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CERTIFICATION REPORT FOR AREA 1 PHASE II -- SECTOR 1, 2a AND CONVEYANCE DITCH

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 1998

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20710-RP-0008
REVISION C
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LIST OF ACRONYMS AND ABBREVIATIONS

A1PI	Area 1, Phase I
A1PII	Area 1, Phase II
A1PII-S1	Area 1, Phase II Sector 1
A1PII-S2a	Area 1, Phase II, Sector 2a
ALARA	As Low As Reasonably Achievable
ASCOC	Area Specific Constituent of Concern
ASL	Analytical Support Level
CD	Conveyance Ditch
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
COC	Constituent of Concern
CRDL	Contract Required Detection Limit
CU	Certification Unit
DOE	US Department of Energy
EPA	Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	Final Remediation Level
GFAA	graphite furnace atomic absorption
GIS	Geographical Information System
HAMDC	highest allowable minimum detectable concentration
HPGe	High Purity Germanium Detector
MDC	minimum detectable concentration
OU5	Operable Unit 5
OSDF	On-Site Disposal Facility
PCB	polychlorinated biphenyl
ppm	parts per million
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study

RTRAK	Radiation Tracking System
ROD	Record of Decision
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SER	South Entrance Road
SCQ	Sitewide CERCLA Quality Assurance Project Plan
STP	Sewage Treatment Plan
STPI	Sewage Treatment Plant Incinerator
TPU	total propagated uncertainty
UCL	Upper Confidence Level
V&V	verification and validation
WAC	Waste Acceptance Criteria

EXECUTIVE SUMMARY

This Certification Report presents the information and data used by the US Department of Energy (DOE) to determine that contaminated soil cleanup objectives were successfully achieved in Area 1 Phase II (A1PII) Sector 1, Sector 2a, and the Conveyance Ditch (CD) at the Fernald Environmental Management Project (FEMP). These portions of Area 1 are defined in the Certification Design Letter (CDL) (DOE 1997a). On the basis of this reported information and supporting project files, DOE considers remedial actions complete in this area of the site; therefore, the areas can be certified and characterized for re-use and DOE will proceed with future land use activities upon approval from the regulatory agencies.

The certification activities were conducted within three areas: A1PII Sector 1 (A1PII-S1) Group A, A1PII Sector 2a (A1PII-S2a), and the A1PII Conveyance Ditch. A1PII-S1 Group A is an approximately 80 acre area located south and east of the former production area, south of the old Sewage Treatment Plant (STP), and east of the South Entrance Road (SER). A1PII-S1 Group A includes an approximately 4 acre area west of the SER, which is being characterized for re-use. Following approval of this Certification Report, a portion of the A1PII-S1 will be developed as a borrow area for construction of the On-Site Disposal Facility (OSDF). A1PII Sector 2a is divided into two separate areas of approximately 3 acres each; both are contiguous with the A1PI certified area. These areas require certification to expedite construction of OSDF Cell 3 and an associated haul road tie in. This report also addresses characterization for re-use of the CD area. The CD, a long corridor approximately 50 feet wide and 600 feet long (approximately two thirds of an acre), is designed to accommodate drainage during A1PII Sector 3 remediation.

The scope of this report includes the certification and characterization for re-use of the areas as discussed above, which are divided into 22 Certification Units (CUs). Certification sampling was conducted to verify that the mean concentrations or activities for primary Area Specific Constituents of Concern (ASCOCs) remaining in the soil of a CU following remedial activities, if necessary, are less than the Final Remediation Levels (FRLs) at the 95% confidence level, and at the 90% confidence level for secondary ASCOCs. The certification process includes the hot spot criterion that if any certification sample exceeds two times the FRL for primary radiological ASCOCs, further investigation is required, and excavation will be performed if necessary. If the mean residual concentrations or activities are below the FRLs within the respective confidence bounds and the hot spot criterion is met, then the remedial objectives have been

achieved for the CU and it can be released for borrowing, regrading, reseeding and development of a final land use.

Based on historical data and precertification surveys, no remedial activities were required prior to certification for the areas covered under this report. However, one CU in A1PII-S2a was excavated six inches, consistent with the remediation approach applied in Area 1, Phase I, to ensure that the CU passed certification. Several changes to the scope of work defined in the CDL (DOE 1997a) occurred; the most significant include:

- The re-configuration of the CU within the OSDF Cell 3 footprint and the addition of three samples to the certification sample set. These changes were based on field conditions.

- The sampling strategy for the CU, which represents the outfall area west of the South Access Road, was modified. At the time of sampling, part of the area was already excavated and soil stockpiled. An additional four samples were taken from the stockpile, bringing the total number of samples in the CU to twenty.

- In CU A1PII-S2a, which located in the northern portion of A1PII adjacent to the North Access Road (NAR), four sample locations were moved. The original locations fell onto the berm of the relocated NAR, and as a result were moved approximately 10 to 15 ft west to a location off the berm. The boundary of the CU was modified accordingly.

These changes were documented to the regulatory agencies in the letter "Revision to the Certification Design Letter for Area 1, Phase II - Sector 1, 2a and the Conveyance Ditch" dated March 17, 1998.

The samples for A1PII were analyzed at laboratories on the FEMP Approved Laboratories List per the Sitewide CERCLA Quality Assurance Project Plan (SCQ). All the samples in A1PII were analyzed and reported at Analytical Support Level (ASL) D. These packages included sample results associated with QA/QC data and all applicable raw data. The detection limits for total uranium were adjusted from ASL D to ASL E. This change did not impact the quality of the data. The data validation and verification process did not identify any significant quality concerns, except for one sample that was rejected for Chain-of-Custody errors.

All CUs for A1PII Sector 1, 2a and CD passed the certification criteria. The determination of certification or certification failure was based on a review of certification sample data from each CU against certification criteria. All CUs passed final certification relative to the average COC concentration and the "hot spot" determination. All CUs passed on the first round of certification, and no additional corrective

actions were required. However, review of the data showed that in two CUs, A1PII-S1-19 and A1PII-S3-CD, there is localized contamination. In CU A1PII-S1-19 the lead and arsenic results were elevated for one sample. The corrective action will be to excavate approximately 15 cubic yards around this sample, and place the excavated material in the trap range to be treated. In CU A1PII-S3-CD, the total uranium upper confidence level for the CU is 63.58 ug/g, which meets the 82 ug/g FRL objective, but slightly exceeds the 50 ug/g As Low As Reasonably Achievable (ALARA) goal. In order to meet this objective, DOE will perform localized excavations in the northern portion of the CU and around sample located in the southern portion of the CU.

DOE has restricted access to certified areas in order to maintain their integrity prior to transferral for OSDF borrowing activities or final land use. A FEMP procedure (EP-0008) has been developed to implement a process to protect certified areas from becoming re-contaminated. Upon approval of this report, the areas will be transferred for OSDF borrowing activities, A1PII site preparation activities, Sector 3 remediation, or final land use.

SECTION 1.0
INTRODUCTION

1.1 PURPOSE AND SCOPE

This Certification Report presents the information and data used by the US Department of Energy (DOE) to determine that contaminated soil cleanup objectives were successfully achieved in areas to be certified and characterized for re-use. The Certification Design Letter (CDL) (DOE 1997a) defines Area 1 Phase II Sector 1, Sector 2a, and the Conveyance Ditch (CD) (DOE 1997a). On the basis of this reported information and supporting project files, DOE considers remedial goals achieved in this area of the site and will proceed with future land use activities.

1.2 BACKGROUND

In the 1996 Operable Unit 5 (OU5) Record of Decision (ROD) (DOE 1996a), DOE committed to excavating contaminated soil that exceeds health-based final remediation levels (FRLs) with final disposition of the excavated material in the On-Site Disposal Facility (OSDF) or an off-site disposal facility if the Waste Acceptance Criteria (WAC) are exceeded. The OU5 Remedial Investigation Report (DOE 1995) defined the extent of soil contamination exceeding the FRLs, and in general, indicated widespread contamination occurring in approximately 430 acres of the 1050-acre Fernald Environmental Management Project (FEMP). Approximately 1.8 million cubic yards of contaminated soil are anticipated to be excavated and placed within the OSDF.

In the OU5 Remedial Action Work Plan (RAWP) (DOE 1996b), DOE committed to preparing a Sitewide Excavation Plan (SEP) (DOE 1998) defining the overall approach to implementing the soil and at- and below grade debris cleanup obligations identified in the OU2, OU3, and OU5 RODs. The FEMP is divided into distinct remedial areas and phases; this report addresses specific portions of Area 1, Phase II (A1PII). Figure 3-1 of the SEP shows the general soil remediation process. For the certification areas within the scope of this report, precertification activities were conducted, however, no soil excavation activities were required, except in one certification unit (A1PII-S2-2a-01). All certification activities for these areas were conducted in compliance with the current SEP (DOE 1998).

1.3 AREA DESCRIPTION

The certification activities were conducted within three areas: A1PII Sector 1 (A1PII-S1) Group A, A1PII Sector 2a (A1PII-S2a), and the A1PII CD, as shown in Figure 1-1.

A1PII-S1 Group A is an approximately 80 acre area located south and east of the former production area, south of the Sewage Treatment Plant (STP), and east of the South Entrance Road (SER). A1PII-S1 Group A includes an approximately 4 acre area west of the SER, which is being characterized for re-use. The RCRA area identified as the trap range (Figure 1-1) is not included as part of the A1PII-S1 Group A, and will be certified at a latter date. The terrain in A1PII-S1 generally consists of rolling grassland, with a few trees along the South Entrance Road and along the eastern FEMP property boundary. A1PII-S1 contains no designated wetlands and lies outside of the 100-year flood plain of the Great Miami River. There are no waste units or past production facilities within or upwind of A1PII-S1. Following approval of this Certification Report, a portion of the A1PII-S1 will be developed as a borrow area for the OSDF construction and as a backfill borrow area for the STP excavations.

A1PII Sector 2a is divided into two separate areas of approximately 3 acres each; both are contiguous with the Area 1, Phase I certified area (Figure 1-1). These areas require certification to expedite construction of OSDF Cell 3 and an associated haul road tie in.

This report also addresses characterization for re-use of the CD area. The intent of the characterization for re-use process is to characterize an area prior to any construction activities being initiated. In the case of A1PII, the areas for characterization for re-use are being examined to determine if they will meet the certification criteria to potentially be used as clean fill material. As shown on Figure 1-1, the CD is a long corridor approximately 50 feet wide and 600 feet long (approximately two thirds of an acre), and is designed to accommodate drainage during the remediation of A1PII Sector 3.

1.4 SCOPE

The scope of this report includes the certification and characterization for re-use of the areas as discussed above, which are divided into 22 Certification Units (CUs). The certification design for A1PII-S1 Group A CUs follows the general approach as outlined in Section 3.4 of the SEP. As shown in Figure 1-2, the areas to be certified and characterized for re-use consist of:

- 19 CUs in AIPII-S1 Group A labeled A1PII-S1-01 thru A1PII-S1-19
- 2 CUs in A1PII S2a labeled A1PII-S2-2a-01 and A1PII-S2-2a-02
- 1 CU in A1PII Conveyance Ditch labeled A1PII-S3-CD-01.

A1PII-S3-CD-01, A1PII-S1-01, A1PII-S1-03, and A1PII-S1-19 are all being characterized for re-use. The CU A1PII-S3-CD-01 represents the area where conveyance ditch will be located. CU A1PII-S1-03 is

the area where a sediment trap will be constructed which will receive drainage from the CD, and CU A1PII-S1-01 is the outfall area for this drainage. CU A1PII-S1-19 represents the area where storm water run-on and run-off control ditches will be constructed around the trap range area. However, since these areas will receive storm water from non-certified areas during the remediation of A1PII Sector 3 and the trap range, they will require re-certification before final restoration of the area. Two other areas were also characterized for re-use as part of this effort. The first is an area on the South Entrance Road where culverts will be placed connecting the sediment basin to be located in CU A1PII-S1-03 and the outfall area represented by CU A1PII-S1-01. The second is the area on the Sewage Treatment Plant Access Road where culverts will be placed connecting the Conveyance Ditch (CU A1PII-S3-CD) and the sediment basin (CU A1PII-S1-03). The areas to be characterized for re-use are shown in Figure 1-2.

1.5 OBJECTIVES

The objectives of this Certification Report are:

- Describe the area preparation and pre-certification activities.
- Describe the analytical methods, data validation processes, data reduction and statistical processes used to support the certification process.
- Present certification sampling results for the 18 CUs being certified, and the 4 CUs being characterized for re-use.
- Present the statistical analysis showing that all the CUs have passed certification criteria including FRL attainment and hot spot criteria as discussed in Section 2.
- Describe access controls implemented to prevent recontamination.

1.6 REPORT FORMAT

This certification report is presented in five sections with supporting documentation and data in the appendices. These sections are as follows:

Section 1.0	Introduction: Purpose, background, area description, scope, and objectives of the report.
Section 2.0	Certification Approach: The approach to sampling and analysis used for certification and characterization for re-use.
Section 3.0	Summary of Remedial Actions Conducted: Area preparation, excavation, and changes to work scope
Section 4.0	Analytical Methods, Data Validation Processes and Data Reduction
Section 5.0	Certification Evaluation and Conclusions
Section 6.0	Protection of Certified Areas
Appendix A	CU Maps and Statistics Tables
Appendix B	A1PII Certification Design Letter Comment Responses

1.7 FEMP CERTIFICATION AND CHARACTERIZE FOR RE-USE AREAS

In order to track certification and characterize for re-use areas, DOE will include with all Certification Reports and Certification Design Letters a controlled map showing the status of the subject areas. This map is enclosed as Figure 1-3. There have been no significant changes to this map since its last submittal.

