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CERTIFICATION DESIGN LETTER FOR AREA 2, PHASE III PART TWO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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LIST OF ACRONYMS AND ABBREVIATIONS

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A2PIII	Area 2, Phase III
ASCOC	area-specific constituent of concern
ASL	analytical support level
BTV	benchmark toxicity value
CDL	Certification Design Letter
COC	constituent of concern
CU	certification unit
DOE	U.S. Department of Energy
dpm	disintegrations per minute
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	final remediation level
HPGe	high-purity germanium (detector)
IRDP	Integrated Remedial Design Package
mg/kg	milligram per kilogram
OEPA	Ohio Environmental Protection Agency
OU5	Operable Unit 5
pCi/g	picoCuries per gram
PSP	Project Specific Plan
RI/FS	Remedial Investigation/Feasibility Study
RSS	Radiation Scanning System
RTRAK	Radiation Tracking System
ROD	Record of Decision
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SSOD	Storm Sewer Outfall Ditch
STP	Sewage Treatment Plant
SWRB	Storm Water Retention Basin
UCL	Upper Confidence Limit

EXECUTIVE SUMMARY

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This Certification Design Letter (CDL) describes the certification approach for Area 2, Phase III (A2PIII) Part Two. The CDL contains all information required to support the primary objectives (Section 1.1).

The scope of this CDL is limited to A2PIII Part Two, which is an approximately 5-acre plot of land just south of the east chamber of the Storm Water Retention Basin (SWRB). No production operations took place within the area. Part Two was not previously identified as an excavation area; impacted material was identified during initial precertification activities for A2PIII. Remediation will be conducted in Spring 2000 in accordance with the A2PIII Part Two Integrated Remedial Design Package (IRDP, DOE 2000a). After remediation, additional precertification measurements will be collected to access FRL attainment.

The certification design presented in this CDL follows the general approach outlined in Section 3.4 of the Sitewide Excavation Plan (SEP, DOE 1998). The selection of A2PIII Part One ASCOCs was accomplished using constituent of concern (COC) lists in the Operable Unit 5 (OU5) Record of Decision (ROD, DOE 1996), process knowledge of the site COCs and release history. A total of three certification units (CU) were established. Total uranium, thorium-228, thorium-232, radium-226, and radium-228 (the sitewide primary COCs) will be considered ASCOCs in each A2PIII CU. Field sampling is expected to begin in May 2000 and the Certification Report will be issued in July 2000.

1.0 INTRODUCTION

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This CDL describes the certification approach for demonstrating that soil in A2PIII Part Two meets the final remediation levels (FRLs) for all ASCOCs. The format of this CDL follow SEP guidelines.

As a result of the circumstances at the Area 1, Phase II Sewage Treatment Plant (STP) project, where the excavations filled with water prior to collection of certification samples, an expedited approach to certification is being implemented for A2PIII Part Two. Therefore, this CDL is being submitted for review prior to excavation and approval after precertification.

1.1 OBJECTIVES

The primary objectives of this document are to:

- Define the area boundaries addressed in this CDL
- Present maps of historical data and recently acquired real-time and physical soil sample data
- Define the ASCOC selection process and list the selected ASCOCs for A2PIII Part Two
- Present the CU boundaries and proposed sampling strategy
- Summarize the analytical requirements and the statistical methodology that will be employed.
- Present the proposed certification schedule.

1.2 SCOPE

The scope of this CDL is limited to A2PIII Part Two, which is a peninsula-like area in the south-central portion of the FEMP site within A2PIII, approximately 5 acres (Figure 1-1). This area is west of the northern leg of the unnamed tributary, south of the east chamber of the SWRB, and east of the Storm Sewer Outfall Ditch (SSOD). The stream bed and side banks of the unnamed tributary and storm sewer outfall drainage area corridor will not be certified until the up-gradient drainage sources have been certified. The certification for this "dirty" corridor will be completed as part of Area 10 remediation.

The pre-remediation topography of this area of the FEMP (Figure 1-2) includes gently rolling uplands with steep hillsides along the SSOD and the unnamed tributaries. The post-remediation topography of this area after excavation is shown in Figure 1-3. There are also large trees and dense brush covering these hillsides.

Based on existing soil contamination data, soil excavation was anticipated in a portion of A2PIII Part Two. Consequently, an IRDP was developed, in accordance with SEP Excavation Approach A, a shallow excavation of impacted material on-property area outside the Former Production Area and other Waste Storage/Management Areas. After excavation of the contaminated soil, the certification process for this area will begin with precertification scanning activities under the Project Specific Plan (PSP) for the A2PIII Precertification Real-Time Scan (DOE 1999) and concluded with certification sampling under the PSP for A2PIII Part Two Certification Sampling (DOE 2000b).

