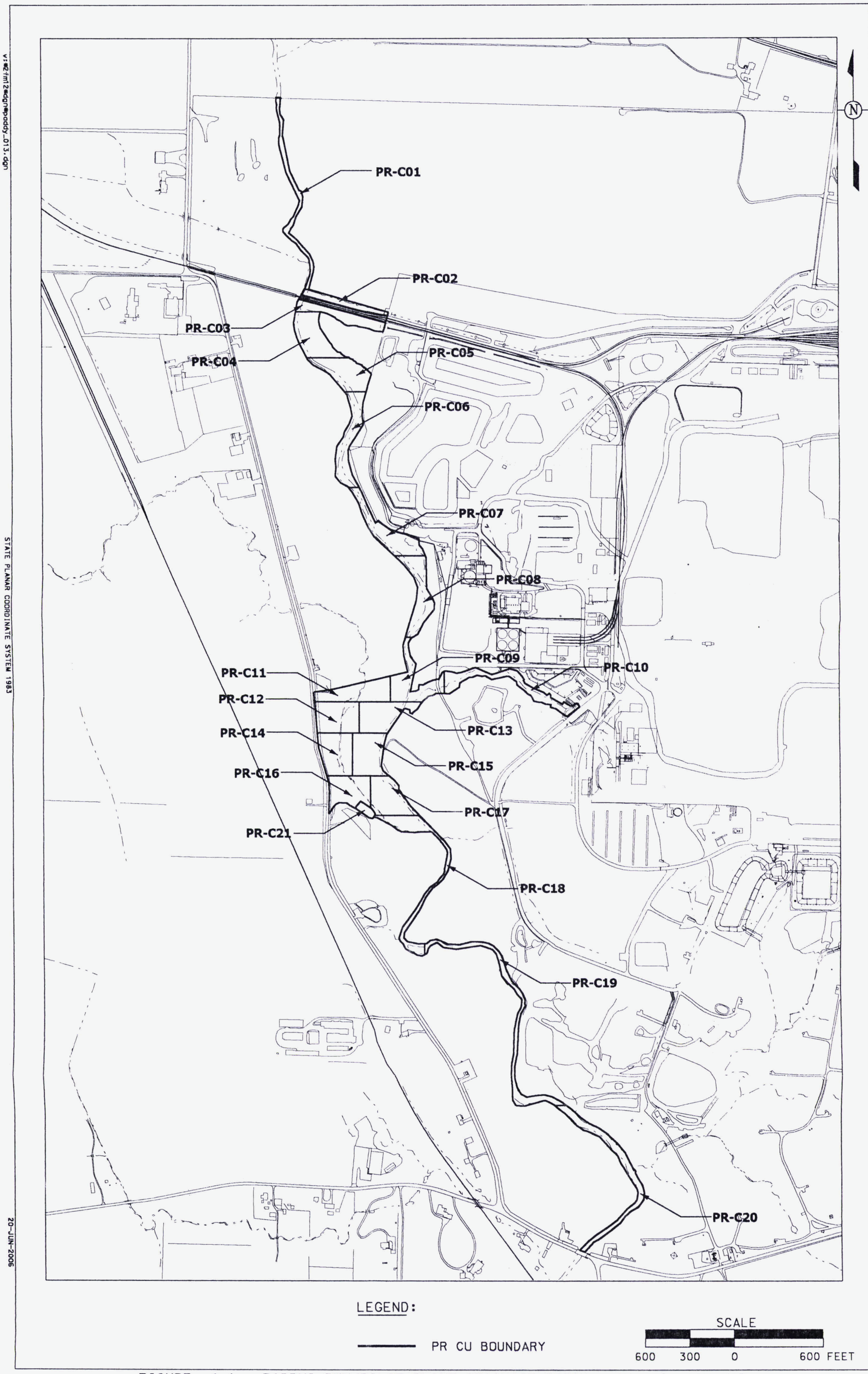

FIGURE 4-1. PADDYS RUN/PILOT PLANT DRAINAGE DITCH – CU LOCATION MAP