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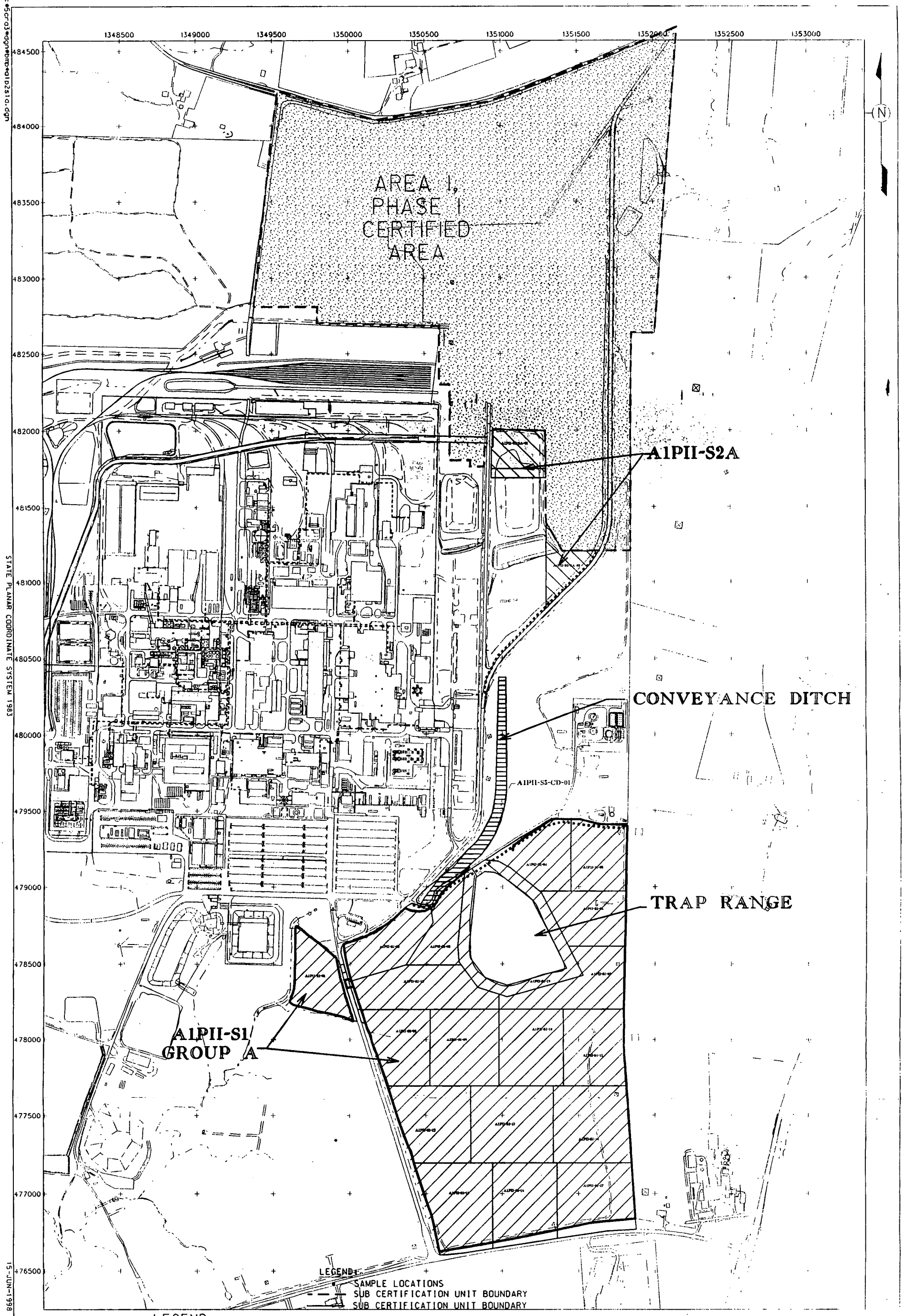

STATE PLANAR COORDINATE SYSTEM 1983

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FIGURE 2-1. AREA 1 PHASE II CERTIFICATION UNITS, QUADRANTS, AND SAMPLE LOCATIONS

FIGURE 1-1. LOCATION MAP OF AREA 1, PHASE II SECTOR I, AND OTHER AREAS TO BE CERTIFIED

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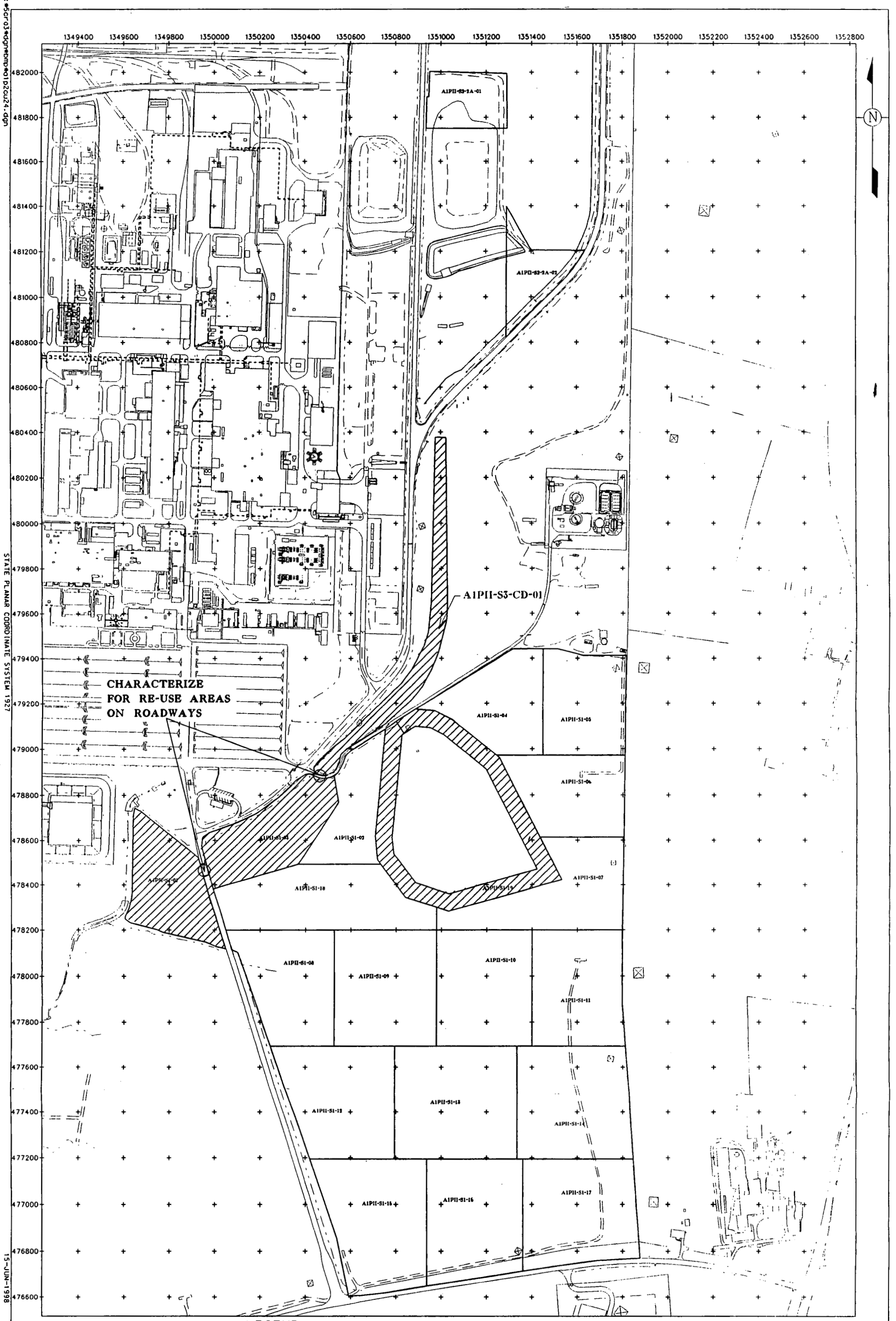
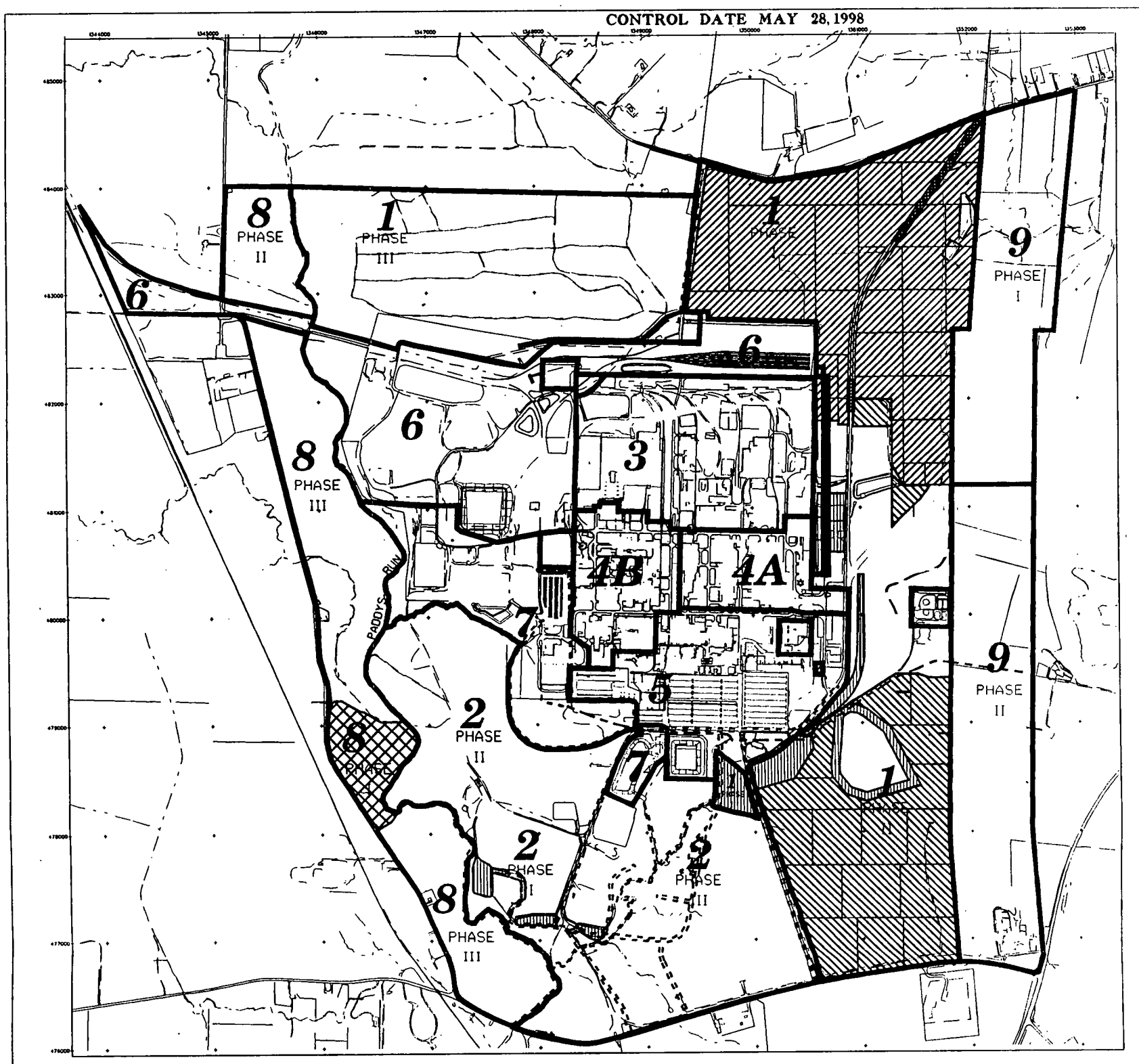


FIGURE 1-2. AREA1 PHASE II CERTIFICATION UNIT BOUNDARIES



LEGEND:

A1PII CERTIFIED AREAS (PENDING AGENCY APPROVAL)

CHARACTERIZATION FOR REUSE AREAS

AREAS EXCLUDED FROM A1PI

A1PI CERTIFIED AREAS (PENDING AGENCY APPROVAL)

A8PI AREAS (CERTIFICATION SAMPLES COLLECTED)

SCALE

1200 600 0 1200 FEET

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FIGURE 1-3. CERTIFICATION AND CHARACTERIZATION FOR REUSE AREAS STATUS MAP

SECTION 2.0
CERTIFICATION APPROACH

2.1 CERTIFICATION STRATEGY

This sections summarizes the Area Specific Constituents of Concern (ASCOCs) selection process, and the certification approach including CU and sampling design, and statistical analysis. The purpose of certification sampling is to verify that the mean concentrations or activities for primary ASCOCs remaining in the soil of a CU following remedial activities are less than the FRLs at the 95% confidence level, and at the 90% confidence level for secondary ASCOCs. The certification process includes the hot spot criterion that if any of the certification samples exceed two times the FRL for primary radiological ASCOCs further action is required as discussed in Section 2.2.5.

If the mean residual concentrations or activities are below the FRLs within the respective confidence bounds and the hot spot criterion is met; the remedial objectives have been achieved for the CU and it can be released for regrading, reseeding and development of a final land use. The general certification strategy is described in the SEP (DOE 1998), and the A1PII Sector 1, 2a and CD specific strategy is described in the CDL (DOE 1997a).

2.1.1 A1PII SECTOR 1, 2a, and CD AREA SPECIFIC CONTAMINANTS OF CONCERN

The OU5 ROD lists 80 soil Constituents of Concern (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 the COC retention process, many 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 remedial investigation 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, which eliminates them from further consideration. The 30 remaining sitewide COCs

account for over 99% of the combined risk to a site receptor model, and they comprise the list from which all of the remediation-area-specific ASCOCs are drawn.

2.1.2 ASCOC Selection Criteria

The selection process for retaining ASCOCs for a remediation area is driven by applying a set of decision criteria. The criteria are:

- The ASCOC must be listed as a soil COC in either the OU2 or OU5 ROD.
- The ASCOC must be traced to site use, either through process knowledge or known release of the constituent to the environment.
- Analytical results must indicate the COC is present at a concentration above its FRL, and the COC greater than the FRL criterion is not attributable to false positives or elevated CRDLs.

2.1.3 ASCOC Selection Process for A1PII-S1 Group A CUs and the Conveyance Ditch CU

Total uranium, radium-226, and radium-228 are sitewide primary COCs and were retained as ASCOCs for this reason, even though historical data did not indicate any FRL exceedances in the area. Due to their classification as sitewide primary COCs, and some suspect detections in the area, both thorium-228 and thorium-232 were retained as ASCOCs during the certification process. Lead was not detected above the FRL in A1PII-S1 Group A CUs; however, there are above-FRL detects along the trap range common boundary (Figure 2-1). To ensure lead contamination does not extend beyond the designated boundary, lead will be retained as an ASCOC for certification only in CUs bordering the trap range.

Table 2-1 summarizes the ASCOCs for the A1PII-S1 Group A CUs and the Conveyance Ditch CU. Note that all ASCOCs are primary ASCOCs, except arsenic and lead.

TABLE 2 -1 ASCOC LIST FOR A1PII-S1 GROUP A CUs & CONVEYANCE DITCH CU

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
Arsenic	12 mg/Kg	Detected above FRL in A1PII-S1 data
Thorium-228	1.7 pCi/g	Detected above FRL in A1PII-S1 data, and a Sitewide Primary ASCOC.
Thorium-232	1.5 pCi/g	Detected above FRL in A1PII-S1 data, and a Sitewide Primary ASCOC
Lead	400 mg/kg	Retained for CUs adjacent to the Trap Range

2.1.4 ASCOC Selection for A1PII-S2a

The two small non-contiguous areas comprising A1PII-S2a will be certified in conjunction with A1PII-S1 Group A CUs to facilitate short term OSDF construction requirements. Since the ASCOC selection process for A1PI included these areas, and due to their congruity with A1PI, these two locations will be certified using the A1PI ASCOC list (Table 2-2). As discussed in the December 23, 1997 revision to the CDL (DOE 1997a), cesium-137 and thorium-230 were removed from the ASCOC list for these CUs. Review of historical data showed no positive results for either analyte within the area.

TABLE 2-2 ASCOC LIST FOR A1PII-S2a

PRIMARY ASCOC	FRL	SECONDARY ASCOCs	FRL
Total Uranium	82 mg/Kg	Arsenic	12.0 mg/Kg
Thorium-232	1.5 pCi/g	Beryllium	1.5 mg/Kg
Thorium-228	1.7 pCi/g	Aroclor-1260	0.13 mg/Kg
Radium-226	1.7 pCi/g		
Radium-228	1.8 pCi/g		

2.2 CERTIFICATION APPROACH

2.2.1 Certification Design

The certification design for A1PII-S1 Group A CUs follows the general approach outlined in Section 3.4 of the SEP (DOE 1998). The CUs have been assigned as approximately 500-ft x 500-ft areas (Figure 2-1). AIPII-S1 Group A consists of 19 CUs, A1PII-S1-01 thru A1PII-S1-19. The A1PII Sector 2a CUs (A1PII-S2-2a-01 and A1PII-S2-2a-02), which are considerably smaller than the nominal 500-ft x 500-ft, were classified as separate CUs. The CD CU is a long, narrow corridor, that was treated as a single CU.

2.2.2 Characterization for Re-Use

As previously discussed several areas were characterized for re-use. These areas include:

1. The entire CD (CU A1PII-S3-CD) area. In the future this area will receive run-off from uncertified areas and will require re-certification.
2. The small area on the South Entrance Road (SER) connecting CUs A1PII-S1-01 to the CUs east of the SER.
3. The small area on the Sewage Treatment Plant Access Road connecting the A1PII-S3-CD and A1PII-S1-03.
4. The entire outfall drainage area west of the SER, which includes all of CU A1PII-S1-01.
5. The location of A1PII sediment basin, which includes the majority of CU A1PII-S1-03.
6. The run-on and run-off ditches for the trap range, which will be constructed after characterization for re-use. These ditches fall into CU A1PII-S1-19.