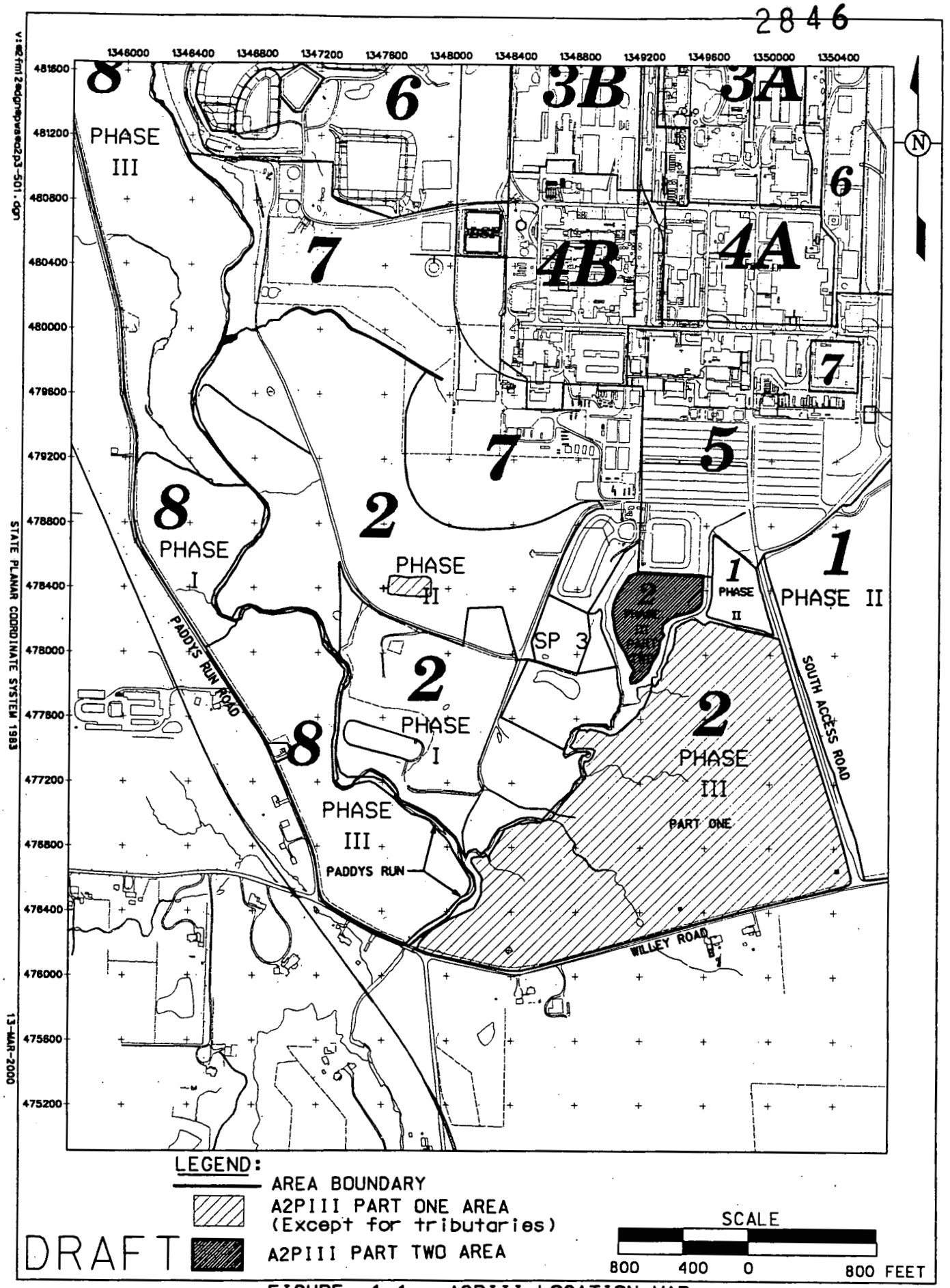

FIGURE 1-1. A2PIII LOCATION MAP

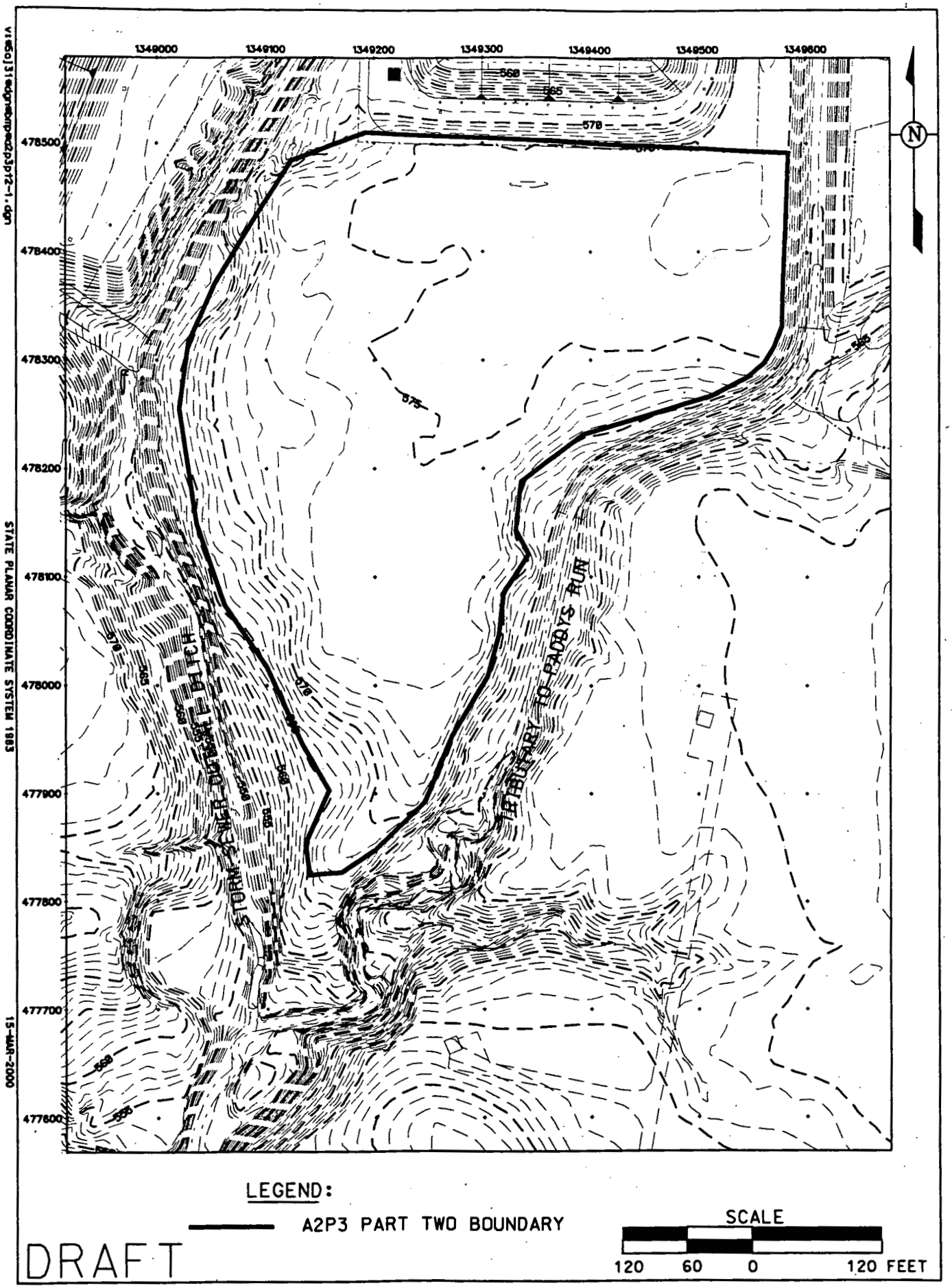

FIGURE 1-2. A2PIII PART TWO
PRE-REMEDIATION TOPOGRAPHY AND SURFACE FEATURES

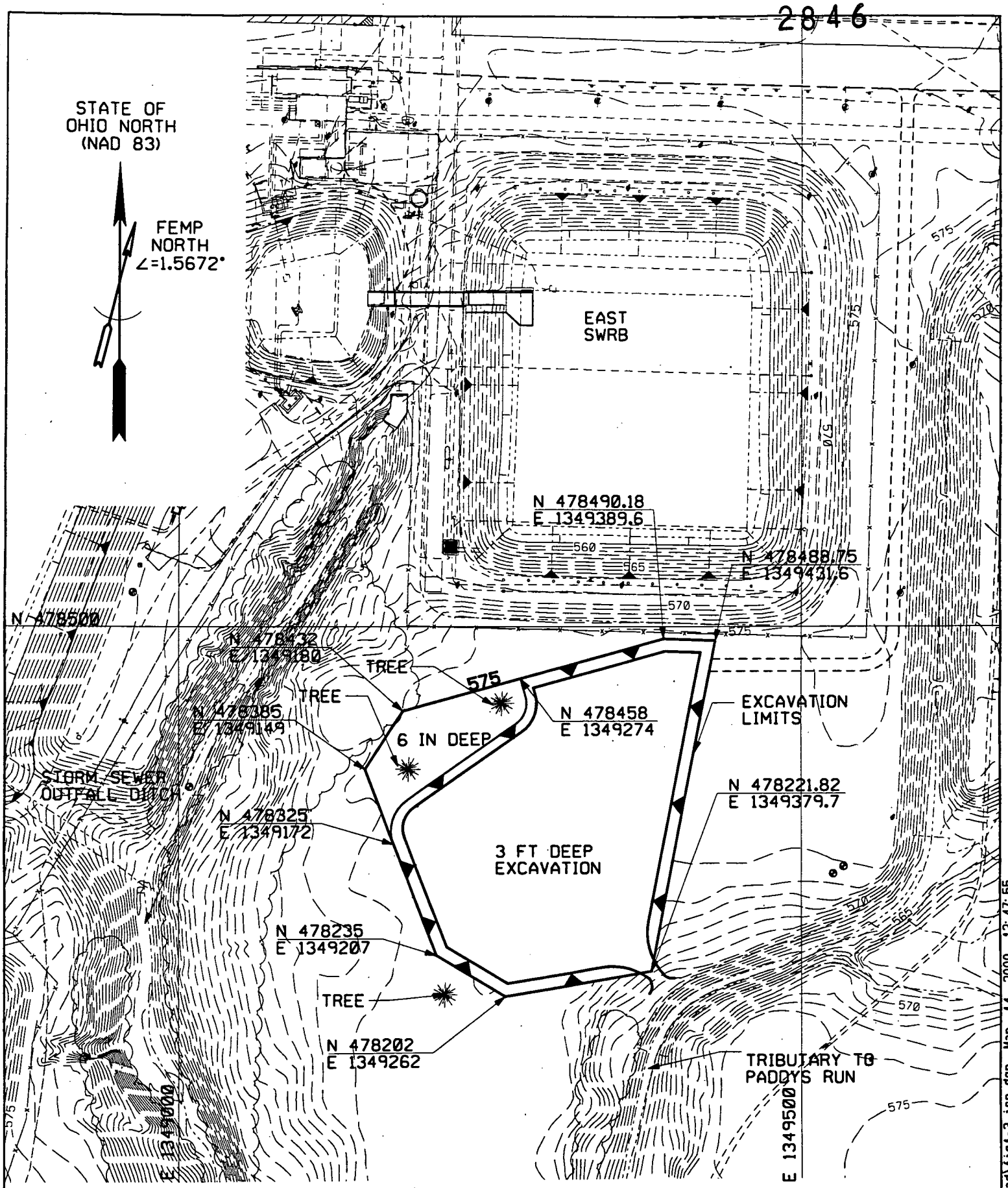

FIGURE 1-3 A2PIII PART TWO POST REMEDIATION TOPOGRAPHY AND SURFACE FEATURES
SCALE 1"=100'

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2.0 HISTORICAL, PREDESIGN AND PRECERTIFICATION DATA

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

Before initiating certification, all historical soil data pertinent to A2PIII Part Two were pulled from the Sitewide Environmental Database (SED), including data within a 100-foot buffer surrounding the subject A2PIII Part Two area. Predesign investigations used to characterize A2PIII Part Two include studies conducted as part of the OU5 Remedial Investigation/Feasibility Study (RI/FS), additional sampling and measurements that have been completed pursuant to RI/FS activities, and real-time and physical sampling data obtained.

The nature and extent of soil contamination at the FEMP site places considerable demands on the coordination of characterization and excavation activities carried out during the remediation process. In many remediation areas, data generated from RI activities are not comprehensive for the purpose of preparing detailed engineering designs and excavation drawings. Additional radiological surveys and sampling programs must be implemented to collect the needed data. Real-time, field-deployable instruments [the Radiation Tracking System (RTRAK), the Radiation Scanning System (RSS), and the high-purity germanium (HPGe) detector] can satisfy a major portion of these additional data needs, and their use is integrated with discrete sampling and subsequent laboratory analysis to maintain an efficient remediation process

2.1 RI/FS DATA REVIEW

The nature and extent of radiological constituents within A2PIII Part Two are based on data collected during RI/FS field investigation activities. More detailed information regarding the extent and nature of contamination in the A2PIII Part Two area, prior to precertification, is available in Section 4.0 of the OU5 RI Report (DOE 1995). The development and list of FRLs pertinent to OU5 are presented in the OU5 ROD.

Figure 2-1, A2PIII Part Two Historical Sample Locations, shows all sample locations within A2PIII Part Two and within a 100-foot buffer area along the perimeter. All results from these borings are below FRLs for primary and secondary COCs, as presented in Appendix A.

2.2 ADDITIONAL SAMPLING/MEASUREMENTS

Two additional investigations have been conducted in A2PIII Part Two pursuant to the RI/FS phase:

- Precertification sampling
- Delineation of areas exceeding FRL.

The purpose of these investigations is discussed in the following paragraphs; the results of the investigations are presented in Appendix A.

2.2.1 Precertification Scanning

A2PIII precertification using real-time monitoring was completed in March 1999. Due to elevated levels of radium-226 within the 5 acre peninsula-like area, A2PIII was separated into two parts, Part One and Part Two. Part One represented 70 acres of area that continued the certification process. Part Two became the 5 acre peninsula-like area that required additional predesign data to bound the impacted area for remediation. Part One precertification data were presented in the CDL for A2PIII Part One with the resulting certification data presented in the A2PIII Part One Certification Report. Therefore, Part One precertification data are not addressed under this CDL.

Real-time instrumentation (HPGe and RSS) was used to delineate the lateral extent of the above-FRL contamination. The results of these scans showing the above-FRL data are shown on Figures 2-2 and 2-3. Appendix A summarizes the data. As noted in these tables and figures, no confirmed monitoring data are above-FRL for total uranium or thorium-232. Nine HPGe Phase II measurements were greater than 3xFRL, five were greater than 2xFRL, and six were greater than 1xFRL for radium-226. All measurements for radium-226 which are greater than 2xFRL are considered "hot spots" and require remediation. Overlaying the HPGe measurements with the RSS data defines the lateral bounding of the radium-226 contamination, as depicted in Figure A-3. The scans show two distinct areas of contamination in addition to several outlying measurements above the radium-226 FRL.

According to guidelines established in Section 3.3.3 of the SEP, precertification activities will be conducted after excavation remediation and in disturbed portions of A2PIII Part Two. These data will be used to evaluate residual radiological contamination patterns and assist in confirming CU designs. All real-time results (RTRAK, RSS and HPGe) will be presented in the final version of this CDL and will be moisture and radon corrected. All A2PIII Part Two precertification data will be accessible through the SED.

2.2.2 Physical Sampling for Above FRLs

Based on the results of the initial A2PIII precertification sampling effort, seven predesign physical borings were collected during April 1999 in order to bound the contamination vertically. Initially, eleven samples from these borings were analyzed for radium-226, technetium-99, thorium-230, potassium-40, thorium-232, and total uranium. In addition, thirteen archive samples were submitted in two phases for analysis of the primary radionuclides radium-226, radium-228, thorium-228, thorium-232 and total uranium. The locations of these borings were chosen based on spatial distribution and levels of contamination. Four borings were located along the perimeter and one within the interior of the larger of the above-FRL areas. One boring was located within the smaller of the two above-FRL areas, and one boring location was placed in the approximate center of the outlying above-FRL readings. The location and results of these samples are depicted in Figure 2-4.

Sampling and analysis for radium-226 was conducted to confirm real-time monitoring data and determine the depth of contamination. Historic photos showed evidence of past soil disturbance which coincides with the radium-226 footprint. In addition, there was evidence of a potential construction road through the area from the STP; as a result, technetium-99 was added as an analyte for the initial eleven samples because of recent detections of above-WAC technetium-99 in locations within the former STP. Potassium-40 was also added as an analyte for the initial eleven samples since fertilizer might have been spread in the area. Thorium-230 is the parent isotope of radium-226 and is predominately an alpha-emitter which is not easily detected by the real-time instrumentation; thus, it was added to the initial list of analytes. Total uranium, radium-228, thorium-228, and thorium-232 were added for the archive samples because they are primary sitewide COCs.

The borings were also lithologically described in 6-inch intervals to a depth of 5 feet from the surface. A comparison of soil types between the Xenia soil profile and the actual soil cores proved comparable at

certain depths. Although a comparison of soil colors suggests that potential native soil displacement did occur, there are no obvious signs of fill material.

The borings were monitored with a beta-gamma and alpha frisker prior to archiving or submittal of the samples for analysis; there were no beta-gamma measurements noted above background concentrations. As a result, eleven sample intervals were selected for analysis based on the highest alpha frisker activity at depth for each boring and four additional varying alpha frisker activity ranges [non-detect, 7.5, 15, and 30 disintegrations per minute (dpm)]. The additional intervals were chosen in an attempt to establish a relationship between alpha frisker measurements and analytical data.

The data results from the initial eleven samples showed no evidence of the presence of technetium-99, thorium-230, or potassium-40. The total uranium and thorium-232 levels detected were below their respective FRLs. In an effort to expedite the turnaround time for radium-226, analysis by alpha spectroscopy was also conducted for radium-226 in addition to gamma spectroscopy. Two of the samples showed above-FRL radium-226 concentrations at the surface (0 to 0.5 feet).

In an attempt to bound the surface contamination, seven archive samples (Phase I archives) were submitted for primary radionuclides analysis. The Phase I archive results were below FRL for radium-228, thorium-228, thorium-232, and total uranium. However, five of the seven 6-inch interval samples had above-FRL concentrations for radium-226. As a result, six more archive samples (Phase II) were submitted for analysis to bound contamination at 2.5 feet. These Phase II archive results were at or below-FRL concentrations for radium-226 as well as the other primary radionuclides. Based on this bounding information, remediation is designed for an excavation depth of 3 feet.

Finally, existing data collected from within A2PIII Part Two were also reviewed against the benchmark toxicity values (BTVs) of each constituent of ecological concern and no BTV exceedences were identified.