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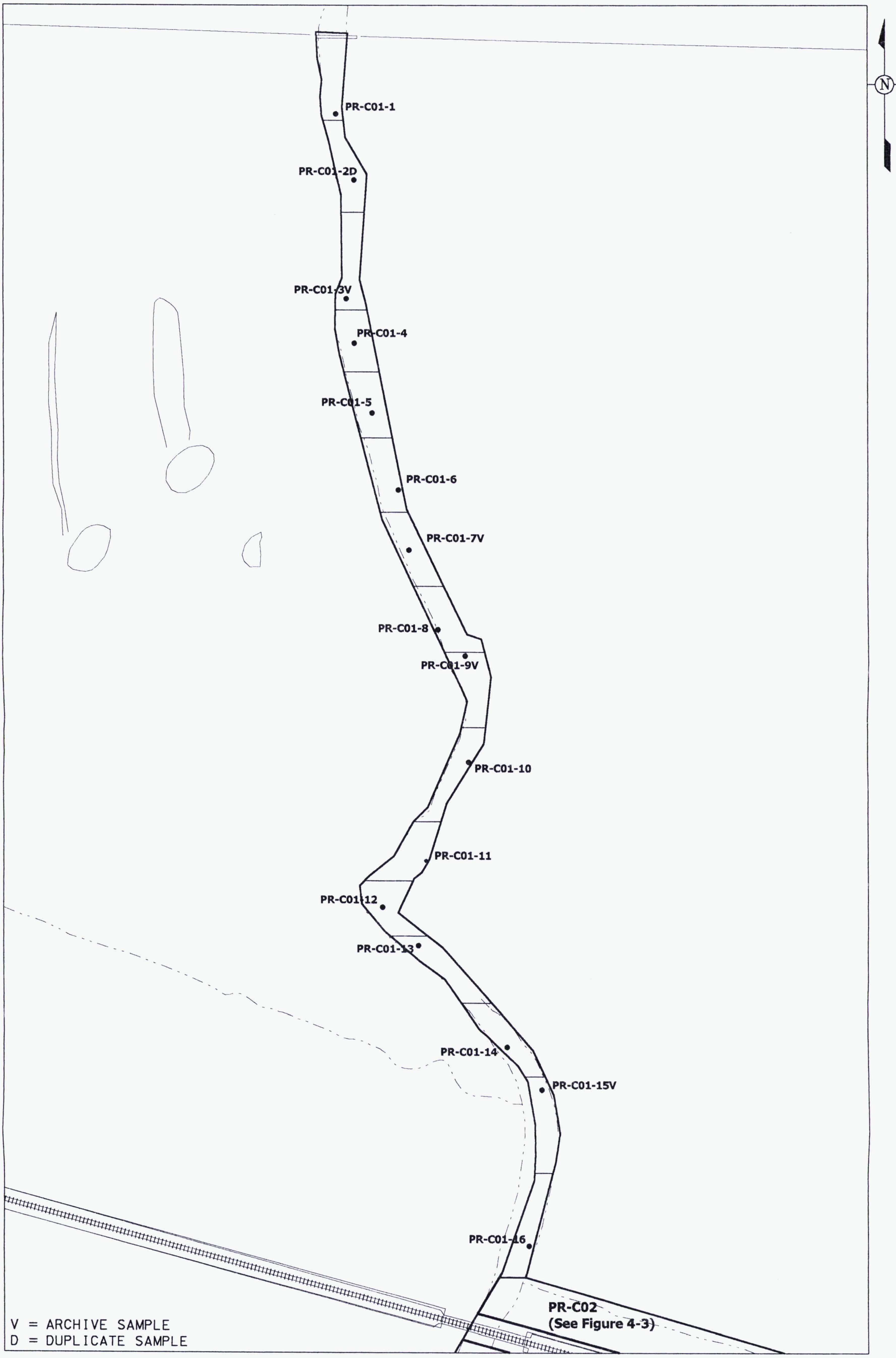
STATE PLANAR COORDINATE SYSTEM 1983

20-JUN-2006

000143



LEGEND:

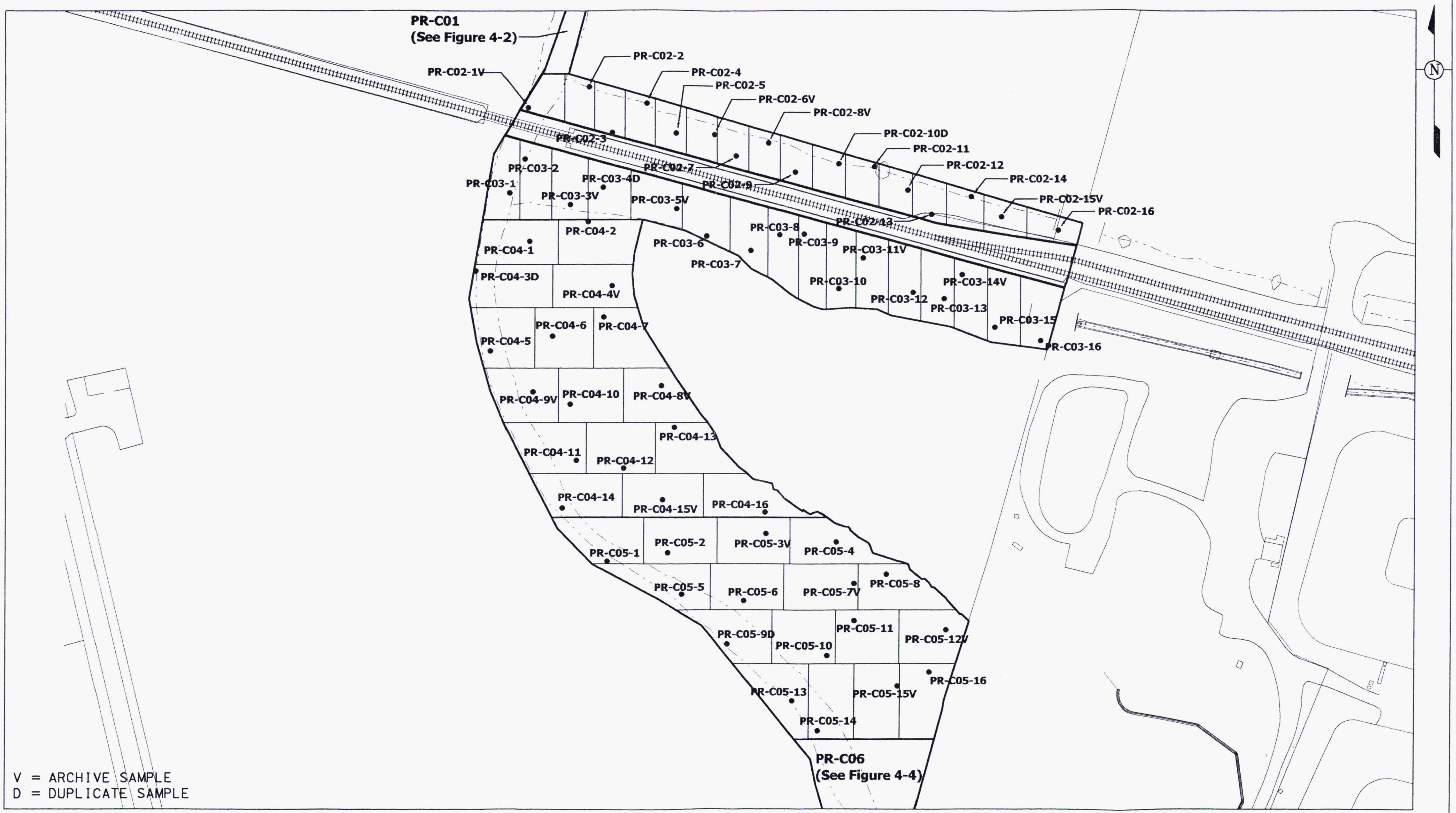
• SAMPLE LOCATION

SCALE

100 50 0 100 FEET

FIGURE 4-2. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN (NORTH) – CU PR-C01

000149



LEGEND:

● SAMPLE LOCATION

SCALE

100 50 0 100 FEET

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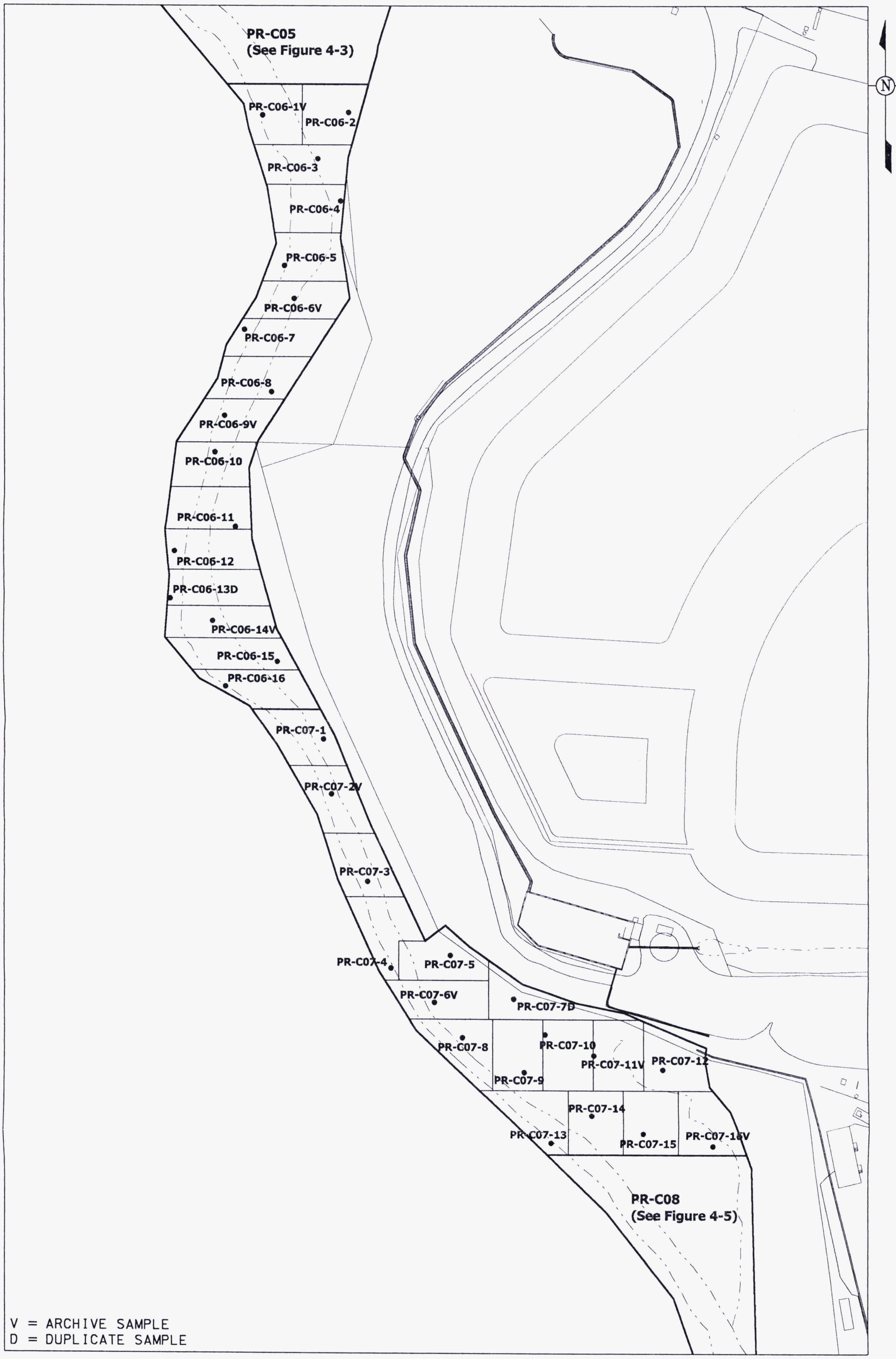
17-MAY-2006

FIGURE 4-3. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN AREA, ADJACENT TO RAIL LINE – CU's PR-C02 THROUGH PR-C05



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STATE PLANAR COORDINATE SYSTEM 1983

11-MAY-2006

LEGEND:

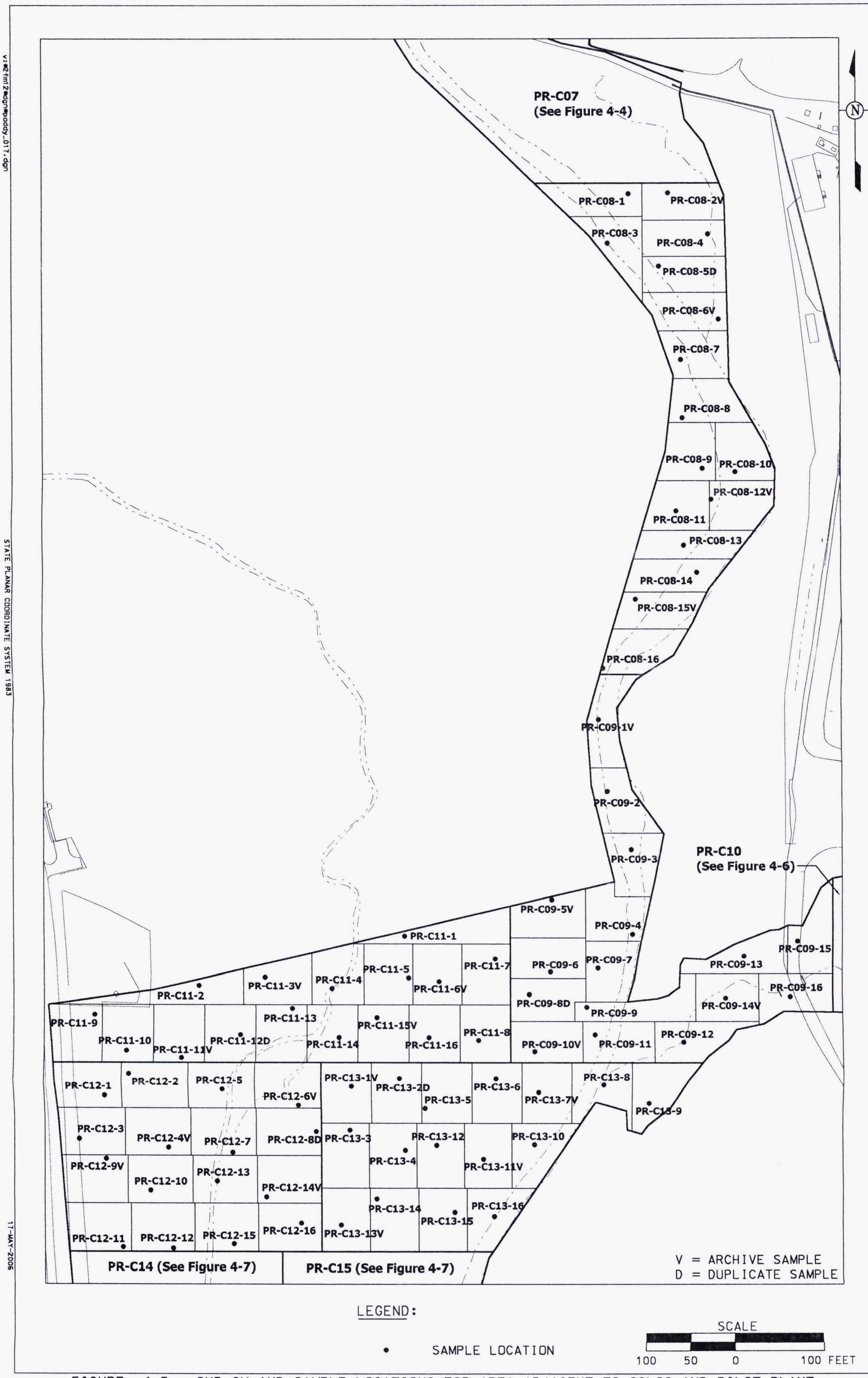
• SAMPLE LOCATION

SCALE

100 50 0 100 FEET

FIGURE 4-4. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN ADJACENT AREA, NORTHERN OXBOW, AND STREAM REROUTED AREA – CU's PR-C06 AND PR-C07

006149



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17-MAY-2006

FIGURE 4-5. SUB CU AND SAMPLE LOCATIONS FOR AREA ADJACENT TO SILOS AND PILOT PLANT DRAINAGE DITCH - CU's PR-C08, PR-C09, PR-C11, PR-C12, AND PR-C13