2.2.3 Sample Selection Process

As shown in Figure 2-1, each CU was divided into quadrants. As discussed in Section 3.4.2.1 of the SEP, the 16 soil sample locations were randomly selected. The sample locations met the following criteria. First, four points are located in each quadrant of the CU. Second, the distance between two sample points has been limited to a minimum distance (area of the CU divided by 8) determined by the CU size and shape. The sample locations for all the CUs within the scope of this report are shown in Figure 2-1.

2.2.4 Certification Sampling

Each sample was collected from the 0 to 6-inch soil interval at the designated and surveyed location. The original number of samples as discussed in the CDL for CUs A1PII-S1-12 through A1PII-S1-17 was twelve. In each CU, three randomly selected samples from each quadrant (12 total) were submitted for analysis for the appropriate ASCOC list. The CDL also required that, for all other CUs, all 16 samples were collected and submitted for analysis to decrease the potential variability due to a smaller sample population. This action would ensure the CUs passed certification as expected without the delay of further analysis of archived samples so that the OSDF construction schedule could be met. For the samples from the SER and the STP Access Road, the CDL required that two samples be collected from each location. One sample was taken from the road fill material, and one sample was taken from the native soil under the road. As a result of various reasons as discussed Section 3.2, some additional samples were collected in some CUs. The following table summarizes the number of samples in the CU:

TABLE 2-3 NUMBER OF SAMPLES WITHIN EACH CU

Certification Unit(s)	Planned Number of Samples	Actual Number of Samples	Notes / Reason
A1PII-S1-01	16	20	Additional samples from stockpile.
A1PII-S1-02 thru A1PII-S1-11	16	16	No Change
A1PII-S1-12 thru A1PII-S1-17	12	12	No Change
A1PII-S1-18 and A1PII-S1-19	16	16	No Change
A1PII-S3-CD	16	16	No Change
A1PII-S2-2a-01	16	19	Additional samples to characterize run-off.
A1PII-S2-2a-02	16	16	No Change
South Entrance Road	2	6	Additional samples taken at the actual location of the culverts.
STP Access Road	2	2	No Change

2.2.5 Statistical Analysis

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% Upper Confidence Limit (UCL) of the mean of each primary COC to its FRL, and the 90% UCL on the mean of the secondary ASCOCs to their respective FRLs, resulting in the pass/fail decision on each individual CU. If the data distribution was not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP (DOE 1998) was used to evaluate the first criterion. The second criterion was related to the hot spot criterion, which states that if a certification sample for a primary radiological ASCOC exceeds two times the FRL, then further action is necessary as shown in Figure 3-10 of the SEP (DOE 1998). Specifically, if the contamination is not widespread in the CU and limited to an individual sample location, the High Purity Germanium Detector (HPGe) will be used to delineate the area. If the area is limited to 10 m^2, then the acceptable concentration is 3 times the FRL. If the area is larger than 10 m^2, then the acceptable concentration is 2 times the FRL. 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.

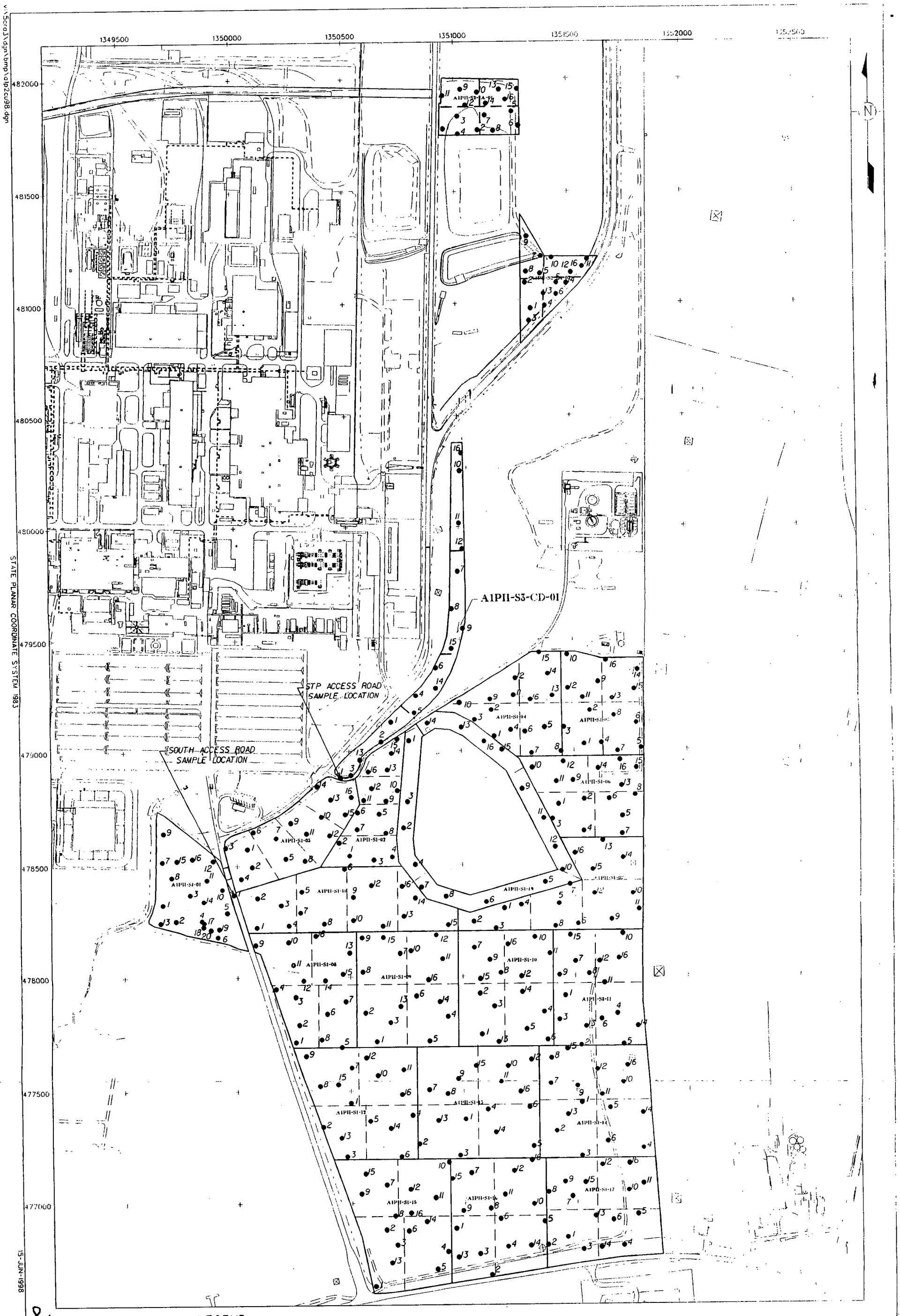

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FIGURE 2-1. AREA 1 PHASE II CERTIFICATION UNITS, QUADRANTS, AND SAMPLE LOCATIONS

SECTION 3.0
OVERVIEW OF FIELD ACTIVITIES

3.1 AREA PREPARATION

Based on historical data and precertification surveys, as summarized in the CDL (DOE 1997a), none of the areas required any remedial activities prior to certification. However, CU A1PII-S2-2a-01, which lies within the OSDF Cell 3 footprint, was excavated six inches, consistent with the remediation approach applied to Area 1, Phase I, to ensure that the CU passed certification.

3.2 CHANGES TO SCOPE OF WORK

The following are changes to the original scope of work as planned in the CDL (DOE 1997a). These changes were documented to the regulatory agencies in the letter "Revision to the Certification Design Letter for Area 1, Phase II - Sector 1, 2a and the Conveyance Ditch" dated March 17, 1998.

- As discussed in the CDL (DOE 1997a), the northernmost CU (A1PII-S2-2a-01) falls within the footprint of OSDF Cell 3. Also, part of the A1PI East Stockpile fell within the CU. The original plan was to move the stockpile out of the CU, and then excavate six inches from this CU. Based on field conditions, the stockpile could not be moved as far south as originally planned, but could be moved far enough to allow OSDF Cell 3 construction. Therefore, the southern CU boundary was moved approximately 50 ft north, which made the CU smaller. The random sample point selection process was re-done based on the new configuration. After approximately 5685 cubic yards of soil were excavated, the certification samples were collected. Before excavation, a physical sample for Waste Acceptance Criteria (WAC) determination was taken and a Radiation Tracking system (RTRAK) scan was performed. The RTRAK scan showed no contamination above 80 ppm for uranium, which is well below the 1030 ppm WAC limit. The physical sample results were: 16 ppm for total uranium, and a non-detect for technetium-99 with a Minimum Detectable Concentration of 1.1 pCi/g. Once these results were confirmed, the area was excavated and the material was placed in the East Impacted Stockpile. Figure 3-1 shows the old and new CU designs.

- Field inspection of the A1PII-S2-2a-01 showed that the CU may have received runoff from the East Impacted Stockpile. An additional three samples were collected at locations where the CU may have been contaminated. Figure 3-1 shows the sample locations (17, 18, and 19). None of the results for these three samples approached the FRL for any of the ASCOCs. The total uranium results were 15.26 ug/g, 15.03 ug/g, and 9.57 ug/g, and the UCL for the CU without these samples is 6.17 ug/g. While it is possible that the slighted elevated results (as compared to the UCL for CU) for the three corrective action samples could be attributed to the uncontrolled run-off, the results are still well below the FRL. Fortunately, the lack of adequate stormwater controls in this CU did not jeopardize the attainment of the certification criteria. In the future no certification sampling will be performed without ensuring that adequate stormwater controls are in place.

The statistical analysis of CU A1PII-S2a-01, included in Appendix A, includes an evaluation of the certification criteria with the additional 3 samples and without the additional samples. The CU passes the certification both ways.

- The sampling strategy for the CU which represents the outfall area (A1PII-S1-01) west of the South Access Road was modified. At the time of sampling, the area was being used by the South Plume Optimization Project, and part of the planned outfall line was excavated and stockpiled. An additional four samples were taken from the stockpile, bringing the total number of samples in the CU to 20. Figure 3-2 shows the location of these additional certification samples and the location of the stockpile. The results of these additional samples are all well below the FRLs. The statistical analysis of this CU, as presented in Appendix A, includes an evaluation of the data with and without the additional 4 samples. The CU passes certification both ways.

- In CU A1PII-S1-05, sample point 05 was moved about 8 feet to the west of its original location. The original point fell in the middle of a gravel road (1-1.5 feet thick) that was installed in 1993. In the future, certification sampling points will not be moved without agency approval.

- In CU A1PII-S2-2a-02, four sample points (#4, #6, #14, and #15) fell on the berm of the relocated North Entrance Road. The samplers were allowed to move the samples approximately 10 to 15 feet west to a location off the berm. The boundary of the CU was modified accordingly. Figure 3-3 shows the location of the original samples and the boundary changes.

- In CU A1PII-S1-19, the CU that surrounds the trap range area, the certification boundary was modified to include the trap range building. The original design had part of the trap range building in the CU and part out of the CU. Since this CU is being characterized for reuse, modifying the CU boundary to include the entire building ensured that the entire area would be characterized. After the boundary was changed, the random sample selection process was repeated. Figure 3-4 shows this change.

- The original CDL planned to take two samples from one location at the planned culverts on the SER, which will connect the sediment basin (CU A1PII-S1-03) and the outfall area (CU A1PII-S1-01). However, the design of the basin and planned location of the culverts changed after the sampling was complete. In order to ensure that samples are located in the actual area which is being characterized for re-use, four additional samples were collected at two locations. (See Section 5.2 for further clarification.)