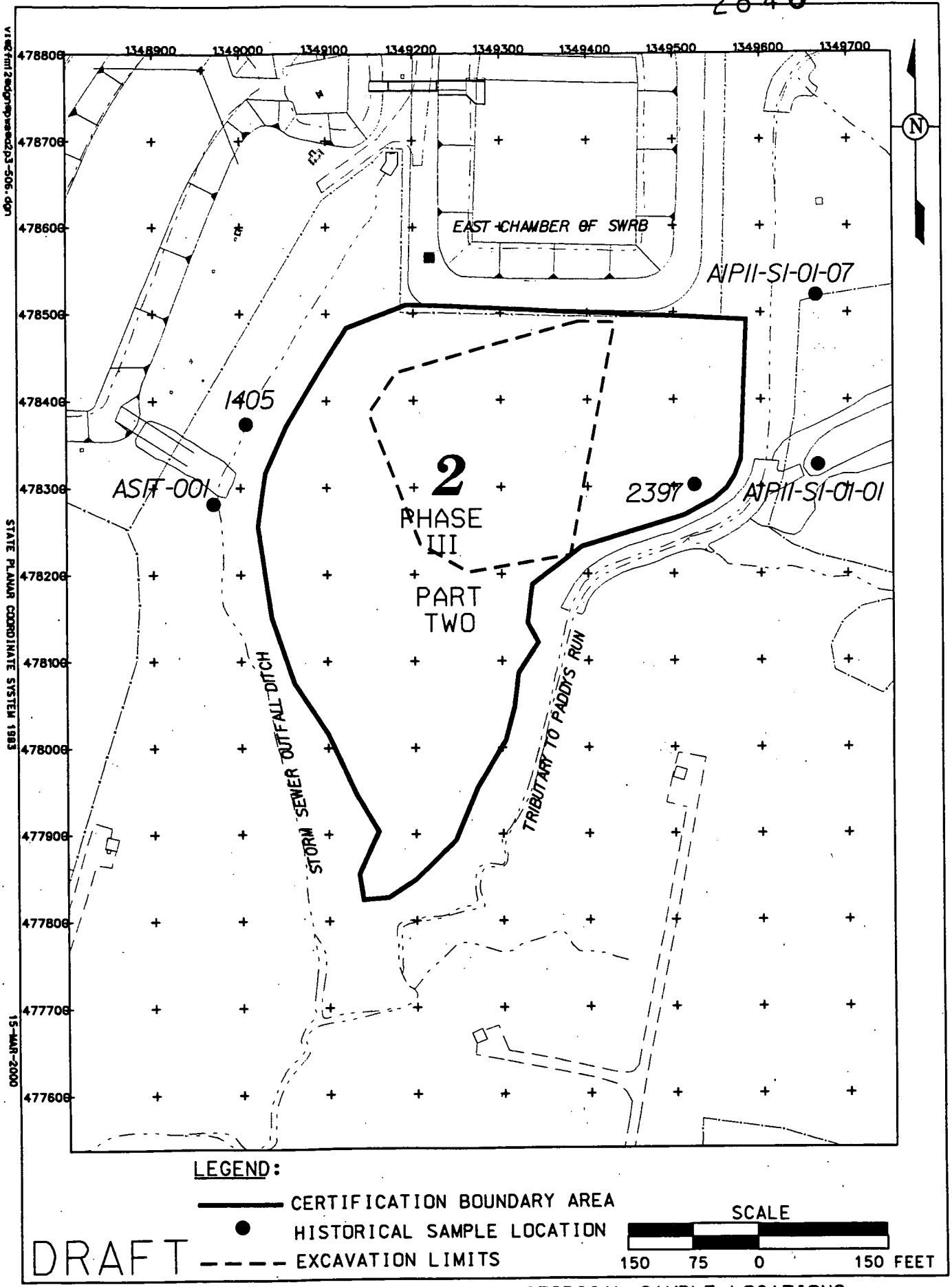


FIGURE 2-1. A2PIII PART 2 HISTORICAL SAMPLE LOCATIONS

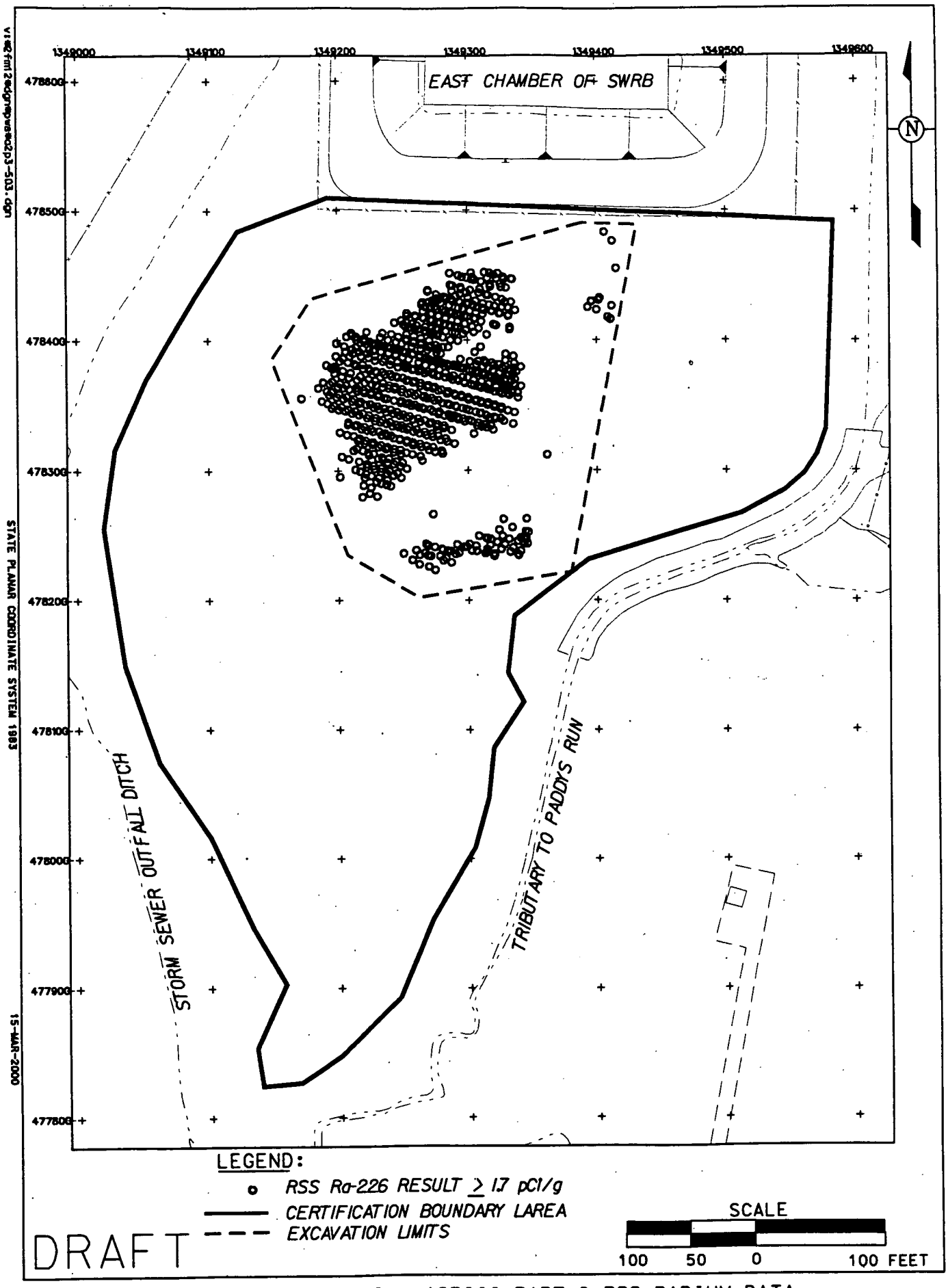


FIGURE 2-2. A2PIII PART 2 RSS RADIUM DATA

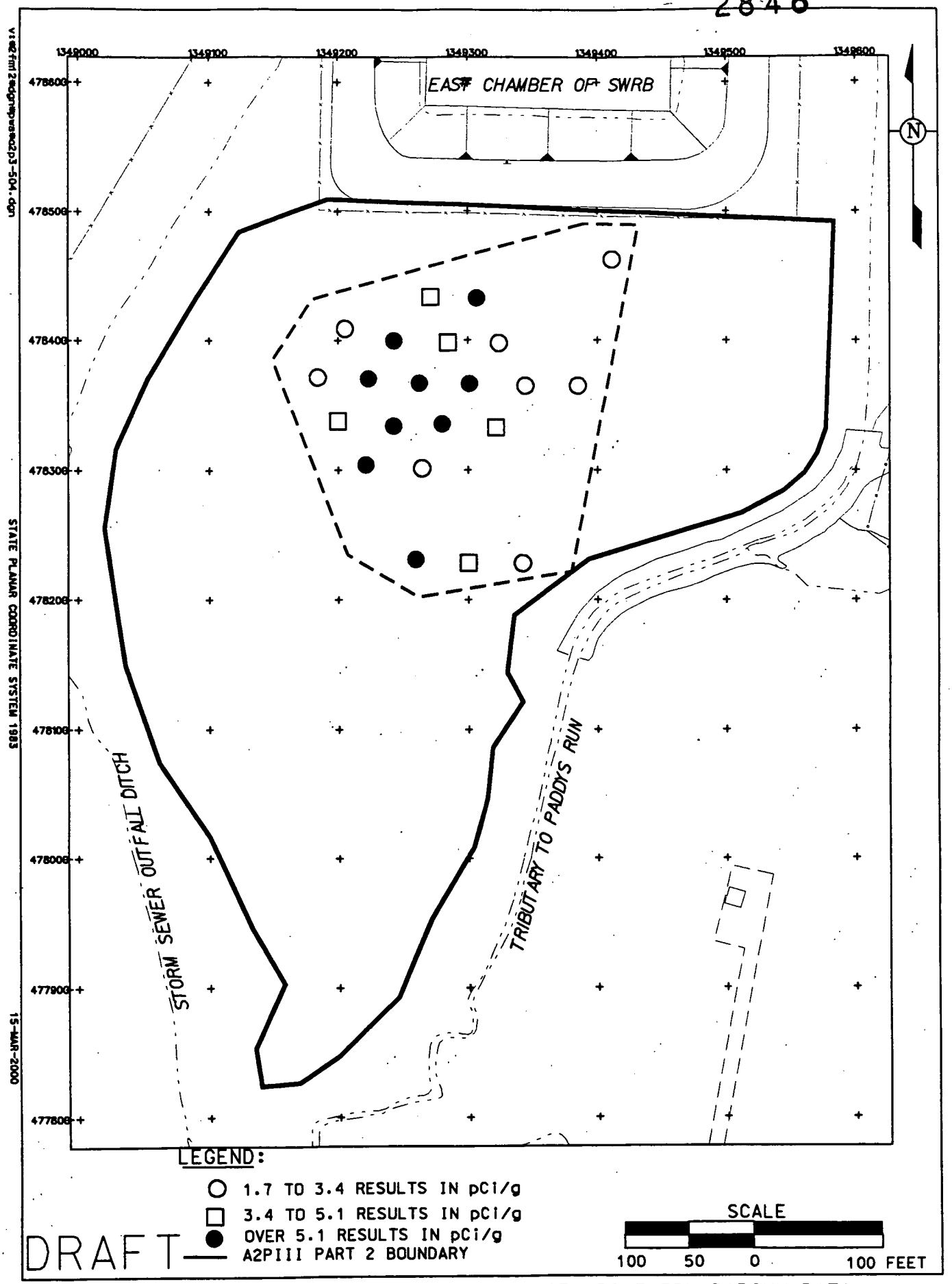
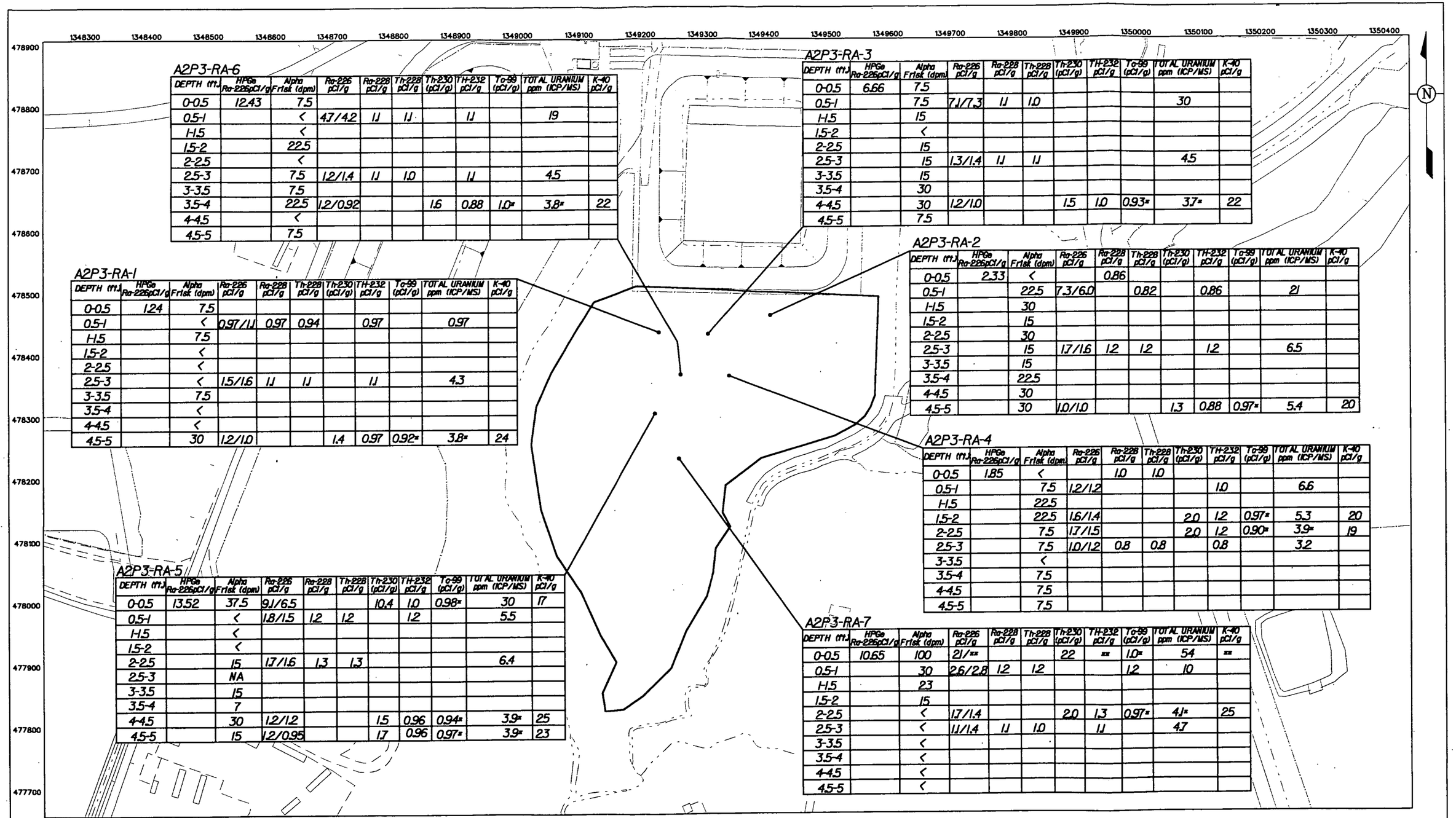


FIGURE 2-3. A2PIII PART 2 HPGE ABOVE FRL RADIUM DATA



A2P3-RA-6

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	12.43	7.5								
0.5-1		<	4.7/4.2	1.1	1.1		1.1		19	
1-1.5		<								
1.5-2		22.5								
2-2.5		<								
2.5-3		7.5	1.2/1.4	1.1	1.0		1.1		4.5	
3-3.5		7.5								
3.5-4		22.5	1.2/0.92			1.6	0.88	1.0*	3.8*	22
4-4.5		<								
4.5-5		7.5								

A2P3-RA-3

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	6.66	7.5								
0.5-1		7.5	7.1/7.3	1.1	1.0				30	
1-1.5		15								
1.5-2		<								
2-2.5		15								
2.5-3		15	1.3/1.4	1.1	1.1				4.5	
3-3.5		15								
3.5-4		30								
4-4.5		30	1.2/1.0			1.5	1.0	0.93*	3.7*	22
4.5-5		7.5								

A2P3-RA-1

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	1.24	7.5								
0.5-1		<	0.97/1.1	0.97	0.94		0.97		0.97	
1-1.5		7.5								
1.5-2		<								
2-2.5		<								
2.5-3		<	1.5/1.6	1.1	1.1		1.1		4.3	
3-3.5		7.5								
3.5-4		<								
4-4.5		<								
4.5-5		30	1.2/1.0			1.4	0.97	0.92*	3.8*	24

A2P3-RA-2

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	2.33	<		0.86						
0.5-1		22.5	7.3/6.0		0.82		0.86		21	
1-1.5		30								
1.5-2		15								
2-2.5		30								
2.5-3		15	1.7/1.6	1.2	1.2		1.2		6.5	
3-3.5		15								
3.5-4		22.5								
4-4.5		30								
4.5-5		30	1.0/1.0			1.3	0.88	0.97*	5.4	20

A2P3-RA-4

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	1.85	<		1.0	1.0					
0.5-1		7.5	1.2/1.2				1.0		6.6	
1-1.5		22.5								
1.5-2		22.5	1.6/1.4			2.0	1.2	0.97*	5.3	20
2-2.5		7.5	1.7/1.5			2.0	1.2	0.90*	3.9*	19
2.5-3		7.5	1.0/1.2	0.8	0.8		0.8		3.2	
3-3.5		<								
3.5-4		7.5								
4-4.5		7.5								
4.5-5		7.5								

A2P3-RA-5

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	13.52	37.5	9.1/6.5			10.4	1.0	0.98*	30	17
0.5-1		<	1.8/1.5	1.2	1.2		1.2		5.5	
1-1.5		<								
1.5-2		<								
2-2.5		15	1.7/1.6	1.3	1.3				6.4	
2.5-3		NA								
3-3.5		15								
3.5-4		7								
4-4.5		30	1.2/1.2			1.5	0.96	0.94*	3.9*	25
4.5-5		15	1.2/0.95			1.7	0.96	0.97*	3.9*	23