000143

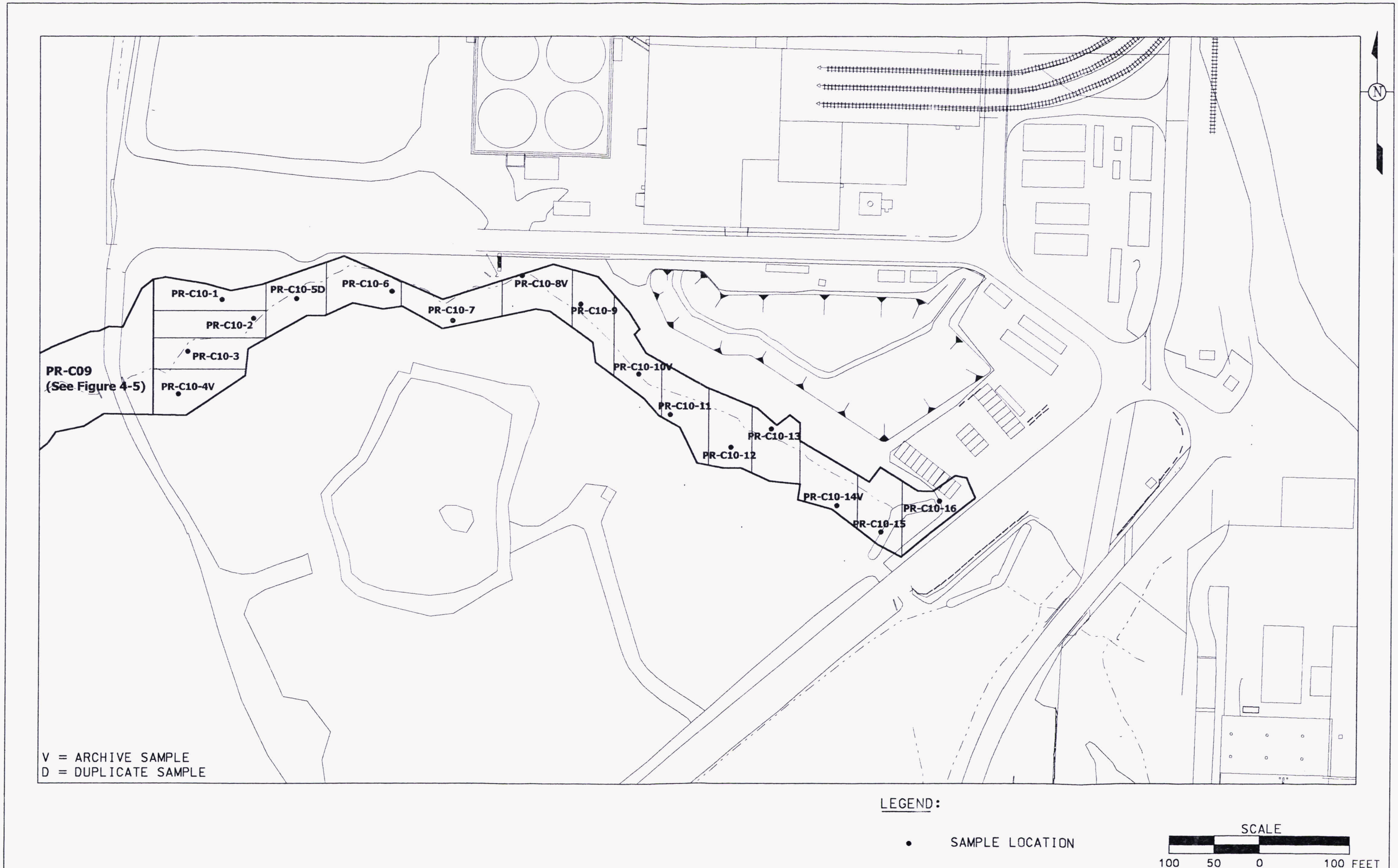

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FIGURE 4-6. SUB CU AND SAMPLE LOCATIONS MAP FOR PILOT PLANT DRAINAGE DITCH – CU PR-C10