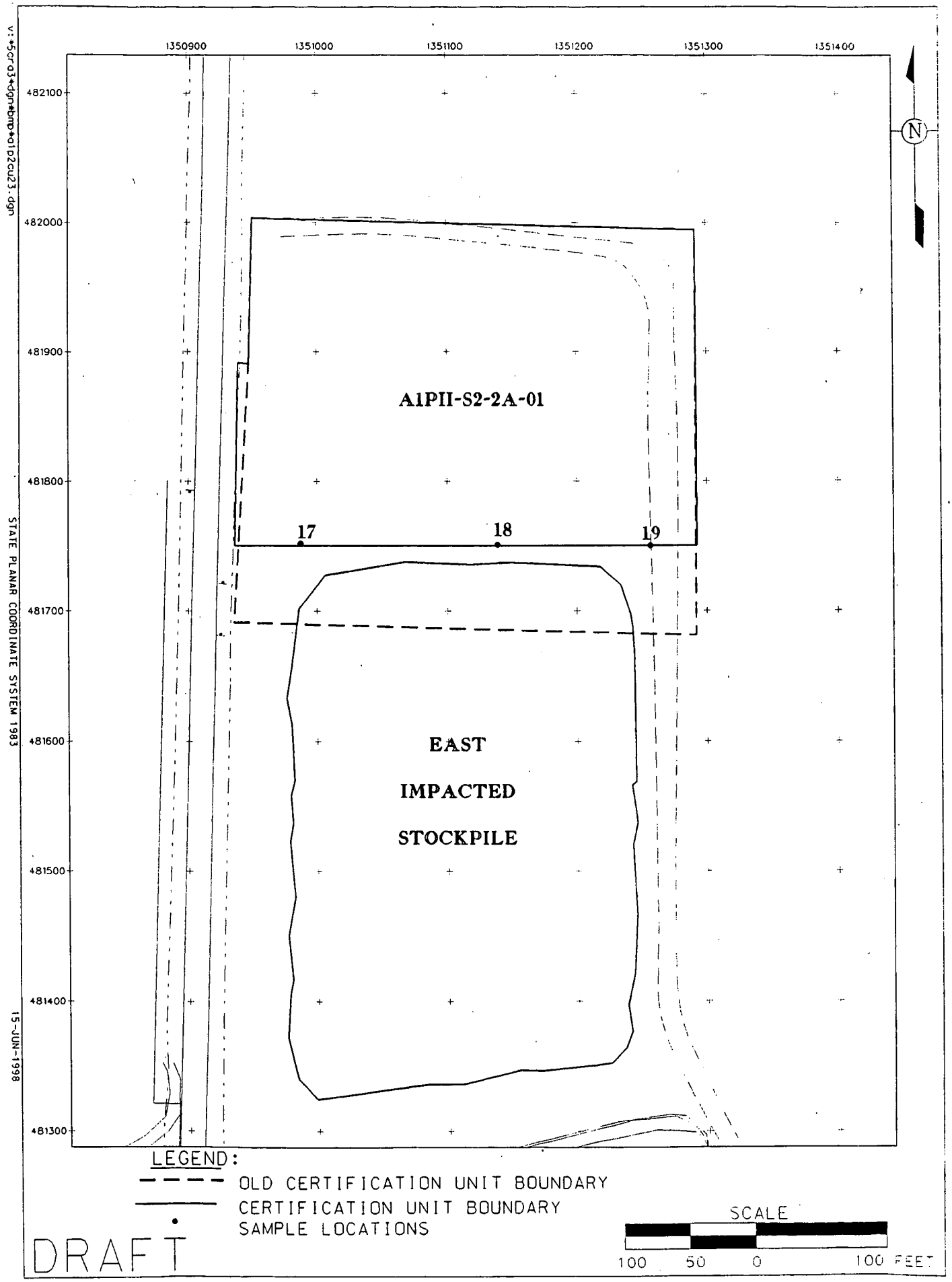

FIGURE 3-1. CERTIFICATION UNIT A1PII-S2-2A-01 BOUNDARY CHANGES

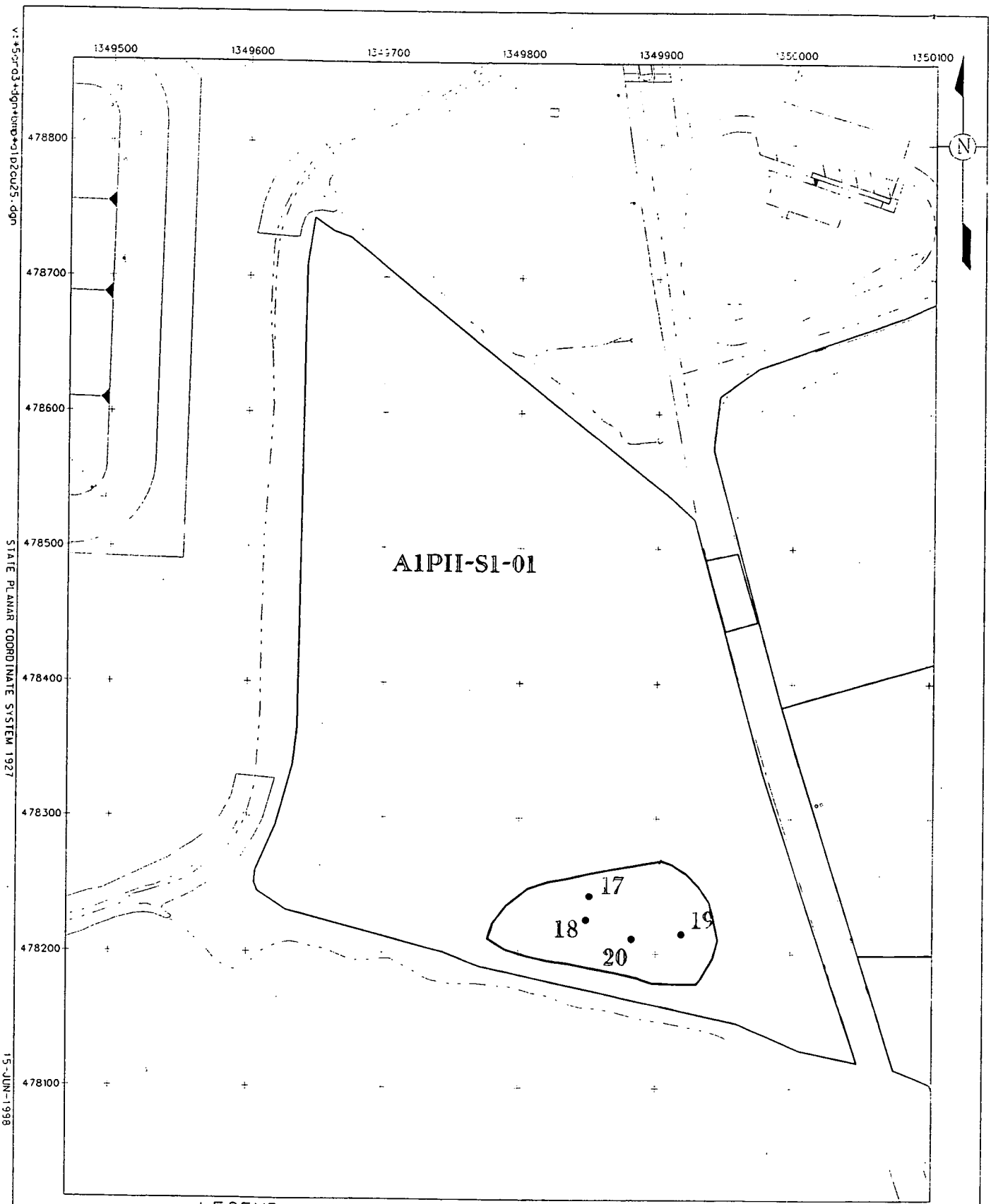

FIGURE 3-2. CERTIFICATION UNIT A1PII-S1-01 ADDITIONAL SAMPLE LOCATIONS

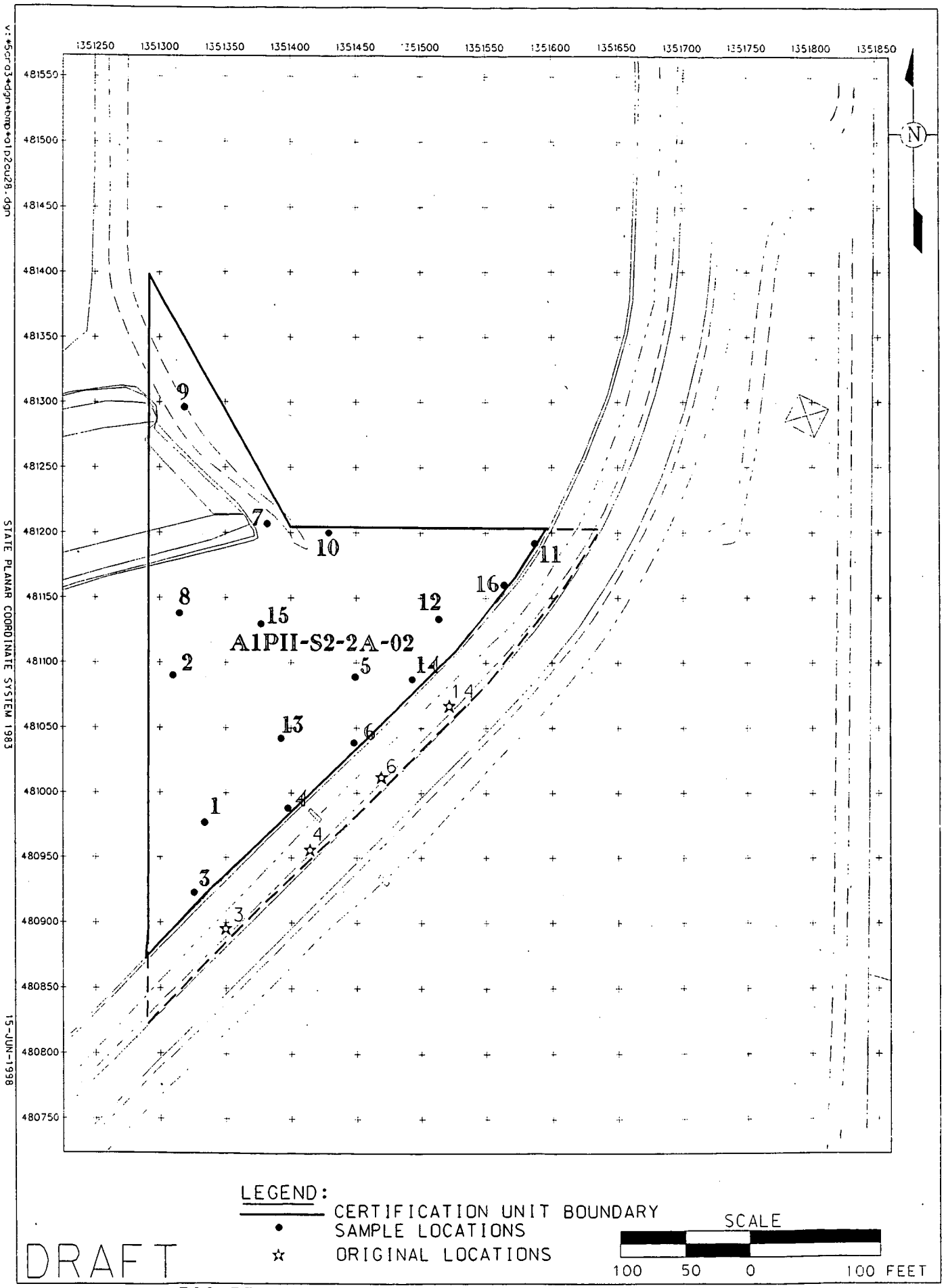

FIGURE 3-3. CERTIFICATION UNIT A1PII-S2-2A-02 SAMPLE AND BOUNDARY CHANGES

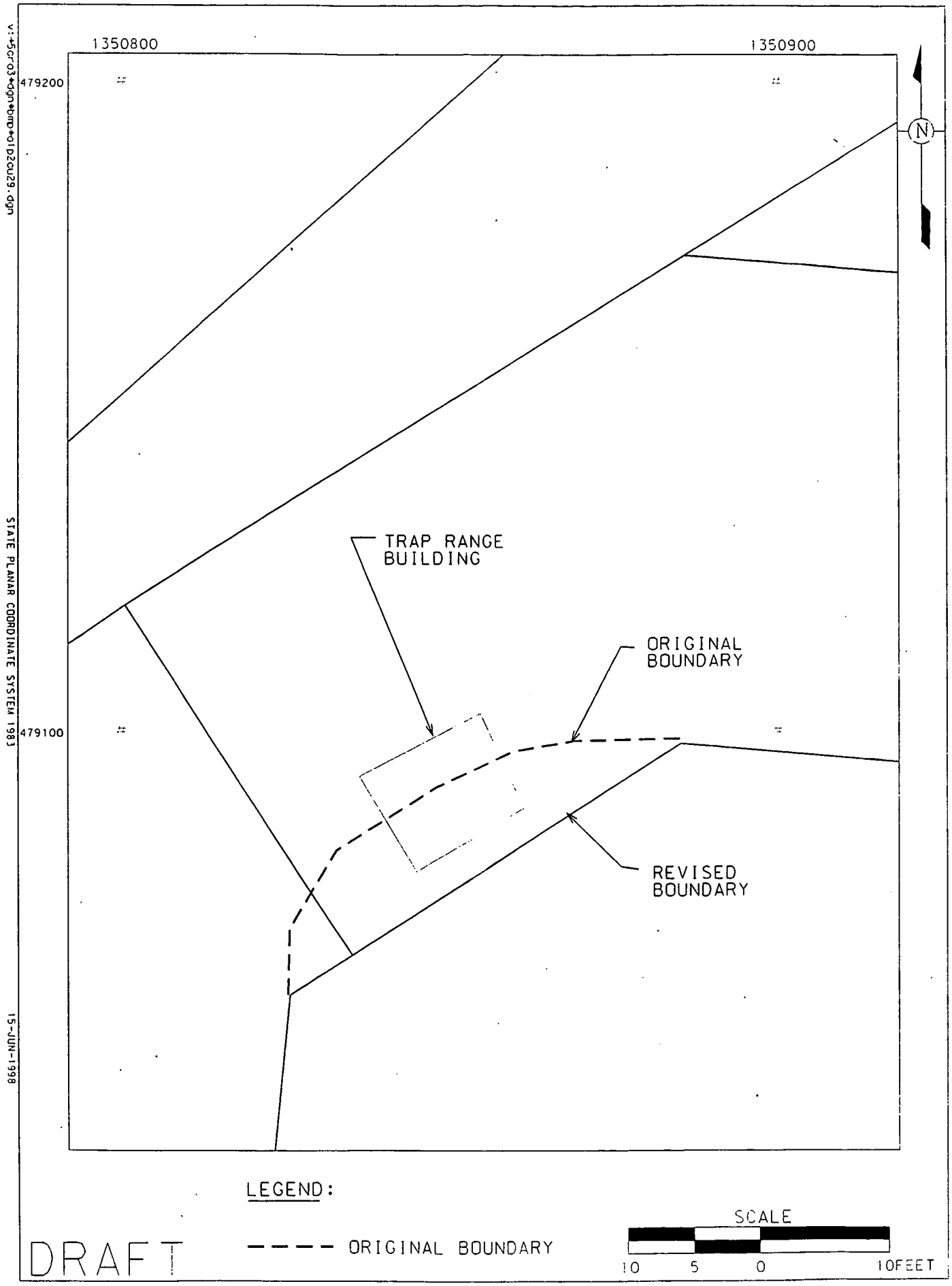

FIGURE 3-4. CERTIFICATION UNIT A1PII-S1-19 BOUNDARY CHANGES

SECTION 4.0
ANALYTICAL METHODOLOGIES, DATA VALIDATION PROCESSES, AND DATA REDUCTION

4.1 ANALYTICAL METHODOLOGIES

The A1PII samples were analyzed at laboratories on the FEMP Approved Laboratories List per the Sitewide CERCLA Quality Assurance Project Plan (SCQ). A laboratory must comply with SCQ requirements to be on the list. Furthermore, each laboratory was audited within one year of the analysis of A1PII samples. The SCQ is also the source for analytical methodologies (Appendix G), data validation and verification, and analytical and field quality assurance/quality control (QA/QC) requirements. For all the certification data, ASL D analytical requirements were selected per Appendix G of the SCQ and the laboratory reported an ASL D data package, which includes all the raw data. For the total uranium data the detection limit for was set at 10% of the FRL (8.2 ug/kg), which is higher than the detection limit in Appendix G. Therefore, by definition, the ASL detection limit for uranium is ASL E. A summary of methods follows.

4.1.1 Chemical Methods

Standard sample analytical methodologies were used. Samples were analyzed for inorganic ASCOCs using the Environmental Protection Agency (EPA)'s Contract Laboratory Program (CLP) method ILMO3.1 or ILMO4.1, depending on the specific task order requirements. Both methods are essentially the same in terms of analytical methodology; ILMO4.1 is the recently promulgated EPA method available for use by laboratories.

Samples were analyzed for polychlorinated biphenyls (PCBs) using SW-846 method 8080 or CLP method OLMO3.1, depending on specific laboratory task order requirements. Both methods are equivalent regarding analytical quality control measurement.

4.1.2 Radiochemical Methods

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

Total Uranium

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

Total Uranium (mg/kg) = (2.998544) x uranium-238 gamma spectroscopy result (pCi/g)

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

Radium 226

Samples were analyzed for radium-226 using gamma spectroscopy. This method does not require chemical separation, but the samples must be allowed a 20 day progeny ingrowth period before counting. Each off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate the results.

Radium 228

Radium-228 was also counted by gamma spectroscopy. Each off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate the results.

Isotopic Thorium

Isotopic thorium was also counted by gamma spectroscopy. Each off-site laboratory used the same gamma ray emission lines and error weighted average methodology to calculate the results.

4.2 DATA VERIFICATION AND VALIDATION

This section discusses the data verification and validation process (V&V) to examine field and laboratory data. Data were qualified to indicate the level of data usability, or level of confidence in the reported analytical results. The EPA's National Functional Guidelines for Data Review (Organic Data) and the National Functional Guidelines for Data Review (Inorganic Data) (EPA 1994), as adapted and approved by EPA Region V, were used for this process.

Specific parameters associated with the data were evaluated during V&V to determine whether or not the data quality objectives were met. Five principal quality assurance parameters, i.e., precision, accuracy, completeness, comparability, and representativeness, were addressed during V&V. Field sampling and

handling, laboratory analysis and reporting, and nonconformances and discrepancies in the data were examined to ensure compliance with appropriate and applicable procedures.

The V&V process evaluated the following parameters:

- Specific Field Forms for sample collection and handling
- Chain of Custody forms
- Completeness of Laboratory Data Deliverable

The data validation process examined the analytical data to determine the level of confidence of the results. General areas examined that apply to all the chemical data include the following:

- Holding Times
- Instrument calibrations
- Calculation of results
- Matrix spike/matrix spike duplicate recoveries
- Laboratory/field duplicate precision
- Field/Laboratory Blank contamination
- Dry weight correction for solid samples
- Correct detection limits reported
- LCS recoveries and compliance with established limits

Specific areas of evaluation for organic PCB data include:

- Gas chromatographic quality of PCB target compounds
- Surrogate recoveries
- Internal or External Standard Area evaluations for PCB data
- Relative percent difference between initial and continuing calibration response and calibration factors

Parameters unique to inorganic analyses that were evaluated include:

- Graphite furnace atomic absorption (GFAA) post-digestion spike recoveries
- Inductively coupled plasma (ICP) and GFAA performance checks

Parameters unique to the evaluation of radiochemical analyses include:

- Calibration data for specific energies
- Background checks
- Relative Error ratios
- Tracer yields
- Detector efficiencies
- Background count correction

For this project, all the radiological data were reviewed and validated for all criteria noted above. Ten percent of the radiological data were validated to validation level D. This validation included the same review process as for ASL B, but included a systematic review of the raw data and recalculations. For the metals and organic data 10% were validated to level D, and the remaining data were verified for completeness and were not validated.

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

- No qualification; the positive result or detection limit is confident as reported.