A2P3-RA-7

DEPTH (ft.)	HPGe Ra-226pCi/g	Alpha Frisk (dpm)	Ra-226 pCi/g	Ra-228 pCi/g	Th-228 pCi/g	Th-230 (pCi/g)	TH-232 pCi/g	Tc-99 (pCi/g)	TOTAL URANIUM ppm (ICP/MS)	K-40 pCi/g
0-0.5	10.65	100	21/**			22	**	1.0*	54	**
0.5-1		30	2.6/2.8	1.2	1.2			1.2	10	
1-1.5		23								
1.5-2		15								
2-2.5		<	1.7/1.4			2.0	1.3	0.97*	4.1*	25
2.5-3		<	1.1/1.4	1.1	1.0		1.1		4.7	
3-3.5		<								
3.5-4		<								
4-4.5		<								
4.5-5		<								

FINAL REMEDIATION LEVELS (FRL):

Ra-226 - 1.7 pCi/g
Tc-99 - 30.0 pCi/g
Th-230 - 280 pCi/g
K - 40 - Not Applicable
Th-232 - 1.5 pCi/g
TOTAL URANIUM - 82 ppm

NOTES: * MINIMUM DETECTABLE CONCENTRATION (MDC)
** INSUFFICIENT SAMPLE QUANTITY AVAILABLE FOR ANALYSIS
NA - NOT AVAILABLE
< - LESS THAN MINIMUM DETECTABLE COUNT RATE
A2PIII PART 2 BOUNDARY

a ALPHA SPEC / GAMMA SPEC METHOD

SCALE 000018

150 75 0 150 FEET

v:\2-fm12\dgn\map\har\dp-th\a2p3-015.dgn STATE PLANAR COORDINATE SYSTEM 1983 14-MAR-2000

FIGURE 2-4. A2PIII PART 2 SAMPLING DATA SUMMARY

3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

In the OU5 ROD, 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. When FRLs were established for these COCs in the OU5 ROD, they 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, it was possible to reduce the sitewide list of soil COCs from 80 listed in the OU5 ROD to 30. This reduction was possible because the majority of the COCs with FRLs listed in the OU5 ROD have no detections on-site 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

The selection process for retaining ASCOCs for a remediation area is driven by applying a set of decision criteria. A soil contaminant will be retained as an A2PIII Part Two ASCOC if:

- It is listed as a soil COC in the OU5 ROD
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment
- Analytical results indicate the contaminant is present at a concentration above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs
- Physical characteristics of the contaminant, such as half-life, indicate it is likely to persist in the soil between time of release and remediation
- The contaminant is one of the sitewide primary COCs (total uranium, radium-226, radium-228, thorium-232, and thorium-228).

3.2 ASCOC SELECTION PROCESS FOR A2PIII PART TWO

Total uranium, radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary COCs and will be retained as ASCOCs for this reason. Review of historical data shows little above-FRL contamination in this area. Based on these factors and the inability to identify any mechanism for secondary COC contamination of A2PIII Part Two, only the sitewide primary COCs will be retained as ASCOCs. The ASCOC list of A2PIII Part One can be found in Table 3-1.

TABLE 3-1
ASCOC LIST FOR A2PIII PART TWO CUs

ASCOC	FRL	Reason Retained
Total Uranium	82 mg/kg	Retained as a primary ASCOC sitewide
Radium-226	1.7 pCi/g	Retained as a primary ASCOC sitewide
Radium-228	1.8 pCi/g	Retained as a primary ASCOC sitewide
Thorium-228	1.7 pCi/g	Retained as a primary ASCOC sitewide
Thorium-232	1.5 pCi/g	Retained as a primary ASCOC sitewide

mg/kg - milligrams per kilogram
pCi/g - picoCuries per gram
ASCOC - area-specific constituent of concern

4.0 CERTIFICATION APPROACH

4.1 CERTIFICATION DESIGN

The certification design for A2PIII Part Two follows the general approach outlined in Section 3.4 of the SEP. As discussed in Section 3.0 of this document, total uranium, thorium-228, thorium-232, radium-226, and radium-228 (the primary ASCOCs) will be retained in all CUs as the only CU-specific ASCOCs.

4.1.1 CU Design

The certification design and sampling strategy follows Section 3.4 of the SEP. The A2PIII Part Two certification area consists of the following:

- Two Group 1 CUs: one for the excavated radium-226 footprint (A2P3-PT2-C-2) and one for the north east area (A2P3-PT2-C-1), expected to be disturbed during the hauling of impacted material during excavation.
- One Group 2 CU for the southern perimeter, non-impacted (A2P3-PT2-C-3).

If the radium-226 excavation footprint is modified from the design and/or modified due to elevated precertification scanning results, the CU designs will be reevaluated. Any CU changes deemed necessary based on this evaluation will be presented in the final version of this CDL.

Two Group 1 CUs (which can be as large as 62,500 square feet) and one Group 2 CU (which can be as large as 250,000 square feet) are identified and depicted in Figure 4-1. The Group 1 CUs cover the perimeter around the excavation footprint and the area expected to be partially impacted during excavation (truck turnaround, loading area, and equipment laydown area). The Group 2 CU for the southern perimeter, non-impacted area is bounded by the SSOD and the unnamed tributaries and extends only partially down the side banks to allow for potential backup during extreme rain events and flooding. The streambeds and lower side banks are excluded from this certification event and will be certified at a later date with the dirty corridors.

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 easting and northing coordinates within each sub-CU boundary, and testing the locations against the minimum distance criterion for the CU. If minimum distance criterion were violated 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 criterion. The selected A2PIII Part Two certification sampling locations are shown in Figure 4-2.

The allowable minimum distance between pairs ranged from 10.5 feet in CU A2P3-PT2-C-3 to 486.1 feet in CU A2P3-PT2-C-3. Of note, it is possible that subsurface obstacles (e.g., buried rocks or tree roots) could prevent collection at the planned location. If this is the case, the location can be moved up to three feet from the original location, as long as it remains within the same CU and sub-CU boundary. A check of the minimum distances between locations reveals that such a move would not cause a violation of the minimum distance criterion for even the closest of location pairs. A move of more than 3 feet would require a minimum distance recheck and approval from the U.S. Environmental Protection Agency (EPA) and Ohio Environmental Protection Agency (OEPA).

Discrete soil samples will be collected from each of the 16 random sampling locations. Each sample will be collected from the 0 to 6-inch (surface) soil interval at the designated and surveyed sample point. Of the 16 certification samples, a total of 12 will be submitted for analysis. In order to select the 12 samples for analysis and still provide good areal coverage, each CU is divided into quadrants, with each quadrant containing four sample locations. Three of the four samples from each quadrant are then randomly selected for analysis, resulting in a total of 12 samples analyzed per CU. The other four samples from each CU are to be archived and analyzed only if necessary.

4.2 ANALYTICAL METHODOLOGY AND STATISTICAL ANALYSIS

Laboratory analysis of certification samples will be conducted using an approved analytical method, as discussed in Appendix H of the SEP. Analyses will be conducted to Analytical Support Level (ASL) E, where all requirements are the same as ASL D except the minimum detection level for the selected analytical method must be at a minimum of 10 percent of FRL. All results will be validated to ASL B, and a minimum 10 percent of the results from each laboratory will be validated to ASL D. Because results are batched by CU, all results from one CU will be validated to ASL D. Samples rejected during validation may be reanalyzed unless results are greater than FRL. The rejected result will not be used in the statistical analysis. An archive sample may be substituted if there is insufficient material available

from the initial sample. Rejected results which are greater than FRL will require resampling at the same location. If any result is rejected, all data from the laboratory with the rejected result will then be validated to determine the integrity of the results from that laboratory. Once 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 the each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP.

Two criteria must be met for the CU to be certified as passing. 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. On an individual CU basis, any ASCOC with the 95 percent UCL above the FRL results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate the second criterion. The second criterion is related to individual samples. An individual sample cannot be greater than 2xFRL or 3xFRL, based on its size. See Figure 3-11 of the SEP for further details. When the given UCL on the mean for each COC is less than its FRL, and the hot-spot criterion is met, the CU has met both criteria and will be considered certified.

There are three conditions that could result in a CU failing certification: 1) 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 all CUs within the scope of this CDL have passed certification, a Certification Report will be issued. The Certification Report will be submitted to the regulatory agencies to receive acknowledgment that the pertinent operable unit remedial actions were completed and the individual CUs are 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 Report.