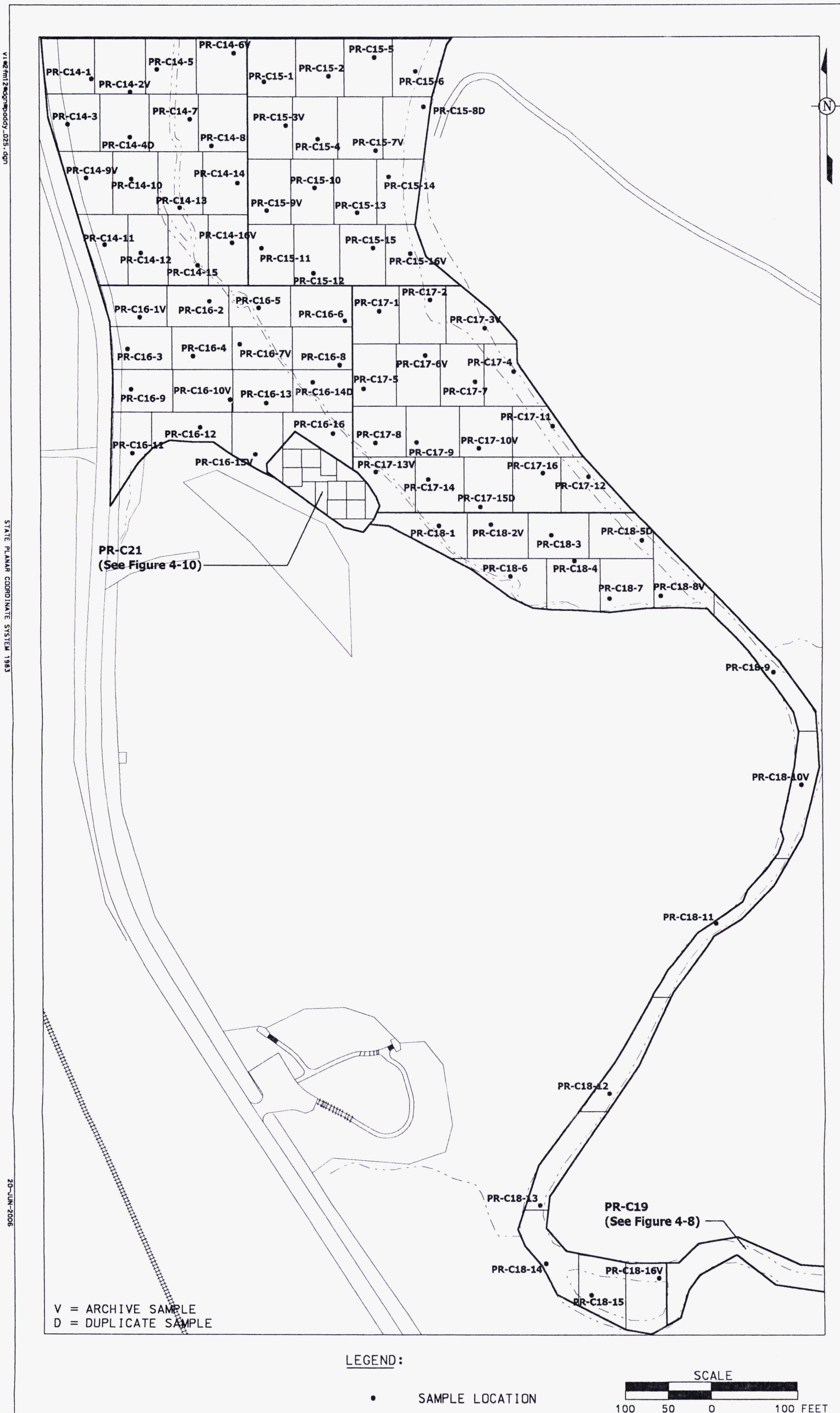

FIGURE 4-7. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN ADJACENT AREAS, SOUTHERN OXBOW, AND STREAM REROUTED AREA - CU's PR-C14 THROUGH PR-C18

006143

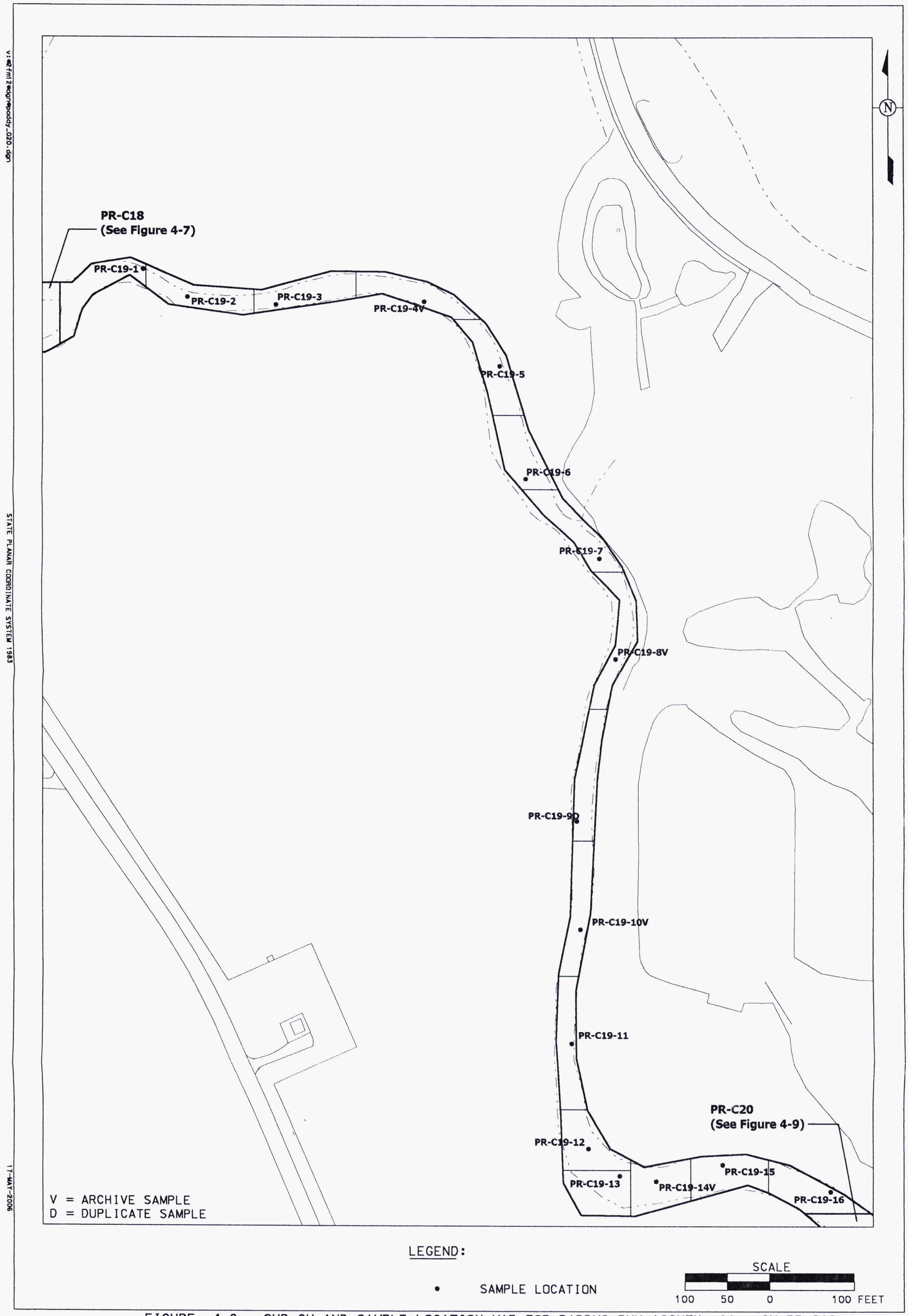

FIGURE 4-8. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN (SOUTH #1) - CU PR-C19