J Positive result is estimated or imprecise; data point is usable for decision-making purposes. Positive results less than the contract required reporting limit are also qualified in this manner.

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

U Undetected result at the stated limit of detection

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

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

NV Not Validated. The results for this sample were not validated.

Z This result, or detection limit in this analysis is not the best one to use; another analysis (e.g., the dilution or re-analysis) contains a more confident and usable result..

The V&V of this data set did not result in any significant impact to the data set, and only one sample was rejected. The radiological sample from location #5 in CU A1PII-S1-18 was rejected for Chain-of-Custody errors. The wrong sample label was placed on the container and shipped to the off-site laboratory before the error was discovered. The correct label was mailed to the laboratory and a non-conformance report was issued. At the time of the preparation of this report the documentation required to accept this sample was not in place, and therefore the sample was rejected. The data for this sample are presented in certification statistics in Appendix A, but not used in the calculations.

4.3 DATA REDUCTION

Each sample used to support the A1PII certification decision was entered in the FEMP Sitewide Environmental Database (SED) with the following information.

Field Information

- Sample Identification Number - A unique number assigned to each discrete sample point.
- Coordinate Information - Northing and Easting locations.
- Certification Unit - Each sample is assigned to a CU based on location.

Laboratory Information

For each sample result the following information is entered:

- Laboratory Result - The reported analytical value from the laboratory.
- Laboratory Qualifier - The qualifier reported from the lab. For inorganic and organic data these qualifiers are consistent with the CLP Qualifiers. For radiological parameters non-detect values are assigned a U qualifier.
- Total Propagated Uncertainty (TPU) - This value represents the uncertainty associated with the reported result. TPU includes the counting error, as well as uncertainty from other laboratory measurements and data reduction.(Applicable to radiological parameters only)
- Units - The units in which the Laboratory Result is reported.

Validation Information

- Validation Result - The result based on the validation process. During the validation process, sample results may be adjusted. For example, if the laboratory result is less than the associated Minimum Detectable Concentration (MDC) , the validation result becomes the MDC value.
- Validation TPU - The TPU based on the validation process.
- Validation Qualifier - The qualifier assigned as a result of the data validation process.
- Validation Units - The units in which the Validation Result is reported.

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

1. All the data for each CU was queried from SED. All the data was used even if the CU had more than the minimum required data points.

2. The data from the validation fields were used for statistics.

3. Data with a qualifier of R or Z was not used in the statistics.

4. For duplicate results the highest of the two values was used in the certification statistics.

5. One half of the non-detect (U or UJ) values were used in the statistics.

SECTION 5.0
CERTIFICATION EVALUATION AND CONCLUSIONS

5.1 CERTIFICATION RESULTS AND EVALUATION

All CUs for A1PII Sector 1, 2a and CD passed the certification criteria. The determination of successful certification or certification failure was based on a review of certification sample data from each CU against criteria discussed in Section 2.2.5. All CUs in A1PII passed final certification relative to the average concentration of COCs, and the 2 x FRL for the primary radiological ASCOCs "hot spot" determination. All CUs passed on the first round of certification, and no additional corrective actions were necessary. Final certification data are presented in Appendix A.

As part of the planned treatability study for the trap range an additional 30 samples were collected to help refine the kriging model within the trap range. These samples were analyzed for lead and arsenic, and are included in Appendix A. Figure 5-1 shows the location and results for arsenic for these additional treatability samples, results from CU A1PII-S1-19, and results from adjacent CUs A1PII-S1-06 and A1PII-S1-07. Figure 5-2 shows the same sample locations with lead results.

Although all the CUs pass certification, evaluation of the certification data set and the certification statistics showed two anomalies. Specifically, elevated results in CU A1PII-S1-19 and in CU A1PII-S3-CD. Sample #10 in CU A1PII-S1-19 showed arsenic (FRL = 12 mg/kg) and lead (FRL = 400 mg/kg) results of 37 mg/kg and 1152 mg/kg, respectively. CU A1PII-S1-19 is the characterization for re-use "doughnut" shaped CU surrounding the trap range. This CU represents the area where stormwater control ditches will be constructed during A1PII site preparation activities. As shown in the Figure 5-1 and 5-2 none of the samples within the immediate vicinity of sample #10 show any lead or arsenic results above the FRL. As discussed with the regulatory agencies, the corrective action will be to take a six inch stripping around a sixteen foot radius of sample A1PII-S1-19-10, approximately 15 cubic yards. The excavated material will be stockpiled in the trap range to be treated. Figure 5-3 shows the location of the sample, the planned stripping area, and the stockpile area in the trap range.

While CU A1PII-S3-CD pass the certification criteria, review of the data and certification statistics the show some localized contamination within the CU. As shown in Figure 5-4, the contamination is localized in two areas. The first area is the northern portion of the CU, where the total uranium results for Samples #10, #11, and #16 are 51.20 ug/g, 51.20 ug/g, and 40.70 ug/g, respectively. The second area is around Sample # 2, which is close to STP Access Road in the southern portion of the CU. The total uranium

result for this sample is 102.00 ug/g. Since the elevated values in this CU are localized, and the UCL for the CU (63.58 ug/g) exceeds the ALARA 50 ug/g goal, DOE will excavate any material up to one foot in depth above northing 479959 (midpoint from sample #11 and #12) to the northern boundary of the CU. Furthermore, a separate excavation one foot deep and extending laterally 20 foot radius will be centered around sample #2. This excavation will terminate at the STP Access Road northern edge of pavement. Additionally this one foot excavation will extend 80 feet beyond the radius in the ditch both upstream and downstream from sample #2. Its width will be from the northern edge of the STP Access Road through the centerline of the ditch and include the ditches' northern bank. The planned excavations are shown in Figure 5-4.

5.2 CHARACTERIZATION FOR RE-USE RESULTS

CUs A1PII-S3-CD, A1PII-S1-01, A1PII-S1-03, and A1PII-S1-19 are characterization for re-use CUs that will be released for site preparation construction activities, but will require re-certification at a future time.

The two other areas were characterized for re-use under the scope of this report. The first is the small area on the South Entrance Road (SER) connecting CUs A1PII-S1-01 to CU A1PII-S1-03, where culverts will be placed to connect the sediment basin (CU A1PII-S1-03) to the outfall area (CU A1PII-S1-01). Figure 5-5 shows these areas. Per the CDL the original plan was to collect two samples from one location in the area of the planned culverts. One sample would be from the road base material and one from the native soil beneath the base. The location of the original samples was selected based on the 90% design submittal. However, after sampling the area, the sediment basin design was modified and made smaller, and the location of the planned culverts was changed. The original sample locations were approximately 40 ft south of the revised location. In order to supplement these data, 4 additional samples were taken from two locations within the construction area (Figure 5-5). The results of the samples are all well below the FRLs, and the data are presented in Appendix A.

The STP Access Road (STPAR) area, where a culvert will be placed connecting the CD (CU A1PII-S3-CD) and the sediment basin (CU A1PII-S1-03), is also being characterized for reuse. Two samples were collected at this location, one from the road base material, and one from the native soil beneath the base. The samples were analyzed for the certification ASCOCs, and the results were all below the FRL. The data is presented in Appendix A.

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5.3 A1PII SECTOR 1, 2a AND CD CERTIFICATION CONCLUSIONS

All of the CUs have passed certification testing analyses relative to the determination of average residual soil concentrations within applicable confidence bounds of all the ASCOCs, and relative to the 2 x FRL for the primary radiological ASCOCs "hot spot" criterion implemented in A1PII.

Based on these results, DOE has determined that the remedial objectives in the OU5 ROD have been achieved in the areas within the scope of this report and no further remedial actions are warranted. The subject areas will be released for final land use, which includes: development of the OSDF borrow area; A1PII site preparation activities, including construction of A1PII sediment basins and conveyance ditch; construction of OSDF Cell 3 and the haul road tie-in; STP back-fill borrow area; and storm water control actions for the trap range.

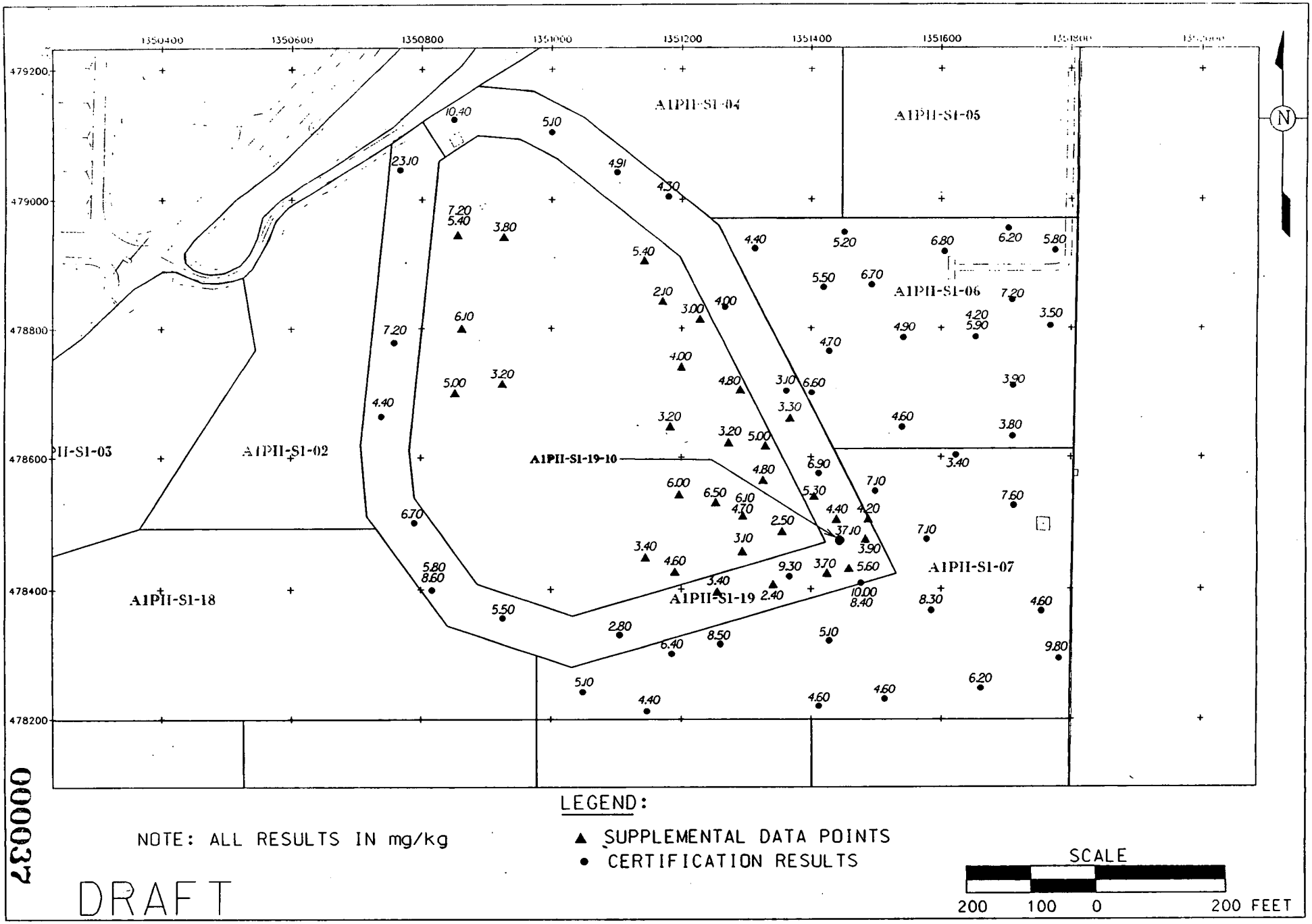

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FIGURE 5-1. ARSENIC CERTIFICATION RESULTS AND SUPPLEMENTAL DATA

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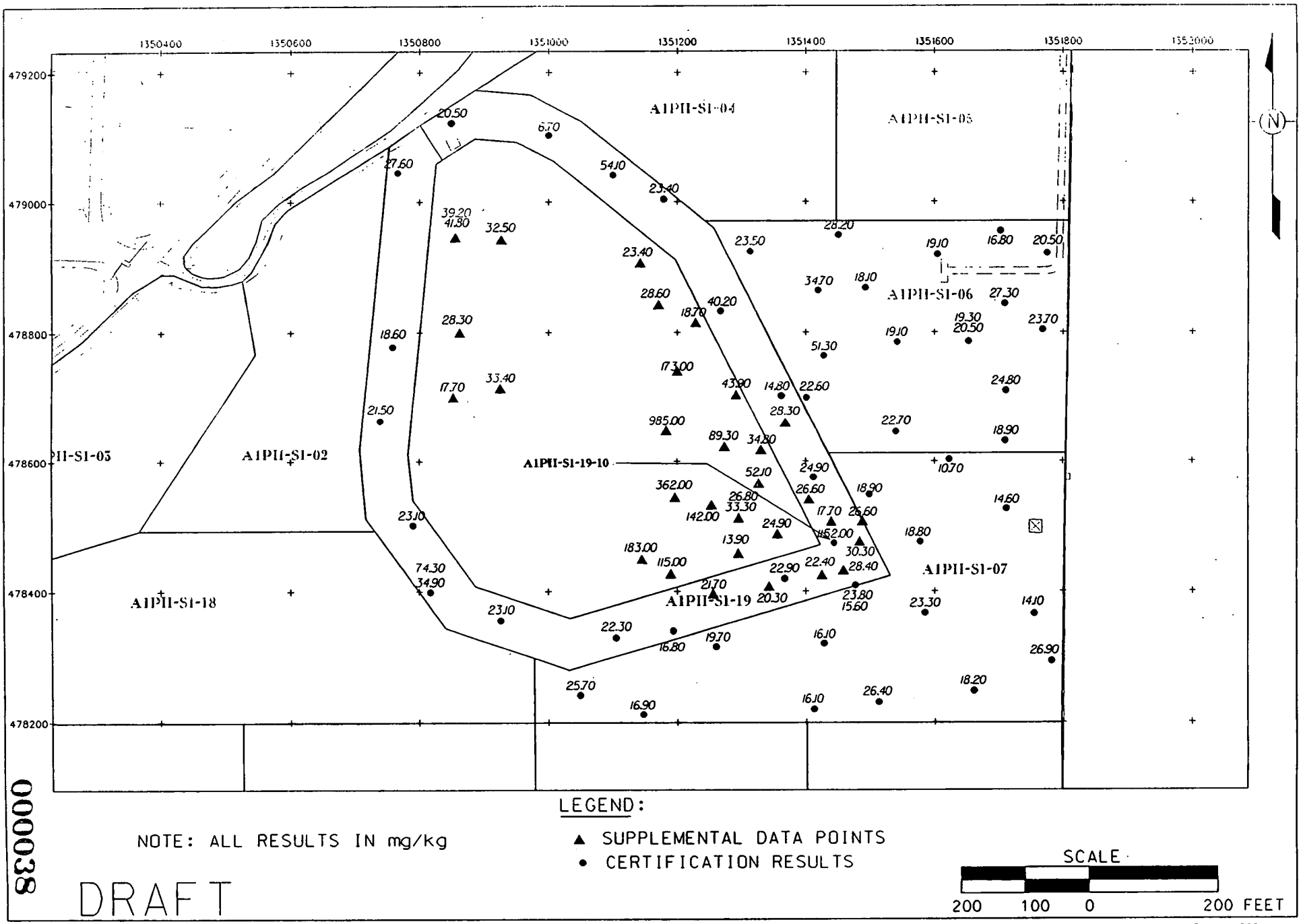