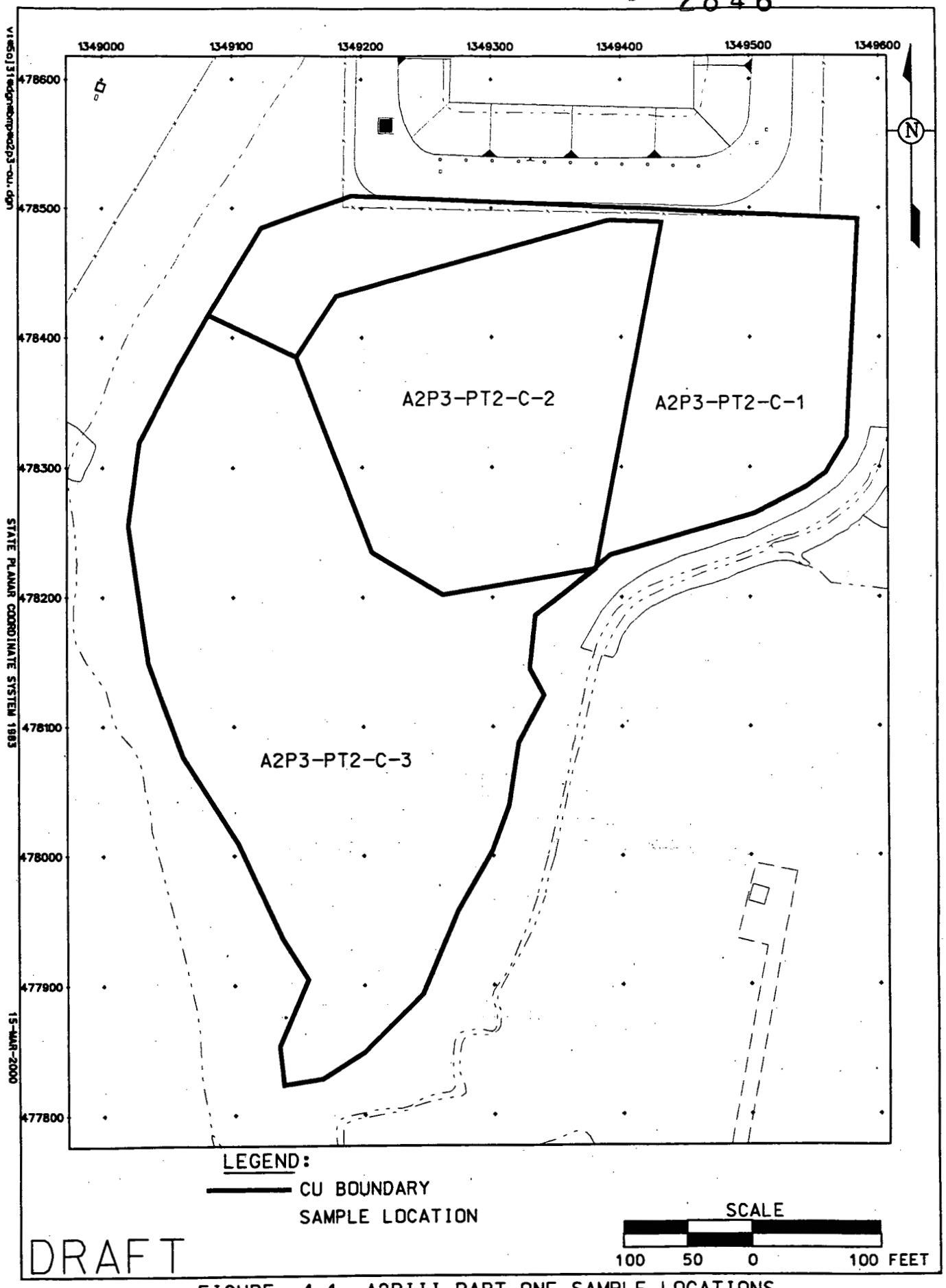


FIGURE 4-1. A2PIII PART ONE SAMPLE LOCATIONS

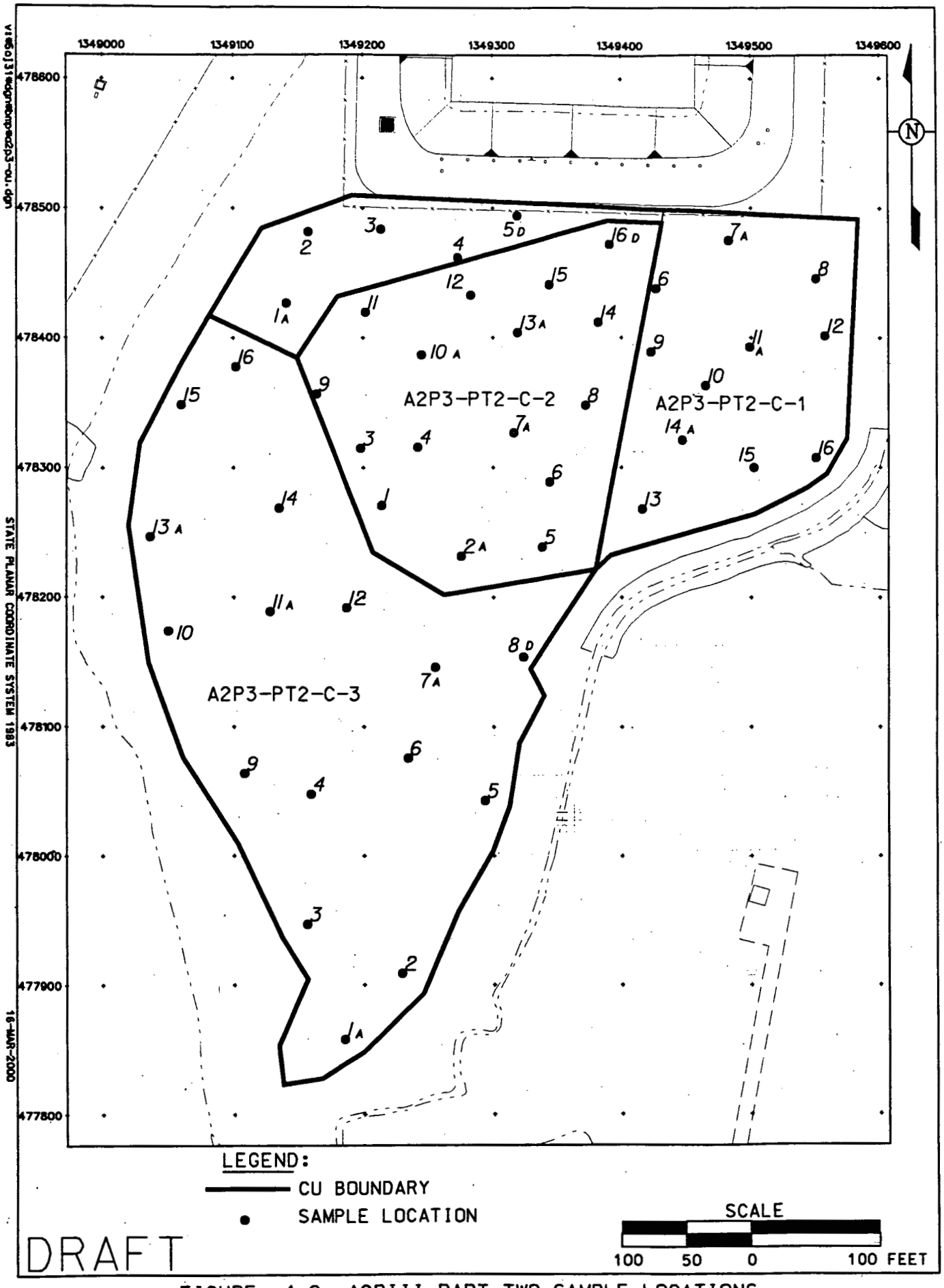


FIGURE 4-2. A2PIII PART TWO SAMPLE LOCATIONS

5.0 SCHEDULE

The following A2PIII Part Two draft schedule shows key activities for the completion of the work within the scope of this CDL.

A2PIII Part Two Activity	Target Date
Submittal of Certification Design Letter	March 17, 2000
Start of Certification Sampling	May 8, 2000
Complete Certification Sampling	May 12, 2000
Complete Analytical Work	July 7, 2000
Complete Data Validation/Statistical Analysis	July 14, 2000
Submit A2PIII Part Two Certification Report to DOE	July 28, 2000
Submit A2PIII Part Two Certification Report to EPA and OEPA	August 4, 2000

* Only the dates for submittal of the CDL and Certification Report are commitments to the EPA and OEPA. Other dates are internal target completion dates.

REFERENCES

U.S. Department of Energy, 1995, "Remedial Investigation/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 Action 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.

U.S. Department of Energy, 1999, "Project Specific Plan for the Area 2, Phase III Precertification Real-Time Scan," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2000a, "Implementation Plan for A2PIII Part Two," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2000b, "Project Specific Plan for Area 2, Phase III Part Two Certification Sampling," Revision A, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

APPENDIX A

HISTORICAL AND PRECERTIFICATION DATA

TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
1,1,1-Trichloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,1,2,2-Tetrachloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,1,2-Trichloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,1-Dichloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,1-Dichloroethene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,2,4-Trichlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
1,2-Dichlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
1,2-Dichloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,2-Dichloroethene (Total)	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,2-Dichloropropane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
1,3-Dichlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
1,4-Dichlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2,4,5-Trichlorophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
2,4,6-Trichlorophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2,4-Dichlorophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2,4-Dimethylphenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2,4-Dinitrophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	UJ	ug/kg
2,4-Dinitrotoluene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2,6-Dinitrotoluene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2-Butanone	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
2-Chloronaphthalene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2-Chlorophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
2-Hexanone	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
2-Methylnaphthalene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	UJ	ug/kg
2-Nitroaniline	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
2-Nitrophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
3,3'-Dichlorobenzidine	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
3-Nitroaniline	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
4,6-Dinitro-2-methylphenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
4-Bromophenyl phenyl ether	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
4-Chloro-3-methylphenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
4-Chlorophenylphenyl ether	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
4-Methyl-2-pentanone	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
4-Nitroaniline	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
4-Nitrophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	UJ	ug/kg
Acenaphthene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Acenaphthylene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Acetone	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Aluminum	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	3890	-	mg/kg
Anthracene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Antimony	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	3.7	U	mg/kg
Arsenic	A1PII-S1-01-01M	A1PII-S1-01-01			478323	1349668	4.4	NV	mg/kg
Arsenic	A1PII-S1-01-01M-D	A1PII-S1-01-01			478323	1349668	3.7	NV	mg/kg
Arsenic	A1PII-S1-01-07M	A1PII-S1-01-07			478518	1349666	3.6	NV	mg/kg
Arsenic	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	5.5	J	mg/kg
Barium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	38.1	-	mg/kg
Benzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Benzo(a)anthracene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Benzo(a)pyrene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Benzo(b)fluoranthene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	76	J	ug/kg
Benzo(g,h,i)perylene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Benzo(k)fluoranthene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	96	J	ug/kg
Beryllium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1.3	UJ	mg/kg
bis(2-Chloroethoxy)methane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
bis(2-Chloroethyl)ether	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
bis(2-Chloroisopropyl) ether	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
bis(2-Ethylhexyl)phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Bromodichloromethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Bromoform	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Bromomethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
Butyl benzyl phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Cadmium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1.3	R	mg/kg
Calcium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	56000	-	mg/kg
Carbazole	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Carbon disulfide	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Carbon Tetrachloride	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Cesium-137	32935	2397	0	1.5	478300.024	1349526.061	0.2	UJ	pci/g
Cesium-137	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.2	UJ	pCi/g
Chlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Chloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Chloroform	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Chloromethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Chromium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	6.8	J	mg/kg
Chrysene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
cis-1,3-Dichloropropene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Cobalt	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	4.7	-	mg/kg
Copper	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	8.1	-	mg/kg
Cyanide	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	0.33	U	mg/kg
Dibenzo(a,h)anthracene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Dibenzofuran	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Dibromochloromethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Diethyl phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	2200	U	ug/kg
Dimethyl phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Di-n-butyl phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Di-n-octyl phthalate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Ethylbenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Fluoranthene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	110	J	ug/kg
Fluorene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Grain Size Diameter, 0.075 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	11.6	NV	% FINER
Grain Size Diameter, 0.106 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	12.9	NV	% FINER

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
Grain Size Diameter, 0.25 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	20.7	NV	% FINER
Grain Size Diameter, 0.425 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	36.7	NV	% FINER
Grain Size Diameter, 0.85 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	69.2	NV	% FINER
Grain Size Diameter, 19 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	100	NV	% FINER
Grain Size Diameter, 2 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	92.7	NV	% FINER
Grain Size Diameter, 37.5 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	100	NV	% FINER
Grain Size Diameter, 4.75 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	98.7	NV	% FINER
Grain Size Diameter, 75 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	100	NV	% FINER
Grain Size Diameter, 9.5 mm	9041	ASIT-001	0	0.5	478279.367	1348971.213	100	NV	% FINER
Gross Alpha	120102	ASIT-001	0	0.5	478279.367	1348971.213	1.3	NV	pCi/L
Gross Beta	120102	ASIT-001	0	0.5	478279.367	1348971.213	1	NV	pCi/L
Hexachlorobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Hexachlorobutadiene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Hexachlorocyclopentadiene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Hexachloroethane	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Indeno(1,2,3-cd)pyrene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Iron	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	8780	-	mg/kg
Isophorone	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Lead	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	10.5	-	mg/kg
Magnesium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13900	-	mg/kg
Manganese	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	450	-	mg/kg
Mercury	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	0.07	UJ	mg/kg
Methylene chloride	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Molybdenum	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	4.5	UJ	mg/kg
Naphthalene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Neptunium-237	32935	2397	0	1.5	478300.024	1349526.061	0.6	U	pci/g
Neptunium-237	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	U	pCi/g
Nickel	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	9	-	mg/kg
Nitrobenzene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
N-Nitroso-di-n-propylamine	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
N-Nitrosodiphenylamine	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
o-Methylphenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
p-Chloroaniline	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Pentachlorophenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1100	U	ug/kg
Phenanthrene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	62	J	ug/kg
Phenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Plutonium-238	32935	2397	0	1.5	478300.024	1349526.061	0.6	U	pci/g
Plutonium-238	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	U	pCi/g
Plutonium-239/240	32935	2397	0	1.5	478300.024	1349526.061	0.6	U	pci/g
Plutonium-239/240	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	U	pCi/g
p-Methylphenol	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	440	U	ug/kg
Potassium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	885	U	mg/kg
Pyrene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	74	J	ug/kg
Radium-226	32935	2397	0	1.5	478300.024	1349526.061	1.22	J	pci/g
Radium-226	A1PII-S1-01-01R	A1PII-S1-01-01			478323	1349668	0.958	-	pci/g
Radium-226	A1PII-S1-01-01R-D	A1PII-S1-01-01			478323	1349668	0.925	-	pci/g
Radium-226	A1PII-S1-01-07R	A1PII-S1-01-07			478518	1349666	0.988	-	pci/g
Radium-226	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.7	UJ	pCi/L
Radium-226	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	J	pCi/g
Radium-228	32935	2397	0	1.5	478300.024	1349526.061	1.08	J	pci/g
Radium-228	A1PII-S1-01-01R	A1PII-S1-01-01			478323	1349668	0.844	-	pci/g
Radium-228	A1PII-S1-01-01R-D	A1PII-S1-01-01			478323	1349668	0.813	-	pci/g
Radium-228	A1PII-S1-01-07R	A1PII-S1-01-07			478518	1349666	0.861	-	pci/g
Radium-228	120102	ASIT-001	0	0.5	478279.367	1348971.213	1.7	UJ	pCi/L
Radium-228	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.5	UJ	pCi/g
Ruthenium-106	32935	2397	0	1.5	478300.024	1349526.061	1	UJ	pci/g
Ruthenium-106	9041	ASIT-001	0	0.5	478279.367	1348971.213	1	UJ	pCi/g
Selenium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	1.3	R	mg/kg
Silicon	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	831	-	mg/kg
Silver	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	0.26	U	mg/kg

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
Sodium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	111	-	mg/kg
Strontium-90	32935	2397	0	1.5	478300.024	1349526.061	0.5	U	pci/g
Strontium-90	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.5	U	pCi/g
Styrene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Technetium-99	32935	2397	0	1.5	478300.024	1349526.061	1	U	pci/g
Technetium-99	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.9	U	pCi/g
Tetrachloroethene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Thallium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	0.26	UJ	mg/kg
Thorium, Total	32935	2397	0	1.5	478300.024	1349526.061	5.13	J	mg/kg
Thorium, Total	32960	2397			478300.02	1349526.06	18	UNV	mg/kg
Thorium, Total	9041	ASIT-001	0	0.5	478279.367	1348971.213	7.296124	NV	pCi/g
Thorium-228	32935	2397	0	1.5	478300.024	1349526.061	0.989	J	pci/g
Thorium-228	A1PII-S1-01-01R	A1PII-S1-01-01			478323	1349668	0.839	-	pci/g
Thorium-228	A1PII-S1-01-01R-D	A1PII-S1-01-01			478323	1349668	0.785	-	pci/g
Thorium-228	A1PII-S1-01-07R	A1PII-S1-01-07			478518	1349666	0.873	-	pci/g
Thorium-228	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.2	UJ	pCi/L
Thorium-228	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	UJ	pCi/g
Thorium-230	32935	2397	0	1.5	478300.024	1349526.061	1.21	J	pci/g
Thorium-230	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.3	UJ	pCi/L
Thorium-230	9041	ASIT-001	0	0.5	478279.367	1348971.213	2.5	J	pCi/g
Thorium-232	32935	2397	0	1.5	478300.024	1349526.061	0.6	UJ	pci/g
Thorium-232	A1PII-S1-01-01R	A1PII-S1-01-01			478323	1349668	0.844	-	pci/g
Thorium-232	A1PII-S1-01-01R-D	A1PII-S1-01-01			478323	1349668	0.813	-	pci/g
Thorium-232	A1PII-S1-01-07R	A1PII-S1-01-07			478518	1349666	0.861	-	pci/g
Thorium-232	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.1	UJ	pCi/L
Thorium-232	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.8	J	pCi/g
Toluene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
trans-1,3-Dichloropropene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Trichloroethene	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Uranium, Total	98062	1405	0	0.5	478371.168	1349009.012	8.2	-	mg/kg

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TABLE A-1
A2PIII PART TWO HISTORICAL DATA