000149

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17-MAY-2006

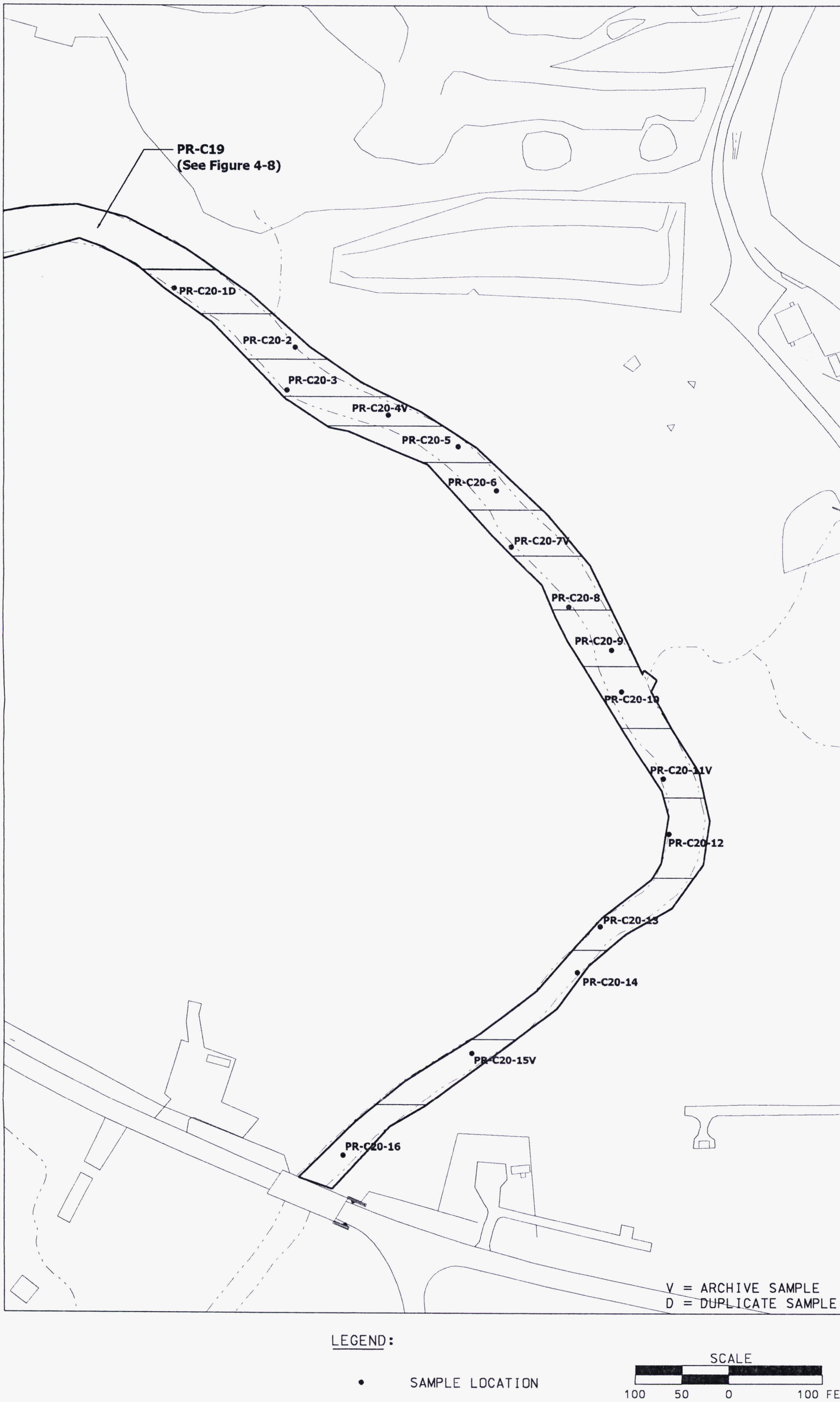

FIGURE 4-9. SUB CU AND SAMPLE LOCATION MAP FOR PADDYS RUN (SOUTH #2) - CU PR-C20

006143