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FIGURE 5-2. LEAD CERTIFICATION RESULTS AND SUPPLEMENTAL DATA

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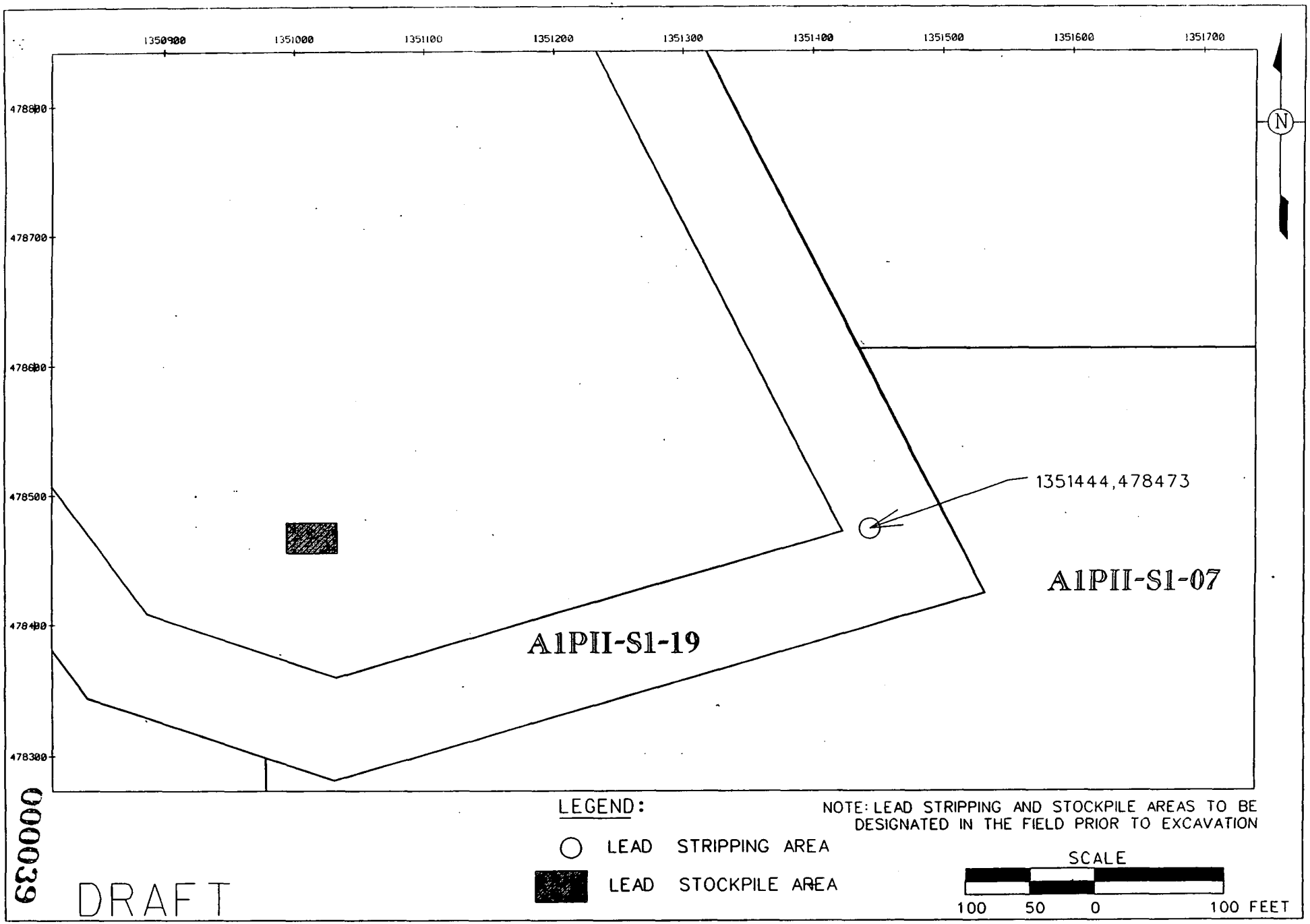

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FIGURE 5-3. PLANNED EXCAVATION AROUND SAMPLE A1PII-S1-19-10

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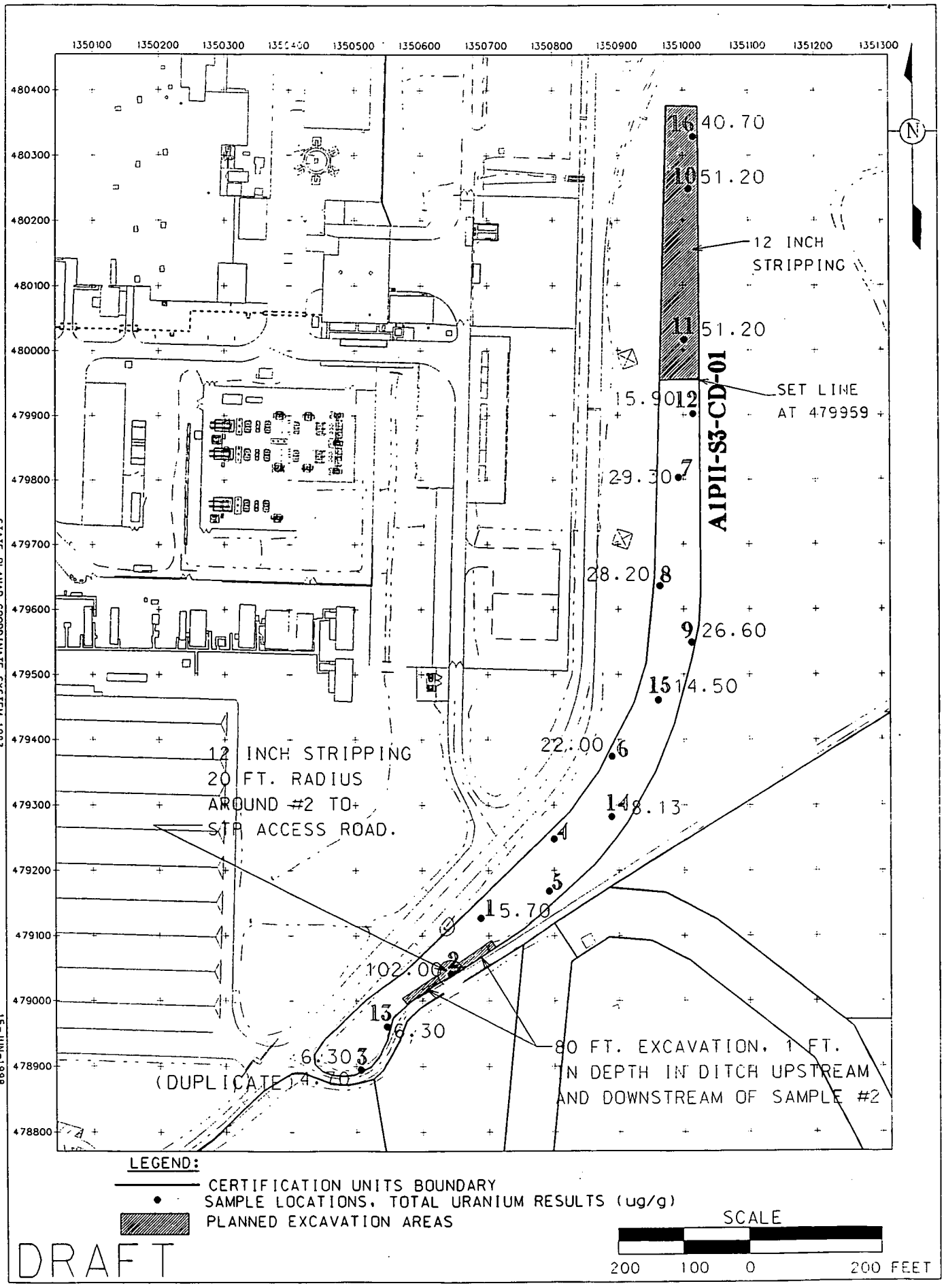

FIGURE 5-4. PLANNED EXCAVATIONS IN CU A1PII-SB-CD

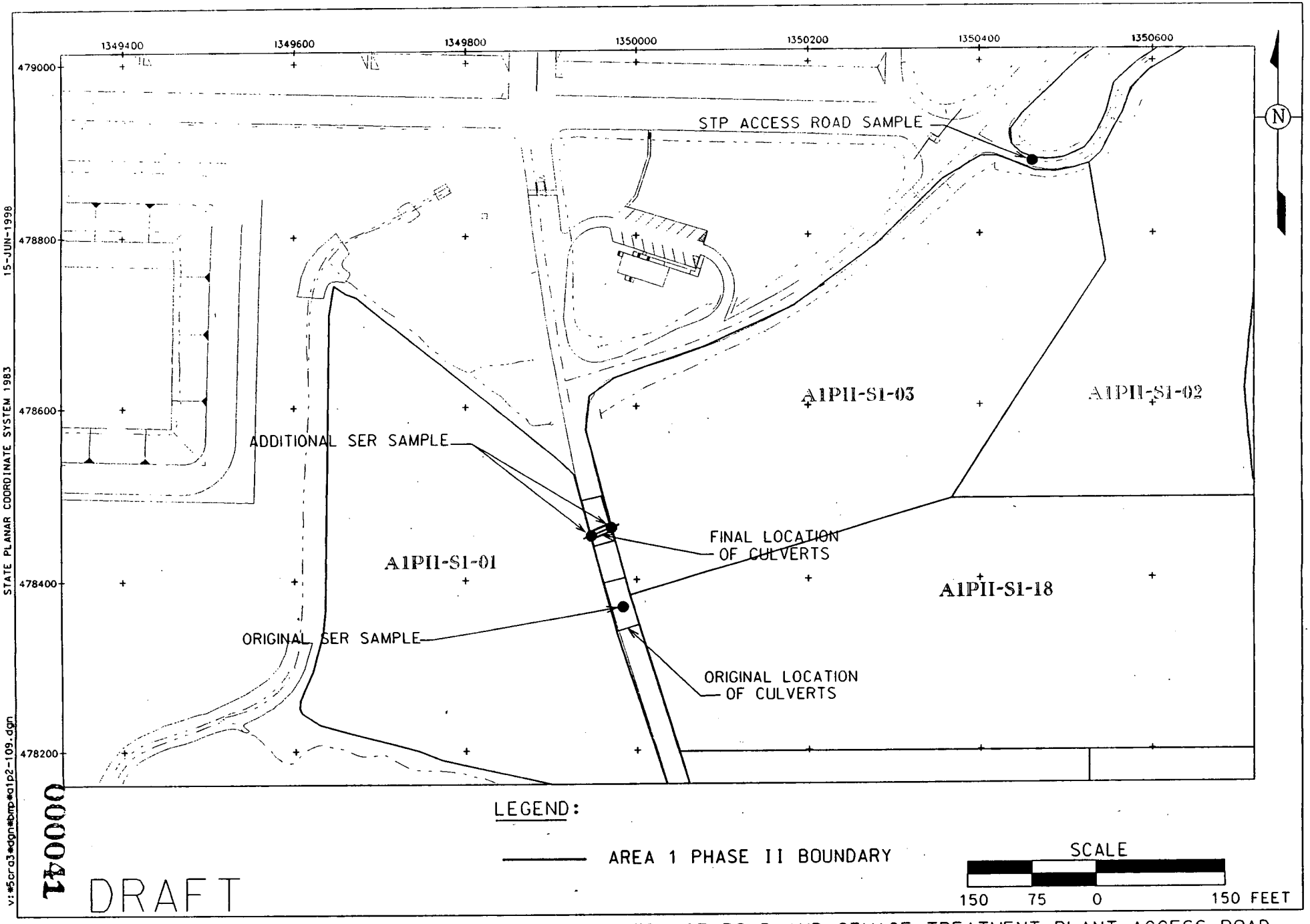

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FIGURE 5-5. LOCATION OF SAMPLES ON SOUTH ENTRANCE ROAD AND SEWAGE TREATMENT PLANT ACCESS ROAD

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SECTION 6.0
PROTECTION OF CERTIFIED AREAS

DOE has restricted access to certified areas in order to maintain their integrity prior to transferral for final land use. A FEMP procedure (EP-0008) has been developed to implement a process to protect certified areas from becoming re-contaminated.

The procedure is summarized as follows:

- At the initiation of certification sampling activities for a remediation area, temporary fencing will be installed to delineate the boundaries of the perimeter of the "certified" area.
- Signs will be posted upon the temporary perimeter fencing that require access approval for entry into the "certified" area.
- To gain access to the "certified" area, the individual(s) or project desiring admittance will submit a written request to the responsible project manager.
- Any equipment to be used within the "certified" area must have been cleaned in accordance with FEMP certified area access procedure.
- FEMP management team representatives must instruct general employees/operators on the entry and exit requirements for a "certified" area.

After DOE certifies the remediated area, it will be transferred for final land use. At that time, best management practices and administrative controls will be used to protect the area from contamination, and other controls will be implemented as needed.

As previously described, CUs A1PII-S3-CD, A1PII-S1-01, A1PII-S1-03, and A1PII-S1-19 will all require re-certification at a future time.