Parameter	Sample ID	Location ID	Top Depth	Bottom Depth	Northing	Easting	Result	Qualifier	Units
Uranium, Total	98064	1405	1.5	2	478371.168	1349009.012	9.9	-	mg/kg
Uranium, Total	98066	1405	3	3.5	478371.168	1349009.012	3.9	-	mg/kg
Uranium, Total	98089	1405	17.5	18	478371.168	1349009.012	2.6	-	mg/kg
Uranium, Total	98100	1405	24.5	25	478371.168	1349009.012	4.3	-	mg/kg
Uranium, Total	98115	1405	33.5	34	478371.168	1349009.012	2.7	-	mg/kg
Uranium, Total	32935	2397	0	1.5	478300.024	1349526.061	9.5	J	mg/kg
Uranium, Total	32960	2397			478300.02	1349526.06	11	UNV	mg/kg
Uranium, Total	A1PII-S1-01-01R	A1PII-S1-01-01			478323	1349668	2.06	UJ	mg/kg
Uranium, Total	A1PII-S1-01-01R-D	A1PII-S1-01-01			478323	1349668	0.039	UJ	mg/kg
Uranium, Total	A1PII-S1-01-07R	A1PII-S1-01-07			478518	1349666	1.45	UJ	mg/kg
Uranium, Total	120092	ASIT-001	0	0.5	478279.367	1348971.213	11	NV	mg/kg
Uranium, Total	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.1	U	ug/L
Uranium, Total	9041	ASIT-001	0	0.5	478279.367	1348971.213	4	J	mg/kg
Uranium-234	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.1	UJ	pCi/L
Uranium-234	9041	ASIT-001	0	0.5	478279.367	1348971.213	1.3	NV	pCi/g
Uranium-235/236	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.1	UJ	pCi/L
Uranium-235/236	9041	ASIT-001	0	0.5	478279.367	1348971.213	0.6	U	pCi/g
Uranium-238	120102	ASIT-001	0	0.5	478279.367	1348971.213	0.1	UJ	pCi/L
Uranium-238	9041	ASIT-001	0	0.5	478279.367	1348971.213	1.4	NV	pCi/g
Vanadium	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	14.7	-	mg/kg
Vinyl Acetate	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Vinyl chloride	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Xylenes, Total	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	13	U	ug/kg
Zinc	120090-1	ASIT-001	0	0.5	478279.367	1348971.213	17.2	R	mg/kg

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TABLE A-2
HPGe RESULTS FOR TOTAL URANIUM, THORIUM-232, AND RADIUM-226

Location	Northing	Easting	Detector Height	Total Uranium (ppm)	Thorium-232 (pCi/g)	Radium-226 (pCi/g)
A2P3-P1-T-145-G	477710.08	1349112.66	100cm	12.80	0.46	0.75
A2P3-P1-T-146-G	477748.83	1349132.03	100cm	14.50	0.67	0.75
A2P3-P1-T-147-G	477719.56	1349150.02	100cm	9.98	0.45	0.71
A2P3-P1-T-148-G	477772.48	1349146.01	100cm	14.00	0.61	0.81
A2P3-P1-T-149-G	477817.74	1349145.07	100cm	13.10	0.62	0.84
A2P3-P1-T-150-G*	477795.64	1349122.72	100cm	13.80	0.73	0.84
A2P3-P1-T-151-G	477847.91	1349226.31	100cm	11.30	0.72	0.97
A2P3-P1-T-152-G	477886.51	1349280.66	100cm	13.50	0.66	0.78
A2P3-P1-T-153-G*	477942	1349293.01	100cm	16.00	0.69	0.83
A2P3-P1-T-154-G	477972.19	1349309.37	100cm	18.20	0.83	0.90
A2P3-P1-T-155-G	478016.6	1349323.45	100cm	16.80	0.74	0.88
A2P3-P1-T-156-G	478058.52	1349330.42	100cm	11.80	0.69	0.75
A2P3-P1-T-157-G	478094.65	1349338.54	100cm	20.10	0.73	0.83
A2P3-P1-T-158-G	478139.92	1349342.97	100cm	12.60	0.68	0.76
A2P3-P1-T-159-G	478171.48	1349340.58	100cm	0.06	0.62	0.56
A2P3-P1-T-160-G	478263.36	1349476.31	100cm	0.04	0.61	0.67
A2P3-P1-T-161-G*	478467.49	1349158.81	100cm	26.00	0.69	0.75
A2P3-P1-T-162-G	478433.87	1349127.55	100cm	25.80	0.70	0.71
A2P3-P1-T-163-G	478400.08	1349104.01	100cm	19.60	0.83	0.73
A2P3-P1-T-164-G	478429.51	1349097.08	100cm	24.40	0.79	0.75
A2P3-P1-T-165-G	478469.56	1349124.67	100cm	32.60	0.72	1.38
A2P3-P1-T-166-G	478380.84	1349060.94	100cm	12.00	0.60	0.59
A2P3-P1-T-167-G	478348.9	1349041.5	100cm	14.10	0.77	0.77
A2P3-P1-T-168-G	478009.37	1349068.16	100cm	10.80	0.67	0.68
A2P3-P1-T-169-G	477973.54	1349076.3	100cm	14.70	0.62	0.67
A2P3-P1-T-169-G-D	477973.54	1349076.3	100cm	12.90	0.62	0.71
A2P3-P1-T-170-G	477932.68	1349090.51	100cm	12.50	0.55	0.60
A2P3-P1-T-170-G-D	477932.68	1349090.51	100cm	14.10	0.59	0.63
A2P3-P1-T-171-G	477889.29	1349102.43	100cm	12.70	0.46	0.55
A2P3-P1-T-171-G-D	477889.29	1349102.43	100cm	10.90	0.48	0.56
A2P3-P1-T-172-G	477844.96	1349110.03	100cm	9.55	0.39	0.66
A2P3-P1-23D-1-G	478458.32	1349525.68	100cm	9.25	0.78	0.98
A2P3-P1-23D-2-G	478456.65	1349561.76	100cm	15.60	0.79	1.12
A2P3-P1-23D-3-G	478423.31	1349544.02	100cm	6.82	0.83	1.32
A2P3-P1-23D-3-G-D	478423.31	1349544.02	100cm	8.22	0.81	1.32
A2P3-P1-23D-4-G	478391.11	1349560.74	100cm	0.06	0.76	1.02
A2P3-P1-23D-5-G	478320.46	1349558.86	100cm	10.30	0.76	0.89
A2P3-P1-23D-6-G	478362.11	1349575.45	100cm	10.90	0.63	0.76
A2P3-P1-23D-7-G	478423.76	1349577.35	100cm	11.70	0.72	0.83
A2P3-P1-24A-1-G	478459.64	1349485.55	100cm	8.04	0.80	1.05
A2P3-P1-24A-2-G	478435.08	1349502.46	100cm	7.53	0.79	1.15
A2P3-P1-24A-3-G	478398.96	1349522.69	100cm	8.65	0.88	1.10
A2P3-P1-24A-4-G	478354.64	1349539.2	100cm	8.14	0.74	0.95
A2P3-P1-24A-5-G	478288.87	1349536.77	100cm	<MDC	0.62	0.85

TABLE A-2
HPGe RESULTS FOR TOTAL URANIUM, THORIUM-232, AND RADIUM-226

Location	Northing	Easting	Detector Height	Total Uranium (ppm)	Thorium-232 (pCi/g)	Radium-226 (pCi/g)
A2P3-P1-24A-6-G	478321.69	1349517.47	100cm	13.10	0.82	1.09
A2P3-P1-24A-7-G	478356.04	1349499.23	100cm	10.80	0.77	1.06
A2P3-P1-24A-8-G	478391.89	1349480.58	100cm	0.04	0.82	1.00
A2P3-P1-24A-9-G	478425.82	1349465.62	100cm	10.00	0.80	1.28
A2P3-P1-24A-10-G	478426.35	1349425.52	100cm	7.29	0.82	1.16
A2P3-P1-24A-11-G	478392.87	1349441.47	100cm	11.40	0.86	1.08
A2P3-P1-24A-12-G	478358.52	1349462.45	100cm	0.06	0.73	0.88
A2P3-P1-24A-13-G	478324.34	1349478.59	100cm	8.53	0.71	0.91
A2P3-P1-24A-14-G	478292.3	1349459.46	100cm	17.00	0.62	0.74
A2P3-P1-24A-15-G	478326.58	1349438.75	100cm	0.08	0.73	1.01
A2P3-P1-24A-16-G	478362.16	1349421.43	100cm	10.80	0.77	1.03
A2P3-P1-24A-17-G	478396.25	1349401.38	100cm	14.00	0.81	1.15
A2P3-P1-24A-18-G	478430.74	1349383.21	100cm	13.80	0.79	1.39
A2P3-P1-24A-18-GD	478430.74	1349383.21	100cm	11.80	0.81	1.29
A2P3-P1-24A-19-G	478430.58	1349345.94	100cm	13.70	0.66	1.34
A2P3-P1-24A-20-G	478397.98	1349362.13	100cm	17.20	0.83	1.35
A2P3-P1-24A-21-G	478364.87	1349381.49	100cm	19.60	0.77	1.69
A2P3-P1-24A-22-G	478327.1	1349405.54	100cm	13.90	0.67	0.95
A2P3-P1-24A-23-G	478294.51	1349418.85	100cm	12.60	0.73	0.98
A2P3-P1-24A-24-G	478259.2	1349440.85	100cm	0.06	0.76	1.00
A2P3-P1-24A-25-G	478260.61	1349481.08	100cm	0.04	0.71	1.03
A2P3-P1-24A-26-G*	478295.57	1349377.87	100cm	14.60	0.73	1.01
A2P3-P1-24A-27-G	478330.47	1349359.51	100cm	13.60	0.72	1.03
A2P3-P1-24A-28-G	478364.71	1349340.92	100cm	20.30	0.69	1.85
A2P3-P1-24A-29G*	478226.74	1349376.27	100cm	7.64	0.68	0.91
A2P3-P1-24A-29G-D	478226.74	1349376.27	100cm	10.90	0.69	1.01
A2P3-P1-24B-1-G	478226.92	1349418.36	100cm	0.06	0.67	0.87
A2P3-P1-24B-2-G	478194.67	1349370.38	100cm	6.12	0.67	0.74
A2P3-P1-24C-1-G	478165.85	1349176.94	100cm	13.40	0.67	1.02
A2P3-P1-24C-2-G	478165.63	1349216.55	100cm	15.70	0.69	1.06
A2P3-P1-24C-4-G	478132.06	1349272.29	100cm	16.50	0.64	0.97
A2P3-P1-24C-5-G	478165.02	1349255.28	100cm	14.40	0.64	0.85
A2P3-P1-24C-6-G	478164.35	1349293.59	100cm	12.90	0.73	1.02
A2P3-P1-24C-7-G	478130.06	1349310.87	100cm	15.40	0.69	0.97
A2P3-P1-24C-8-G	478200.54	1349315.43	100cm	14.40	0.72	0.99
A2P3-P1-24D-1-G	478397.67	1349320.7	100cm	23.10	0.70	2.41
A2P3-P1-24D-2-G	478398.49	1349284.67	100cm	32.40	0.69	3.91
A2P3-P1-24D-3-G	478366.39	1349301.38	100cm	48.20	0.75	13.15
A2P3-P1-24D-4-G	478332.53	1349321.5	100cm	23.30	0.64	3.66
A2P3-P1-24D-4-G-D	478332.53	1349321.5	100cm	25.80	0.64	3.81
A2P3-P1-24D-5-G*	478297.95	1349338.94	100cm	16.60	0.72	1.03
A2P3-P1-24D-6-G	478262.41	1349355.97	100cm	11.70	0.69	1.16
A2P3-P1-24D-7-G*	478228.16	1349338.62	100cm	13.30	0.75	1.69
A2P3-P1-24D-7-G-D	478228.16	1349338.62	100cm	13.70	0.79	1.68

TABLE A-2
HPGe RESULTS FOR TOTAL URANIUM, THORIUM-232, AND RADIUM-226

Location	Northing	Easting	Detector Height	Total Uranium (ppm)	Thorium-232 (pCi/g)	Radium-226 (pCi/g)
A2P3-P1-24D-8-G	478265.15	1349317.25	100cm	13.80	0.65	1.66
A2P3-P1-24D-9-G	478299.57	1349299.97	100cm	13.10	0.66	0.90
A2P3-P1-24D-10-G	478335.52	1349280.3	100cm	37.60	0.73	8.96
A2P3-P1-24D-11-G	478367.03	1349262.87	100cm	39.50	0.59	12.43
A2P3-P1-24D-12-G	478399.82	1349243.47	100cm	41.20	0.61	10.34
A2P3-P1-24D-13-G	478370.61	1349223.66	100cm	45.70	0.65	9.90
A2P3-P1-24D-14-G	478333.89	1349243.13	100cm	34.90	0.70	8.70
A2P3-P1-24D-15-G	478301.43	1349261.62	100cm	20.60	0.68	2.64
A2P3-P1-24D-16-G	478266.86	1349279.65	100cm	15.20	0.69	1.11
A2P3-P1-24D-17-G*	478228.46	1349300.02	100cm	20.90	0.63	4.21
A2P3-P1-24D-18-G	478197.51	1349277.7	100cm	16.80	0.72	1.18
A2P3-P1-24D-19-G*	478231.24	1349259.79	100cm	43.00	0.67	10.65
A2P3-P1-24D-20-G	478268.78	1349240.82	100cm	17.10	0.72	1.35
A2P3-P1-24D-21-G	478304.16	1349221.55	100cm	39.30	0.74	13.52
A2P3-P1-24D-22-G	478337.79	1349199.66	100cm	26.30	0.75	3.87
A2P3-P1-24D-23-G	478371.47	1349180.91	100cm	23.10	0.62	2.20
A2P3-P1-24D-24-G	478372.17	1349141.11	100cm	11.10	0.71	0.90
A2P3-P1-24D-25-G	478338.86	1349157.32	100cm	16.90	0.75	1.17
A2P3-P1-24D-26-G	478305.55	1349181.24	100cm	16.10	0.71	1.09
A2P3-P1-24D-27-G	478272.18	1349199.07	100cm	19.40	0.71	1.19
A2P3-P1-24D-28-G	478234.26	1349219.09	100cm	18.40	0.72	1.24
A2P3-P1-24D-29-G	478201.13	1349238.13	100cm	22.00	0.69	1.09
A2P3-P1-24D-30-G	478203.19	1349199.8	100cm	14.20	0.69	1.17
A2P3-P1-24D-31-G	478239.3	1349180.61	100cm	14.90	0.64	1.19
A2P3-P1-24D-32-G	478273.27	1349160.76	100cm	13.50	0.58	0.91
A2P3-P1-24D-33-G	478308.95	1349139.16	100cm	16.60	0.60	0.86
A2P3-P1-25A-1-G	478341.44	1349116.56	100cm	11.30	0.68	0.85
A2P3-P1-25A-2-G	478310.66	1349099.59	100cm	9.17	0.66	0.93
A2P3-P1-25A-3-G	478274.88	1349122	100cm	17.00	0.64	0.95
A2P3-P1-25A-4-G	478240.83	1349142.23	100cm	15.60	0.66	1.06
A2P3-P1-25A-5-G	478204.06	1349160.9	100cm	13.40	0.67	1.26
A2P3-P1-25A-6-G	478167.49	1349137.75	100cm	12.90	0.69	1.11
A2P3-P1-25A-7-G	478205.39	1349121	100cm	15.40	0.66	1.08
A2P3-P1-25A-8-G	478242.6	1349102.92	100cm	19.40	0.56	0.84
A2P3-P1-25A-9-G	478206.21	1349083.63	100cm	10.80	0.65	0.95
A2P3-P1-25A-10-G	478168.09	1349098.04	100cm	14.70	0.69	0.99
A2P3-P1-25A-11-G	478245.02	1349072.3	100cm	10.1	0.613	0.672
A2P3-P1-25A-12-G	478274.12	1349081.1	100cm	8.6	0.674	0.721
A2P3-P1-25B-1-G	478094.72	1349134.69	100cm	14.90	0.66	0.87
A2P3-P1-25B-2-G	478066.4	1349114.94	100cm	16.50	0.67	1.00
A2P3-P1-25B-3-G	478067.26	1349150.64	100cm	19.60	0.64	0.87
A2P3-P1-25B-4-G	478031.58	1349127.46	100cm	16.00	0.70	0.87
A2P3-P1-25B-5-G	478034.72	1349094.25	100cm	14.70	0.67	0.98
A2P3-P1-25B-6-G	478062.65	1349071.95	100cm	14.10	0.65	0.90