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APPENDIX A

CU MAPS AND STATISTICS TABLES

APPENDIX A
LIST OF FIGURES AND TABLES

APPENDIX A
LIST OF FIGURES AND TABLES - CONTINUED

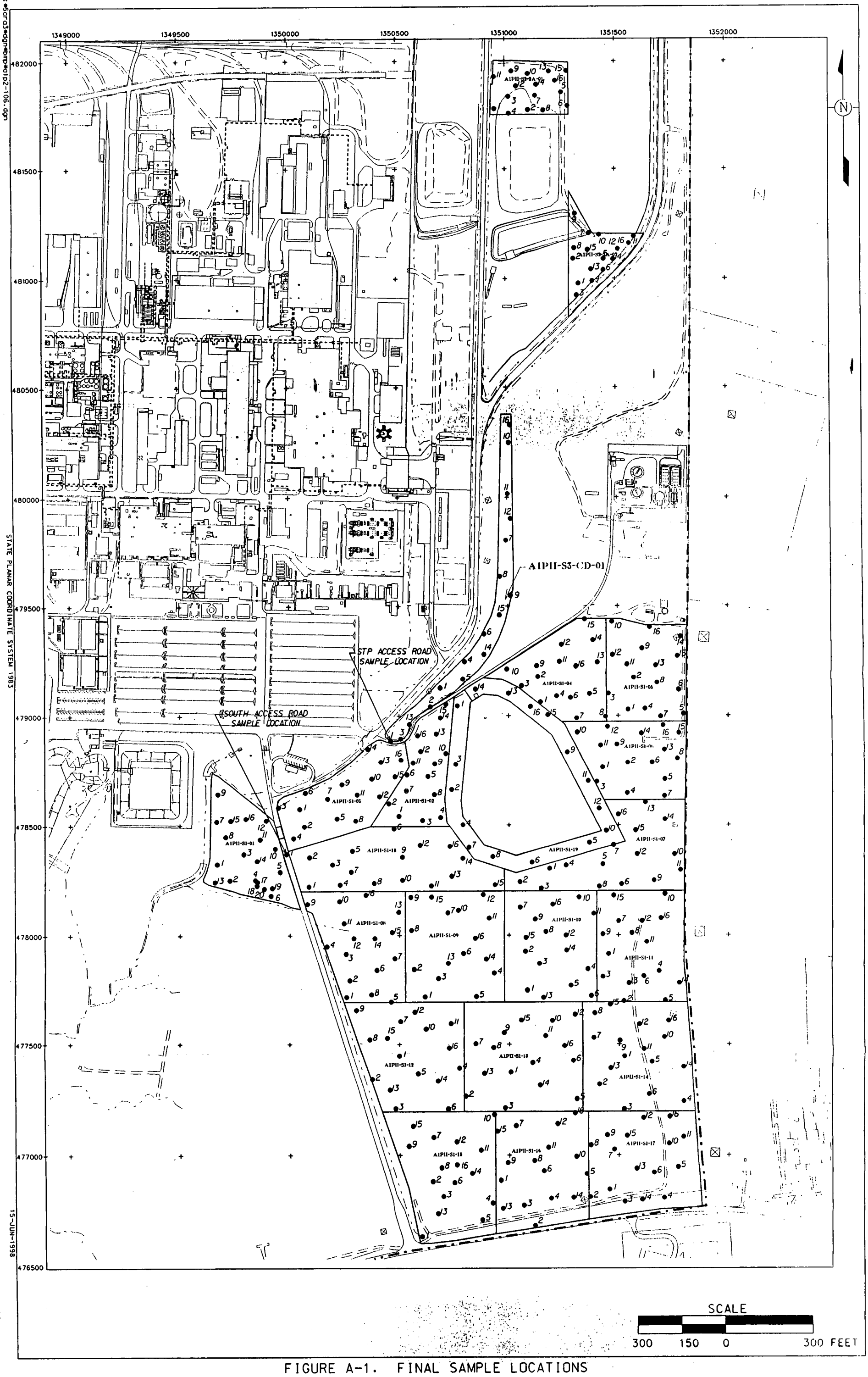

FIGURE A-1. FINAL SAMPLE LOCATIONS

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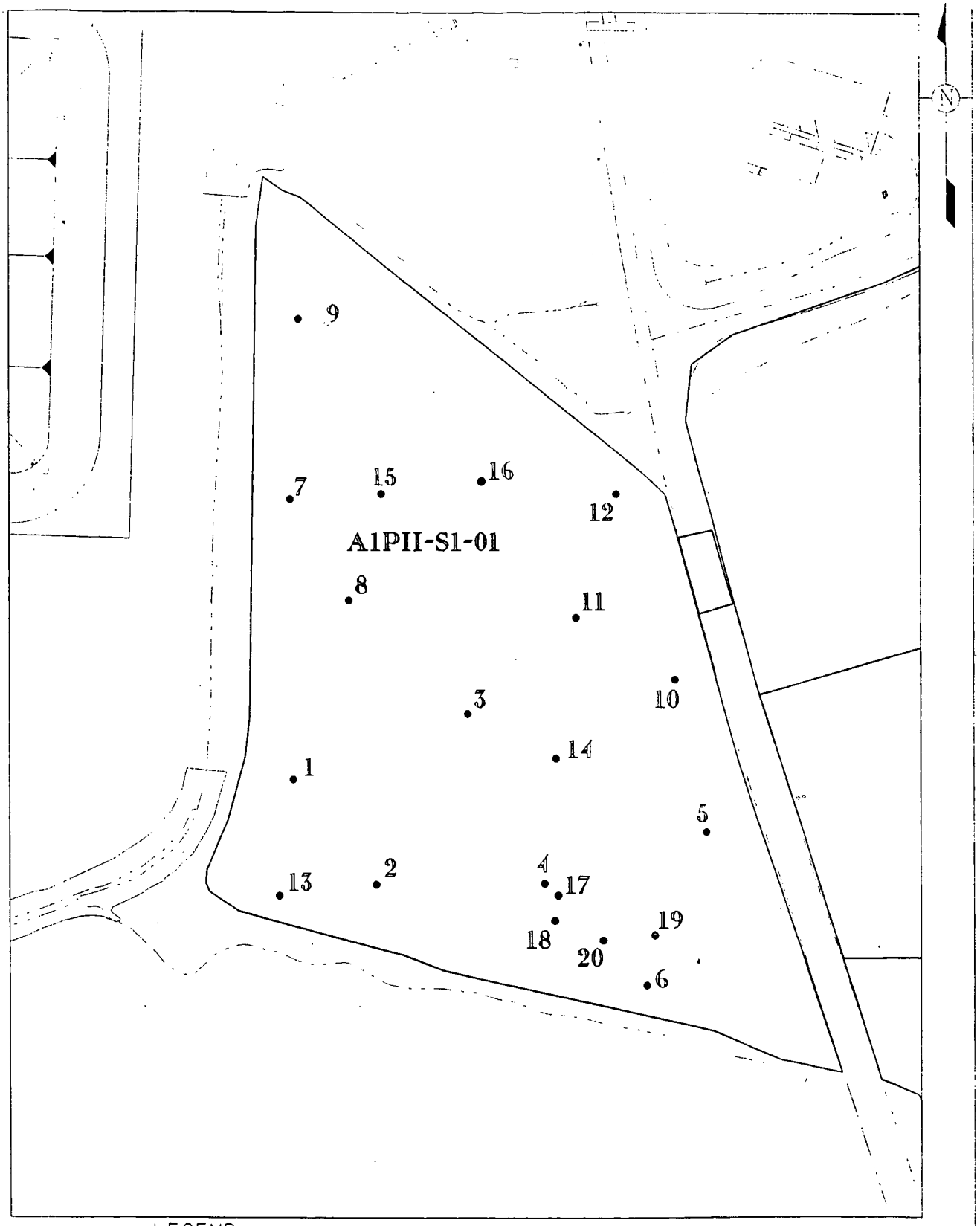

LEGEND:

——— CERTIFICATION UNIT BOUNDARY

• SAMPLE LOCATIONS

SCALE

100 50 0 100 FEET

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FIGURE A-2. CERTIFICATION UNIT A1PII-S1-01 SAMPLE LOCATIONS

Table A-2 CU A1PII-S1-01 Summary Statistics without Stockpile Samples

Area 1 Phase II Certification Statistics (original 16 samples)

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-01-01	0.96 -	0.84 -	0.84 -	0.84 -	7.40 UJ	4.40 NV
A1PII-S1-01-01-D	0.93 -	0.81 -	0.79 -	0.81 -	2.70 UJ	3.70 NV
A1PII-S1-01-02	1.05 -	0.90 -	0.83 -	0.90 -	8.90 UJ	2.20 NV
A1PII-S1-01-03	1.00 -	0.81 -	0.79 -	0.81 -	2.60 UJ	4.60 NV
A1PII-S1-01-04	1.25 -	1.08 -	1.09 -	1.08 -	6.70 UJ	4.90 NV
A1PII-S1-01-05	1.33 -	1.08 -	1.08 -	1.08 -	7.29 -	3.30 NV
A1PII-S1-01-06	0.97 -	0.89 -	0.86 -	0.89 -	7.10 UJ	6.50 NV
A1PII-S1-01-07	0.99 -	0.86 -	0.87 -	0.86 -	6.40 UJ	3.60 NV
A1PII-S1-01-08	1.40 -	1.25 -	1.23 -	1.25 -	2.90 UJ	5.10 NV
A1PII-S1-01-09	0.98 -	1.00 -	0.97 -	1.00 -	6.10 UJ	4.70 NV
A1PII-S1-01-10	1.32 -	1.13 -	1.10 -	1.13 -	17.50 -	4.40 NV
A1PII-S1-01-11	1.11 -	1.04 -	1.01 -	1.04 -	15.60 -	3.80 NV
A1PII-S1-01-12	1.26 -	1.16 -	1.13 -	1.16 -	19.00 -	4.90 NV
A1PII-S1-01-13	0.86 -	0.72 -	0.69 -	0.72 -	5.90 UJ	6.60 NV
A1PII-S1-01-14	1.33 -	1.18 -	1.17 -	1.18 -	14.60 -	4.00 NV
A1PII-S1-01-15	1.23 -	1.25 -	1.25 -	1.25 -	7.32 -	3.00 NV
A1PII-S1-01-16	1.02 -	1.08 -	1.04 -	1.08 -	10.10 -	3.00 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	14.8% (LN)	52.9% (N)	64.1% (N)	52.9% (N)	not tested	70.9% (LN)
Test Procedure	t-Test (LN)	t-Test (N)	t-Test (N)	t-Test (N)	Proportions	t-Test (LN)
Sample Size	16	16	16	16	16	16
Est. Mean*	1.13	1.02	1.00	1.02	7.31 **	4.33
UCL	1.21	1.09	1.07	1.09	- -	4.80
Prob.	- -	- -	- -	- -	0.0%	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.40 -	1.25 -	1.25 -	1.25 -	19.00 -	6.60 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	3 Pass	2 Pass	2 Pass	3 Pass	3 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Total Uranium is the average of the 10th and 11th ranked sample results. These two values are "7.29" (..-05) and "7.32" (..-15).
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

Table A-2a CU A1PII-S1-01 Summary Statistics with Stockpile Samples

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-01-01	0.96 -	0.84 -	0.84 -	0.84 -	7.40 UJ	4.40 NV
A1PII-S1-01-01-D	0.93 -	0.81 -	0.79 -	0.81 -	2.70 UJ	3.70 NV
A1PII-S1-01-02	1.05 -	0.90 -	0.83 -	0.90 -	8.90 UJ	2.20 NV
A1PII-S1-01-03	1.00 -	0.81 -	0.79 -	0.81 -	2.60 UJ	4.60 NV
A1PII-S1-01-04	1.25 -	1.08 -	1.09 -	1.08 -	6.70 UJ	4.90 NV
A1PII-S1-01-05	1.33 -	1.08 -	1.08 -	1.08 -	7.29 -	3.30 NV
A1PII-S1-01-06	0.97 -	0.89 -	0.86 -	0.89 -	7.10 UJ	6.50 NV
A1PII-S1-01-07	0.99 -	0.86 -	0.87 -	0.86 -	6.40 UJ	3.60 NV
A1PII-S1-01-08	1.40 -	1.25 -	1.23 -	1.25 -	2.90 UJ	5.10 NV
A1PII-S1-01-09	0.98 -	1.00 -	0.97 -	1.00 -	6.10 UJ	4.70 NV
A1PII-S1-01-10	1.32 -	1.13 -	1.10 -	1.13 -	17.50 -	4.40 NV
A1PII-S1-01-11	1.11 -	1.04 -	1.01 -	1.04 -	15.60 -	3.80 NV
A1PII-S1-01-12	1.26 -	1.16 -	1.13 -	1.16 -	19.00 -	4.90 NV
A1PII-S1-01-13	0.86 -	0.72 -	0.69 -	0.72 -	5.90 UJ	6.60 NV
A1PII-S1-01-14	1.33 -	1.18 -	1.17 -	1.18 -	14.60 -	4.00 NV
A1PII-S1-01-15	1.23 -	1.25 -	1.25 -	1.25 -	7.32 -	3.00 NV
A1PII-S1-01-16	1.02 -	1.08 -	1.04 -	1.08 -	10.10 -	3.00 NV
A1PII-S1-01-17	0.88 -	0.76 -	0.75 -	0.76 -	5.30 UJ	2.00 NV
A1PII-S1-01-18	1.13 -	0.94 -	0.92 -	0.94 -	11.20 -	2.30 NV
A1PII-S1-01-19	0.96 -	0.77 -	0.75 -	0.77 -	6.20 UJ	3.50 NV
A1PII-S1-01-20	0.96 -	0.82 -	0.80 -	0.82 -	5.90 UJ	3.40 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	9.7% (LN)	33.7% (LN)	43.6% (LN)	33.7% (LN)	not tested	61.8% (LN)
Test Procedure	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	Proportions	t-Test (LN)
Sample Size	20	20	20	20	20	20
Est. Mean*	1.10	0.98	0.96	0.98	7.31 **	4.03
UCL	1.17	1.05	1.03	1.05	- -	4.48
Prob.	- -	- -	- -	- -	0.0%	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.40 -	1.25 -	1.25 -	1.25 -	19.00 -	6.60 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	3 Pass	2 Pass	2 Pass	3 Pass	3 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Total Uranium is the average of the 10th and 11th ranked sample results. These two values are "7.29" (..-05) and "7.32" (..-15).
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

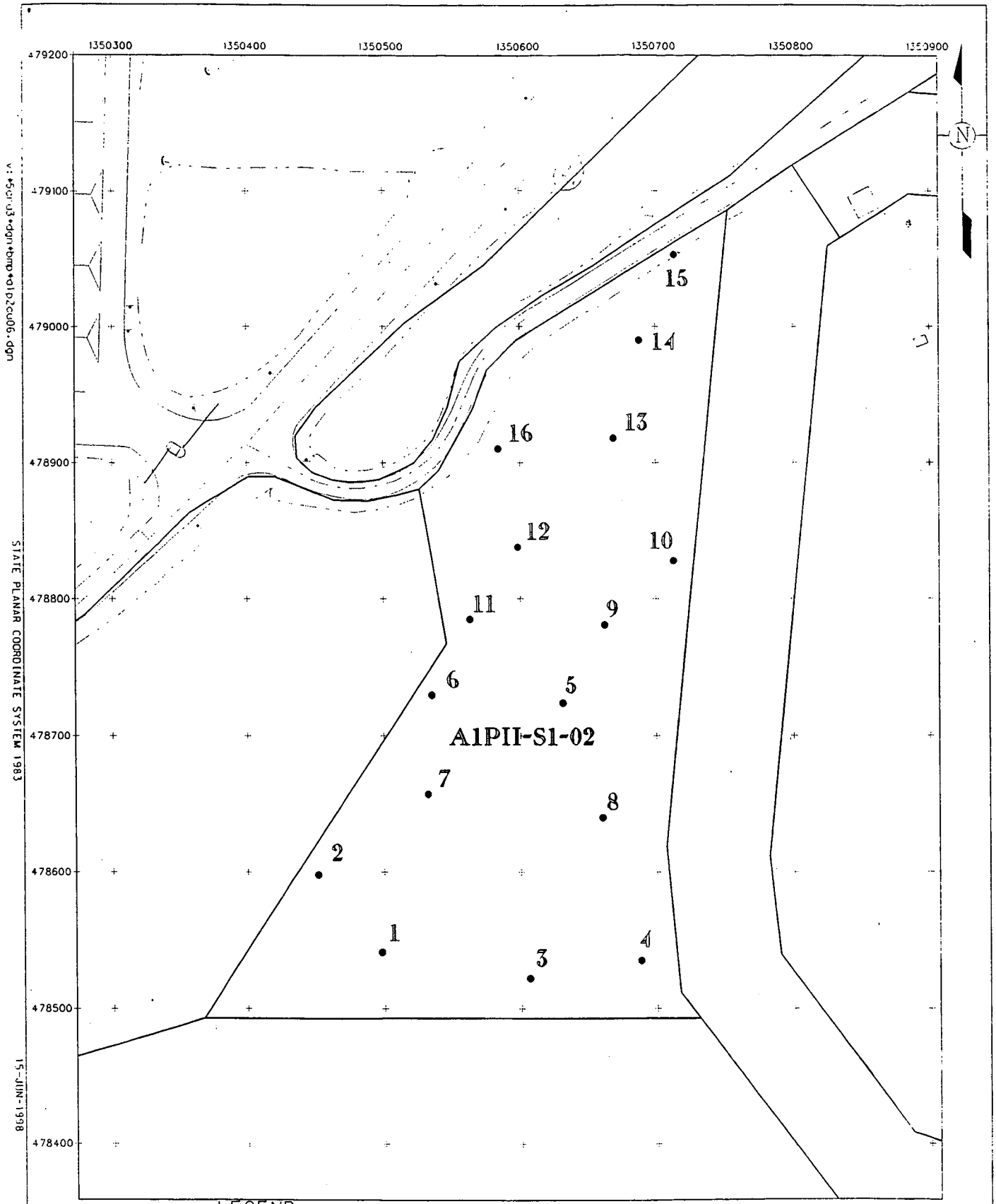


FIGURE A-3. CERTIFICATION UNIT A1PII-S1-02 SAMPLE LOCATIONS

Table A-3 CU A1PII-S1-02 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-02-01	1.40 J	1.20 -	1.20 -	1.20 -	13.96 J	3.90 NV	18.70 NV
A1PII-S1-02-02	1.30 J	1.10 -	1.10 -	1.10 -	14.27 J	6.90 NV	22.50 NV
A1PII-S1-02-02-D	1.40 J	1.10 -	1.10 -	1.10 -	7.80 J	7.70 NV	24.00 NV
A1PII-S1-02-03	1.20 J	0.87 -	0.84 -	0.87 -	14.29 J	7.20 NV	21.00 NV
A1PII-S1-02-04	1.30 J	1.10 -	1.20 -	1.10 -	6.20 J	5.30 NV	17.10 NV
A1PII-S1-02-05	1.20 J	1.10 -	1.10 -	1.10 -	16.40 J	5.40 NV	21.30 NV
A1PII-S1-02-06	1.10 J	1.10 -	1.10 -	1.10 -	14.75 J	5.30 NV	16.20 NV
A1PII-S1-02-07	1.10 J	1.20 -	1.20 -	1.20 -	6.30 J	5.90 NV	26.90 NV
A1PII-S1-02-08	1.10 J	1.00 -	1.00 -	1.00 -	10.39 J	5.20 NV	26.60 NV
A1PII-S1-02-09	1.20 J	0.98 -	1.10 -	0.98 -	16.50 J	5.30 NV	16.90 NV
A1PII-S1-02-10	1.10 J	1.00 -	1.10 -	1.00 -	26.62 J	4.60 NV	15.90 NV
A1PII-S1-02-11	1.10 J	1.00 -	1.00 -	1.00 -	8.00 J	4.90 NV	15.70 NV
A1PII-S1-02-12	1.10 J	0.86 -	0.87 -	0.86 -	6.60 J	8.70 NV	15.40 NV
A1PII-S1-02-13	1.40 J	1.30 -	1.40 -	1.30 -	2.90 J	9.30 NV	16.00 NV
A1PII-S1-02-14	1.10 J	0.98 -	1.00 -	0.98 -	5.40 J	8.40 NV	23.00 NV
A1PII-S1-02-15	1.20 J	1.10 -	1.10 -	1.10 -	10.38 J	6.90 NV	13.70 NV
A1PII-S1-02-16	1.10 J	0.98 -	0.99 -	0.98 -	3.30 J	10.60 NV	18.90 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	0.1% (LN)	39.0% (LN)	29.3% (LN)	39.0% (LN)	47.0% (LN)	47.9% (LN)	26.2% (LN)
Test Procedure	Wilcoxon	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)
Sample Size	16	16	16	16	16	16	16
Est. Mean*	1.15 **	1.05	1.08	1.05	11.32	6.55	19.22
UCL	- -	1.11	1.15	1.11	16.02	7.26	20.68
Prob.	0.019%	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.40 J	1.30 -	1.40 -	1.30 -	26.62 J	10.60 NV	26.90 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Radium-226 is the average of the 8th and 9th ranked sample results. These two values are "1.2 J" (..-03) and "1.1 J" (..-06). The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