TABLE A-2
HPGe RESULTS FOR TOTAL URANIUM, THORIUM-232, AND RADIUM-226

Location	Northing	Easting	Detector Height	Total Uranium (ppm)	Thorium-232 (pCi/g)	Radium-226 (pCi/g)
A2P3-P1-25B-7-G	477997.49	1349107.59	100cm	14.40	0.73	1.01
A2P3-P1-25B-8-G	477970.59	1349094.19	100cm	12.80	0.63	0.89
A2P3-P1-25B-8-GD	477970.59	1349094.19	100cm	11.60	0.60	0.88
A2P3-P1-25B-9-G	477966.04	1349126.94	100cm	9.97	0.71	0.94
A2P3-P1-25B-10-G	478092.48	1349056.9	100cm	14.30	0.68	0.85
A2P3-P1-25B-10-G-	478092.48	1349056.9	100cm	10.30	0.66	0.92
A2P3-P1-25B-11-G	478094.63	1349094.38	100cm	11.80	0.70	0.92
A2P3-P1-25B-11-G-	478094.63	1349094.38	100cm	13.60	0.72	0.93
A2P3-P1-25B-12-G	478128.97	1349078.46	100cm	9.91	0.58	0.84
A2P3-P1-27B-1-G	478460.56	1349447.21	100cm	8.88	0.81	1.27
A2P3-P1-27B-1-G-D	478460.56	1349447.21	100cm	11.90	0.83	1.13
A2P3-P1-27B-2-G	478462.18	1349408.06	100cm	16.80	0.82	2.33
A2P3-P1-27B-3-G	478465.17	1349365.25	100cm	19.50	0.87	1.15
A2P3-P1-27B-4-G	478436.11	1349329.42	100cm	17.00	0.71	1.01
A2P3-P1-27C-1-G	478432.39	1349306.98	100cm	26.80	0.55	6.66
A2P3-P1-27C-2-G	478433.68	1349271.33	100cm	33.30	0.63	4.31
A2P3-P1-27C-3-G	478409.16	1349202.23	100cm	22.00	0.63	2.91
A2P3-P1-27C-4-G	478404.99	1349162.12	100cm	18.70	0.74	0.97
A2P3-P1-27C-5-G	478436.48	1349187.06	100cm	20.70	0.64	0.84
A2P3-P1-27C-6-G	478435.02	1349228.18	100cm	17.70	0.77	1.24
A2P3-P1-27C-7-G	478469.88	1349208.3	100cm	11.60	0.76	0.95
A2P3-P1-27C-8-G*	478466.17	1349250.14	100cm	14.40	0.69	1.02
A2P3-P1-27C-9-G	478463.64	1349288.21	100cm	13.20	0.66	1.10
			Maximum Result	48.2	0.881	13.52

* Measurement taken twice in error; highest result is reported

TABLE A-3
PHYSICAL SAMPLE LOCATION COORDINATES

Location ID	Northing	Easting
A2P3-RA-1	478435.0	1349228.2
A2P3-RA-2	478462.2	1349408.1
A2P3-RA-3	478432.4	1349307.0
A2P3-RA-4	478364.7	1349340.9
A2P3-RA-5	478304.2	1349221.6
A2P3-RA-6	478367.0	1349262.9
A2P3-RA-7	478231.2	1349259.8

TABLE A-4
PHYSICAL SAMPLE ANALYSIS AND FIELD FRISKER RESULTS

Location ID	Depth (ft)	Alpha Frisk (dpm)	Ra-226 Alpha/Gamma Spec (pCi/g)	Ra-228 (pCi/g)	Th-228 (pCi/g)	Th-230 (pCi/g)	Th-232 (pCi/g)	Total Uranium (ppm)	Tc-99 (pCi/g)	Potassium-40 (pCi/g)
A2P3-RA-1	0.5-1	0	0.97/1.1 NV	0.97 NV	0.94 NV	*	0.97 NV	9.7 NV	*	*
A2P3-RA-1	2.5-3	0	1.5/1.6 NV	1.1 NV	1.1 NV	*	1.1 NV	4.3 NV	*	*
A2P3-RA-1	4.5-5	30	1.2/1.03 -	*	*	1.45 -	0.97 -	3.79 UJ	0.92 U	23.8 -
A2P3-RA-2	0.5-1	22.5	7.3/6.0 NV	0.86 NV	0.82 NV	*	0.86 NV	21.0 NV	*	*
A2P3-RA-2	2.5-3	15	1.7/1.6 NV	1.2 NV	1.2 NV	*	1.2 NV	6.5 NV	*	*
A2P3-RA-2	4.5-5	30	1.04/1.05 -	*	*	1.28 -	0.88 -	5.44 J	0.97 U	20.18 -
A2P3-RA-3	0.5-1	7.5	7.1/7.3 NV	1.1 NV	1.0 NV	*	1.1 NV	30 NV	*	*
A2P3-RA-3	2.5-3	15	1.3/1.4 NV	1.1 NV	1.1 NV	*	1.1 NV	4.5 NV	*	*
A2P3-RA-3	4-4.5	30	1.20/1.09 -	*	*	1.53 -	1.0 -	3.68 UJ	0.93 U	22.32 -
A2P3-RA-4	0.5-1	7.5	1.2/1.2 NV	1.0 NV	1.0 NV	*	1.0 NV	6.6 NV	*	*
A2P3-RA-4	1.5-2	22.5	1.59/1.37 -	*	*	2.02 -	1.25 -	5.33 J	0.97 U	19.64 -
A2P3-RA-4	2-2.5	7.5	1.74/1.47 -	*	*	2.03 -	1.16 -	3.89 UJ	0.90 U	19.23 -
A2P3-RA-4	2.5-3	7.5	1.0/1.2 NV	0.8 NV	0.8 NV	*	0.8 NV	3.2 UNV	*	*
A2P3-RA-5	0-0.5	37.5	9.07/6.52 -	*	*	10.41 -	1.01 -	29.51 -	0.98 U	16.74 -
A2P3-RA-5	0.5-1	0	1.8/1.5 NV	1.2 NV	1.2 NV	*	1.2 NV	5.5 NV	*	*
A2P3-RA-5	2-2.5	15	1.7/1.6 NV	1.3 NV	1.3 NV	*	1.3 NV	6.4 NV	*	*
A2P3-RA-5	4-4.5	30	1.25/1.19 -	*	*	1.55 -	0.96 -	3.92 UJ	0.94 U	25.15 -
A2P3-RA-5	4.5-5	15	1.16/0.95 -	*	*	1.67 -	0.96 -	3.91 UJ	0.98 U	23.04 -
A2P3-RA-6	0.5-1	0	4.7/4.2 NV	1.1 NV	1.1 NV	*	1.1 NV	19 NV	*	*
A2P3-RA-6	2.5-3	7.5	1.2/1.4 NV	1.1 NV	1.0 NV	*	1.1 NV	4.5 NV	*	*
A2P3-RA-6	3.5-4	22.5	1.2/0.92 -	*	*	1.571 -	0.88 -	3.8 UJ	1.01 U	22.15 -
A2P3-RA-7	0-0.5	100	20.91/a -	*	*	21.657 -	a	53.9 NV	1.0 U	a
A2P3-RA-7	0.5-1	30	2.6/2.8 NV	1.2 NV	1.2 NV	*	1.2 NV	10 NV	*	*
A2P3-RA-7	2-2.5	0	1.72/1.43 -	*	*	2.04 -	1.27 -	4.1 UJ	0.97 U	25.36 -
A2P3-RA-7	2.5-3	0	1.1/1.4 NV	1.1 NV	1.0 NV	*	1.1 NV	4.7 NV	*	*

* Not analyzed
a Not enough sample quantity

Data Validation Qualifications
NV = Not Validated
\- = No Data Qualifier for a Positive Result
U = Non-Detect, MDC>Results
UJ = Non-detect estimated
J = Estimated

000042

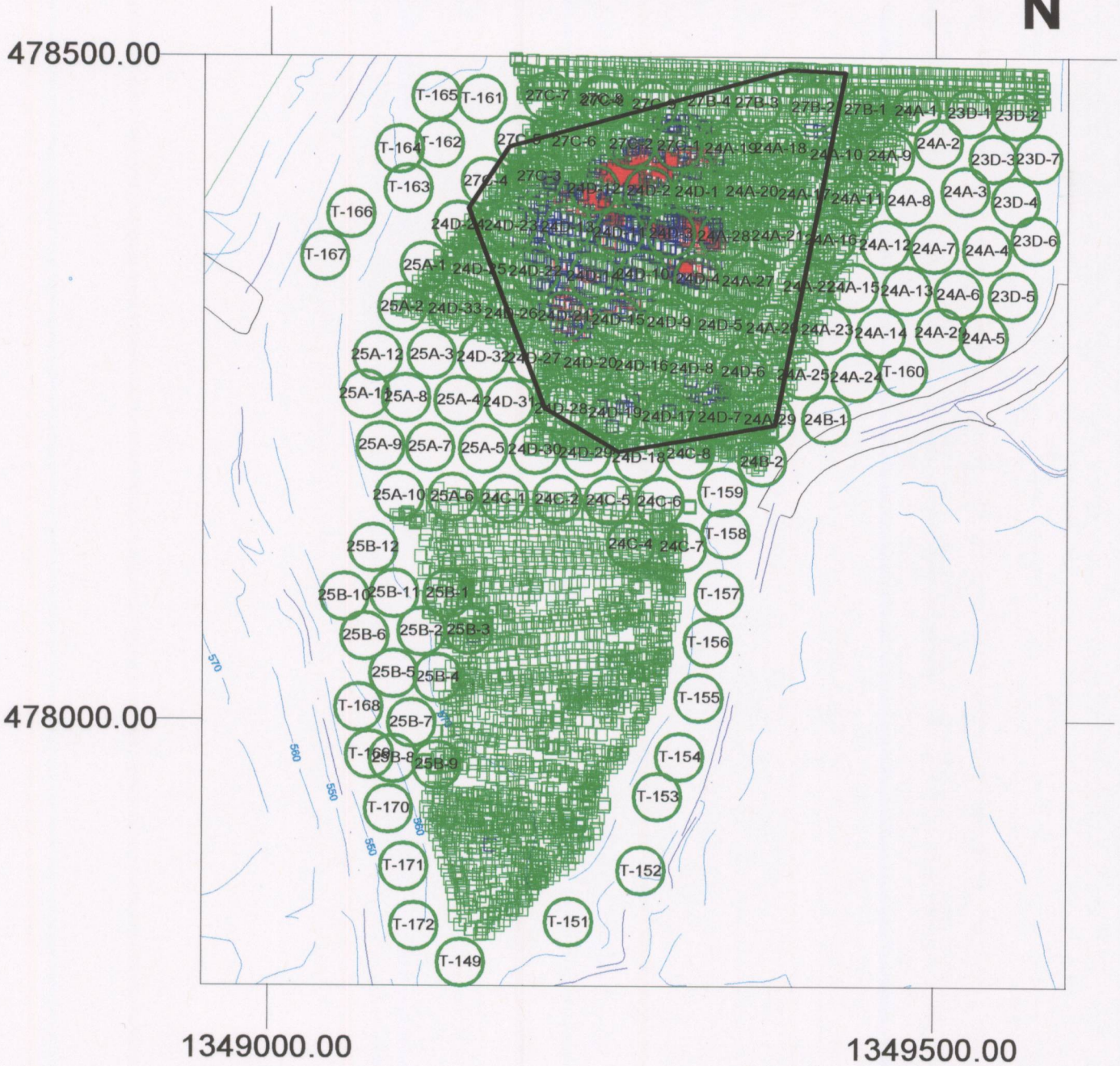
2846

FIGURE A-1

Total Uranium (ppm)

2846

Moisture Corrected
Two Spectra running average
Coverage Plot, Field Of View to Scale



Legend Total Uranium (ppm) RMS	# of Spectra
-50.00 to 82.00	5303
82.00 to 164.00	309
164.00 to 246.00	76
246.00 to 10000.00	33

Legend Total Uranium (ppm) HPGe	# of Spectra
0.00 to 82.00	162
82.00 to 164.00	0
164.00 to 246.00	0
246.00 to 10000.00	0

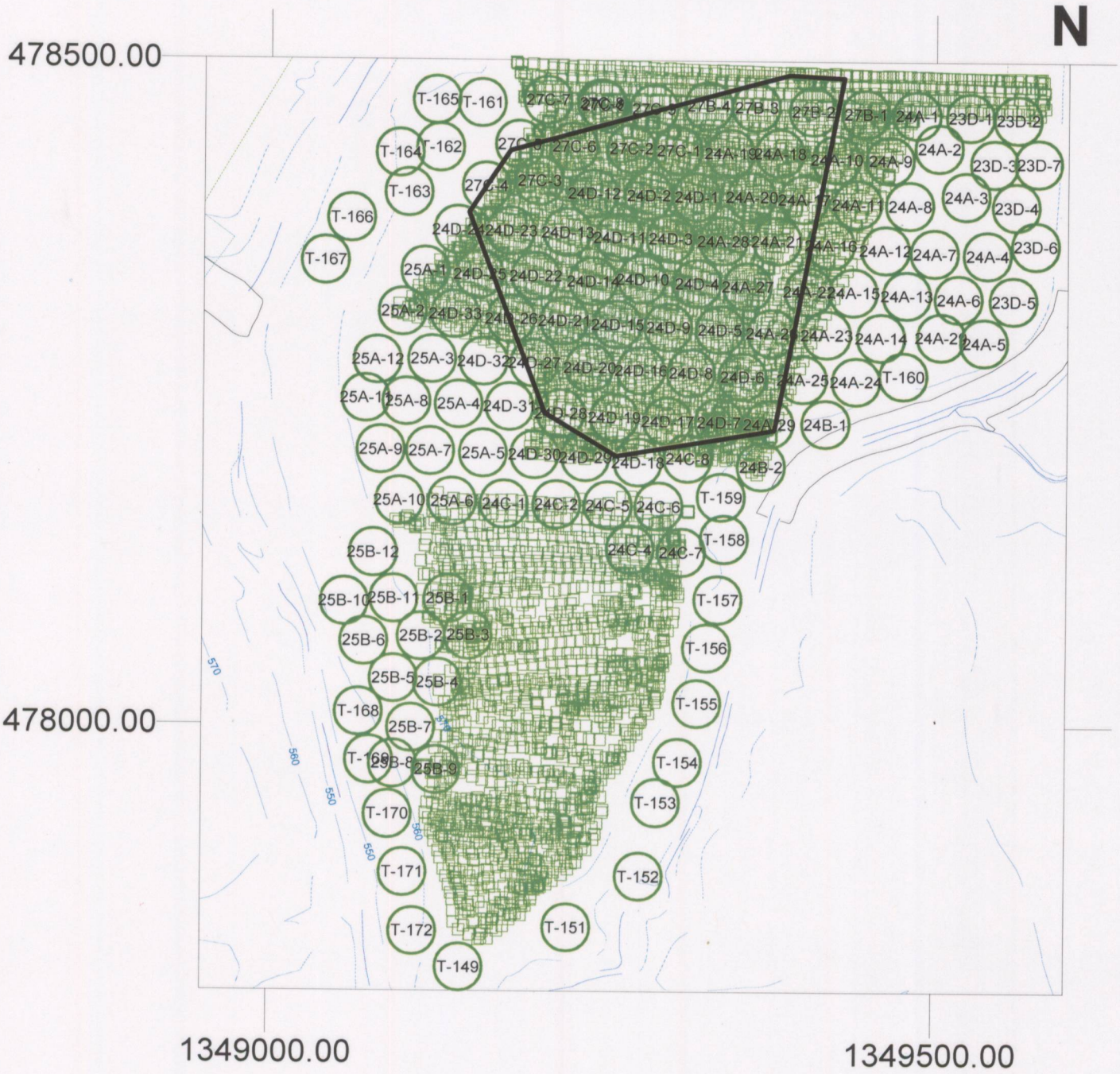
RTIMP DWG Title: A2P3-IP-FIG A1-TU-2PT-
Prepared by: David Allen
File: A2P3_IP_FIG A1_TU_2PT_MC.srf
Date prepared: 8/25/99

FIGURE A-2

2846

Thorium 232 (pCi/gm)

Moisture Corrected
Two Spectra running average
Coverage Plot, Field Of View to Scale



Legend RMS Th-232 (pCi/gm)	# of Spectra
-0.20 to 1.50	5724
1.50 to 3.00	0
3.00 to 4.50	0
4.50 to 10000.00	0

Legend HPGe Th-232 (pCi/g)	# of Spectra
0.00 to 1.50	162
1.50 to 3.00	0
3.00 to 4.50	0
5.10 to 10000.00	0

RTIMP DWG Title: A2P3-IP-FIG A2-TH-2P
Prepared by: David Allen
File: A2P3_IP_FIG A2_TH_2PT_MC.srf
Date prepared: 8/25/99

FIGURE A-3

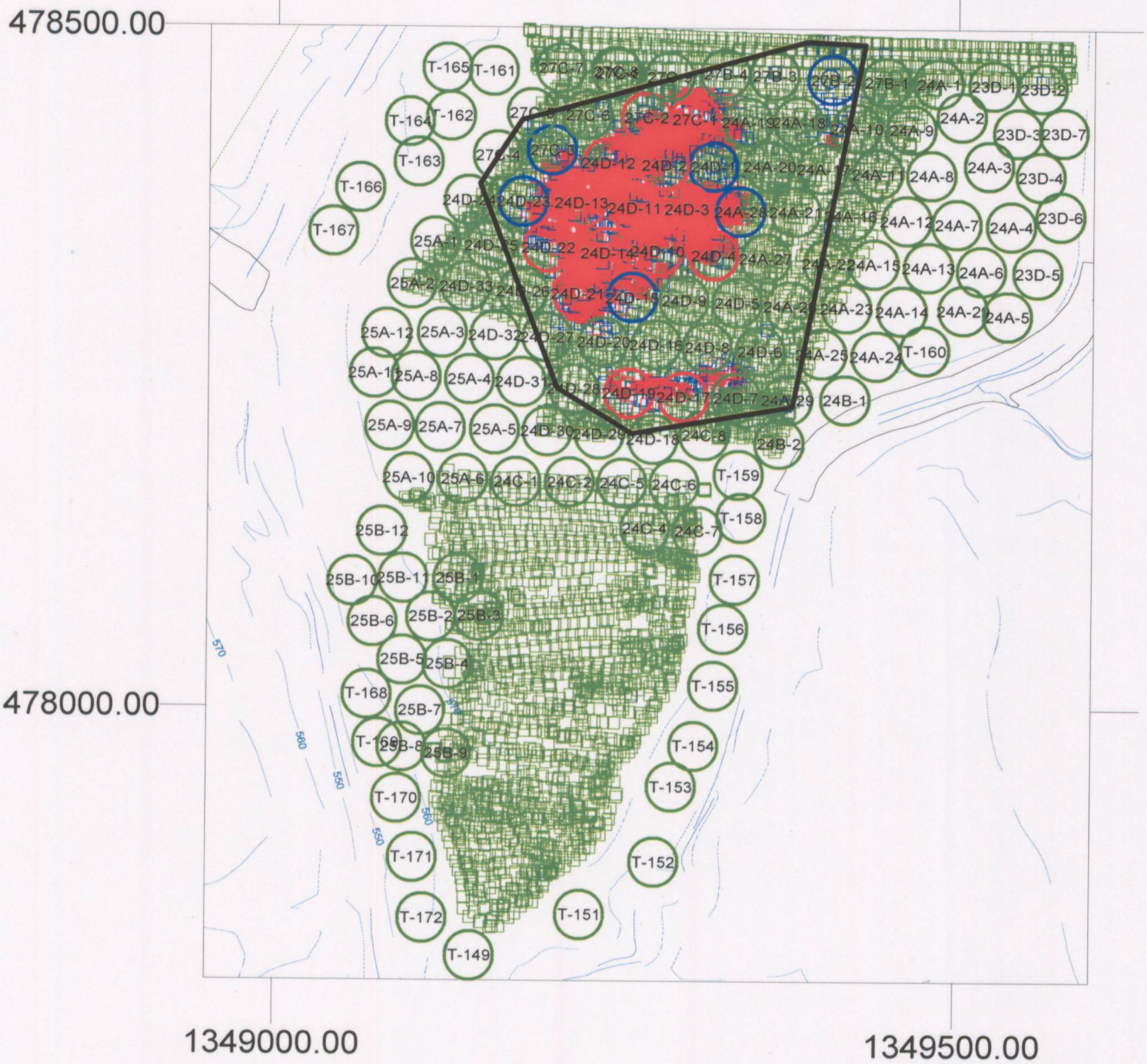
2846

Radium 226 (pCi/gm)

Moisture & Radon Corrected
Two Spectra running average
Coverage Plot, Field Of View to Scale

All points in the highest category are within the excavation boundary

N



Legend RMS Ra-226 (pCi/gm)	# of Spectra Ra-226 (pCi/g)
-0.20 to 1.70	4804
1.70 to 3.40	306
3.40 to 5.10	163
5.10 to 10000.00	451

Legend HPGe Ra-226 (pCi/g)	# of Spectra Ra-226 (pCi/g)
0.00 to 1.70	138
1.70 to 3.40	7
3.40 to 5.10	7
5.10 to 10000.00	10

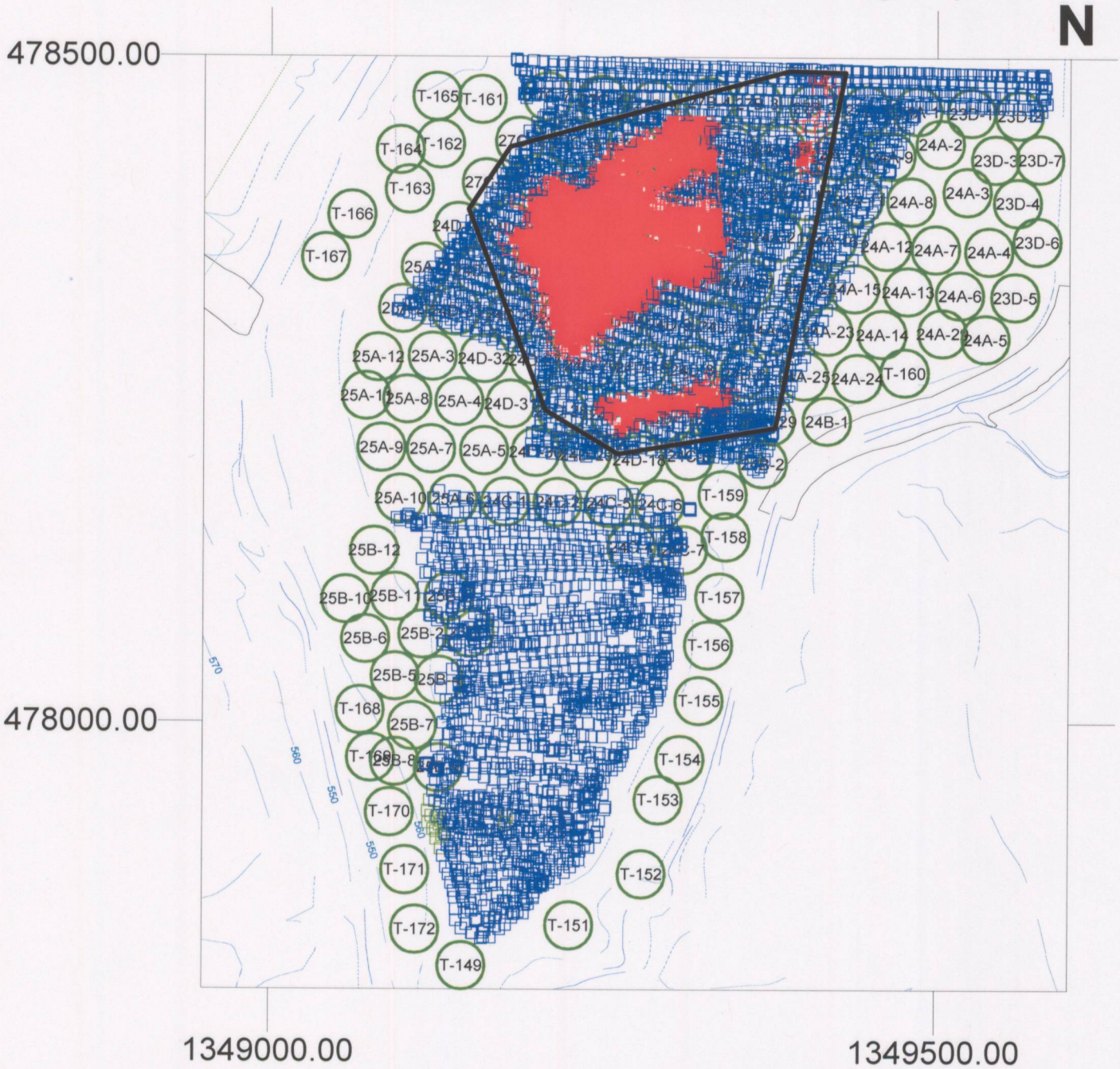
RTIMP DWG Title: A2P3-IP-FIG A3-RA-2PT
Prepared by: David Allen
File: A2P3_IP_FIG A3_RA_2PT_MC.srf
Date prepared: 8/25/99

2846

FIGURE A-4

Total Counts per Second (cps)

One Spectra, no average
Coverage Plot, Field Of View to Scale
No HPGE cps, locations provided for coverage only



Legend cps RMS	# of Spectra
1000.00 to 2000.00	17
2000.00 to 3000.00	4737
3000.00 to 4000.00	320
4000.00 to 10000.00	589

HPGe coverage
162 Spectra

RTIMP DWG Title: A2P3-IP-FIG A4-TC-
Prepared by: David Allen
File: A2P3_IP_FIG A4_TC_1PT_MC.srf
Date prepared: 8/25/99

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