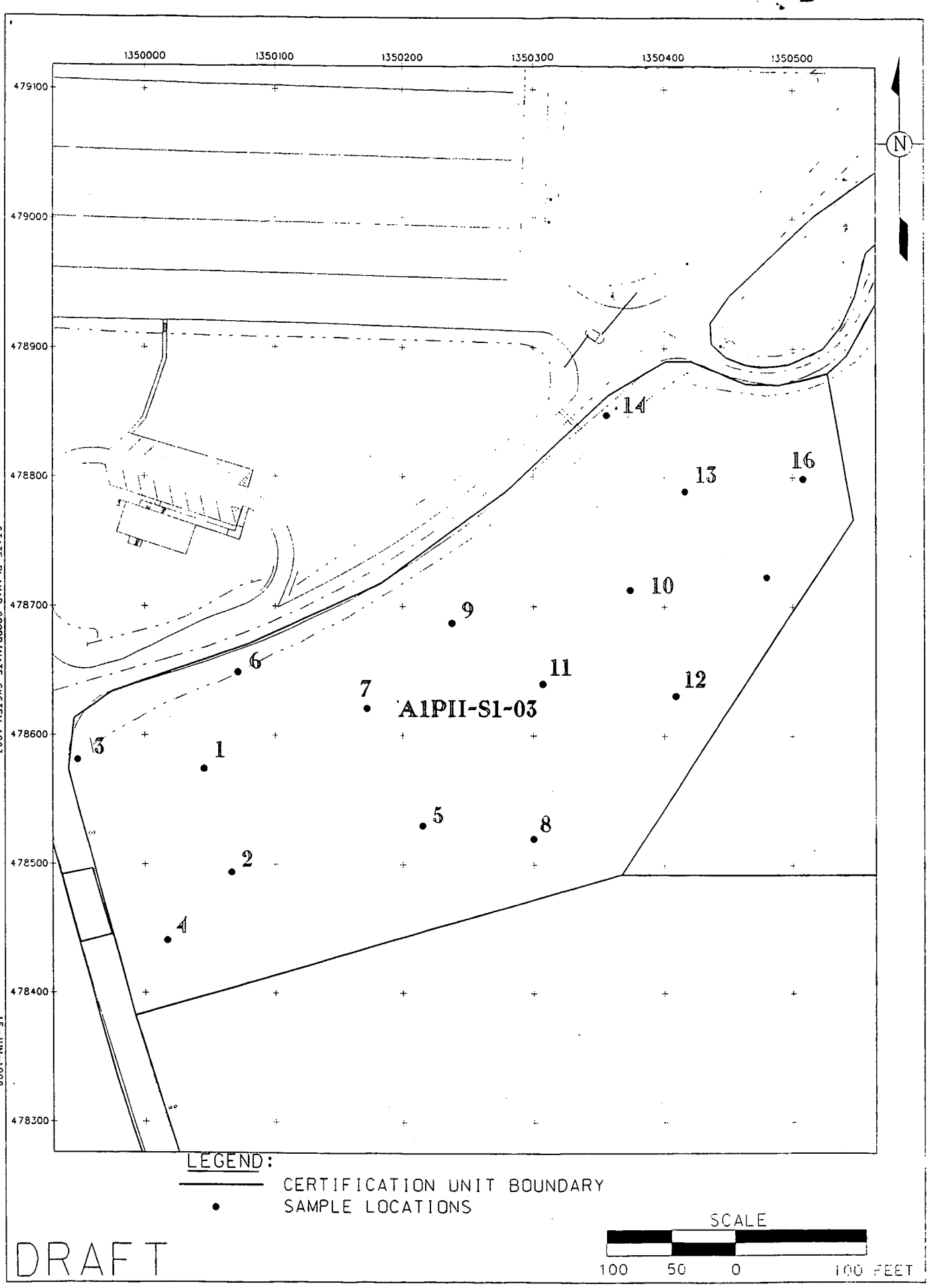


FIGURE A-4. CERTIFICATION UNIT A1PII-S1-03 SAMPLE LOCATIONS

Table A-4 CU A1PII-S1-03 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-03-01	1.28 -	1.06 J	1.08 J	1.06 J	14.30 J	7.30 NV
A1PII-S1-03-02	1.17 -	1.02 J	1.09 J	1.02 J	12.73 J	5.60 NV
A1PII-S1-03-03**	0.47 -	0.29 J	0.30 J	0.29 J	0.78 UJ	2.90 NV
A1PII-S1-03-03-D*	0.52 -	0.19 J	0.18 J	0.19 J	1.64 UJ	2.30 NV
A1PII-S1-03-04	1.22 -	1.05 J	1.04 J	1.05 J	8.61 J	5.60 NV
A1PII-S1-03-05	1.24 -	1.14 J	1.16 J	1.14 J	11.78 J	4.90 NV
A1PII-S1-03-06	1.22 -	1.07 J	1.08 J	1.07 J	10.02 J	6.20 NV
A1PII-S1-03-07	1.19 -	1.19 J	1.27 J	1.19 J	6.05 J	4.90 NV
A1PII-S1-03-08	1.34 -	1.21 J	1.19 J	1.21 J	19.42 J	7.10 NV
A1PII-S1-03-09	1.14 -	1.06 J	1.07 J	1.06 J	17.17 J	9.40 NV
A1PII-S1-03-10	1.28 -	1.23 J	1.36 J	1.23 J	8.51 J	6.90 NV
A1PII-S1-03-11	1.27 -	1.04 J	1.02 J	1.04 J	12.11 J	7.10 NV
A1PII-S1-03-12	1.35 -	1.17 J	1.19 J	1.17 J	14.98 J	7.10 NV
A1PII-S1-03-13	1.19 -	1.02 J	1.04 J	1.02 J	2.55 J	7.70 NV
A1PII-S1-03-14	1.45 -	1.22 J	1.22 J	1.22 J	3.56 J	6.20 NV
A1PII-S1-03-15	1.14 -	1.07 J	1.09 J	1.07 J	17.66 J	6.20 NV
A1PII-S1-03-16	1.25 -	0.99 J	0.99 J	0.99 J	7.12 J	5.00 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	62.9% (LN)	11.4% (LN)	34.5% (LN)	11.4% (LN)	90.9% (N)	43.0% (LN)
Test Procedure	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (N)	t-Test (LN)
Sample Size	16	16	16	16	16	16
Est. Mean*	1.21	1.07	1.10	1.07	10.46	6.29
UCL	1.35	1.27	1.30	1.27	12.90	6.92
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.45 -	1.23 J	1.36 J	1.23 J	19.42 J	9.40 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	4 Pass	4 Pass	5 Pass	7 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valida

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - Sample was omitted from distribution testing (radionuclides only) because with the relatively small sample sizes for determining distribution a single very low value can improperly cause a failure of the Shapiro-Wilk test for normality (and lognormality).
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

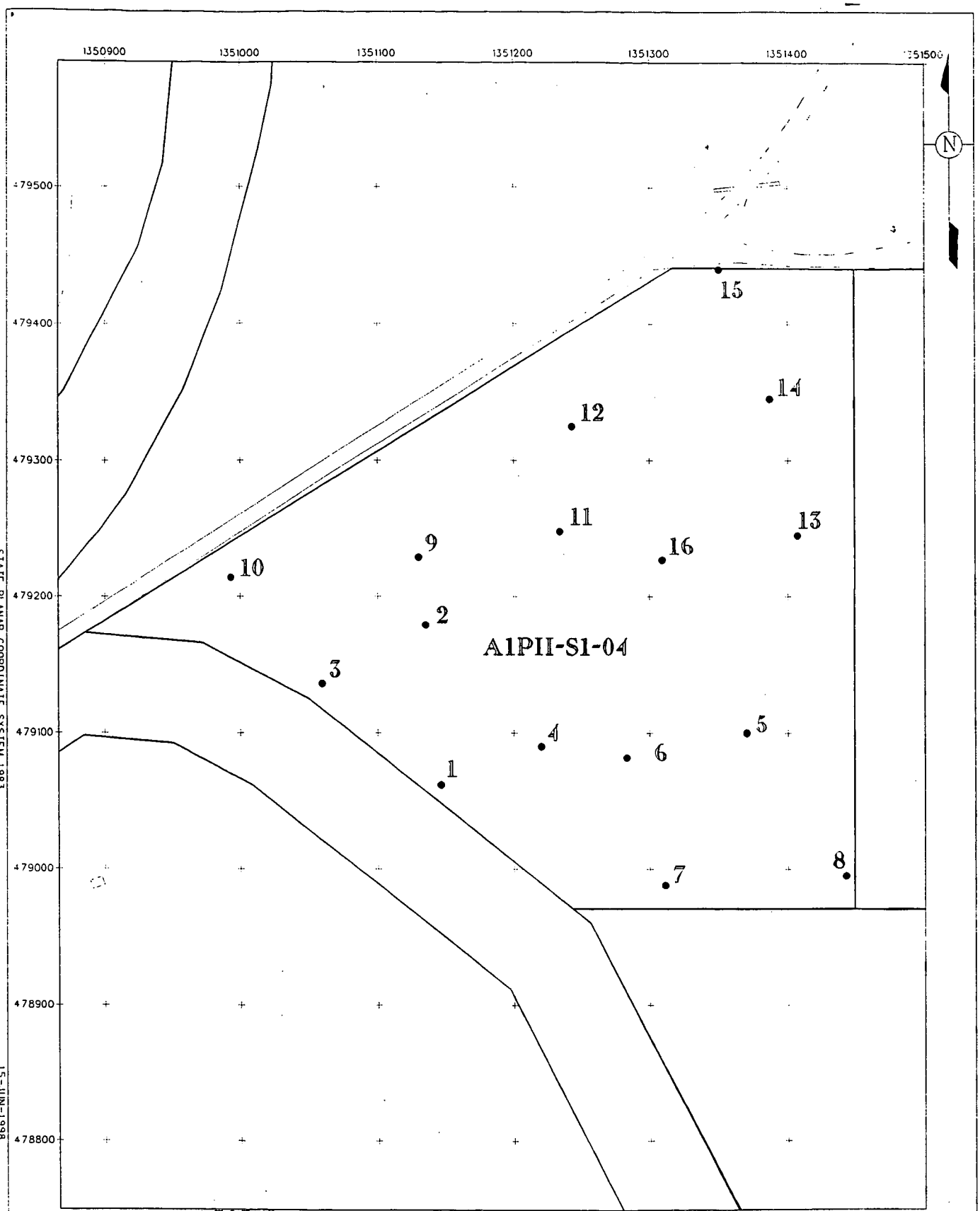


FIGURE A-5. CERTIFICATION UNIT A1PII-S1-04 SAMPLE LOCATIONS

Table A-5 CU A1PII-S1-04 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-04-01	1.18 -	1.12 -	1.10 -	1.12 -	19.20 -	3.20 NV	20.00 NV
A1PII-S1-04-02**	1.24 -	1.10 -	1.07 -	1.10 -	22.50 -	7.80 NV	2.60 NV
A1PII-S1-04-03	1.20 -	1.19 -	1.17 -	1.19 -	27.80 -	6.00 NV	20.60 NV
A1PII-S1-04-04	1.07 -	0.99 -	0.96 -	0.99 -	12.10 -	6.80 NV	32.70 NV
A1PII-S1-04-04-D	1.08 -	1.01 -	1.01 -	1.01 -	11.10 -	5.10 NV	24.00 NV
A1PII-S1-04-05	1.18 -	1.17 -	1.16 -	1.17 -	17.30 -	4.50 NV	26.00 NV
A1PII-S1-04-06	1.15 -	1.08 -	1.06 -	1.08 -	15.20 -	6.20 NV	25.20 NV
A1PII-S1-04-07	1.02 -	1.05 -	1.02 -	1.05 -	10.60 -	5.20 NV	27.50 NV
A1PII-S1-04-08	1.29 -	1.29 -	1.31 -	1.29 -	21.40 -	4.20 NV	26.30 NV
A1PII-S1-04-09	1.05 -	1.02 -	1.01 -	1.02 -	9.47 -	6.40 NV	30.00 NV
A1PII-S1-04-10	1.31 -	1.27 -	1.26 -	1.27 -	13.00 -	7.10 NV	33.00 NV
A1PII-S1-04-11	1.14 -	1.10 -	1.07 -	1.11 -	21.10 -	6.90 NV	26.00 NV
A1PII-S1-04-12	1.10 -	1.08 -	1.04 -	1.08 -	12.30 -	9.10 NV	25.80 NV
A1PII-S1-04-13***	0.58 J	0.44 -	0.43 -	0.44 -	4.80 UJ	4.80 NV	20.00 NV
A1PII-S1-04-14	1.06 -	1.03 -	1.02 -	1.03 -	19.00 -	6.90 NV	16.70 NV
A1PII-S1-04-15	1.24 -	1.18 -	1.16 -	1.18 -	29.40 -	7.90 NV	33.30 NV
A1PII-S1-04-16	1.32 -	1.19 -	1.17 -	1.19 -	11.50 -	5.80 NV	24.00 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	64.5% (LN)	46.9% (LN)	10.6% (LN)	51.7% (LN)	58.5% (LN)	99.1% (N)	43.2% (N)
Test Procedure	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (N)	t-Test (N)
Sample Size	16	16	16	16	16	16	16
Est. Mean*	1.14	1.09	1.07	1.09	17.38	6.18	24.36
UCL	1.24	1.23	1.21	1.23	24.13	6.69	26.90
Prob.	- -	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.32 -	1.29 -	1.31 -	1.29 -	29.40 -	9.10 NV	33.30 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -
a posteriori Sample Size calculation	3 Pass	3 Pass	3 Pass	5 Pass	3 Pass	2 Pass	1 Pass

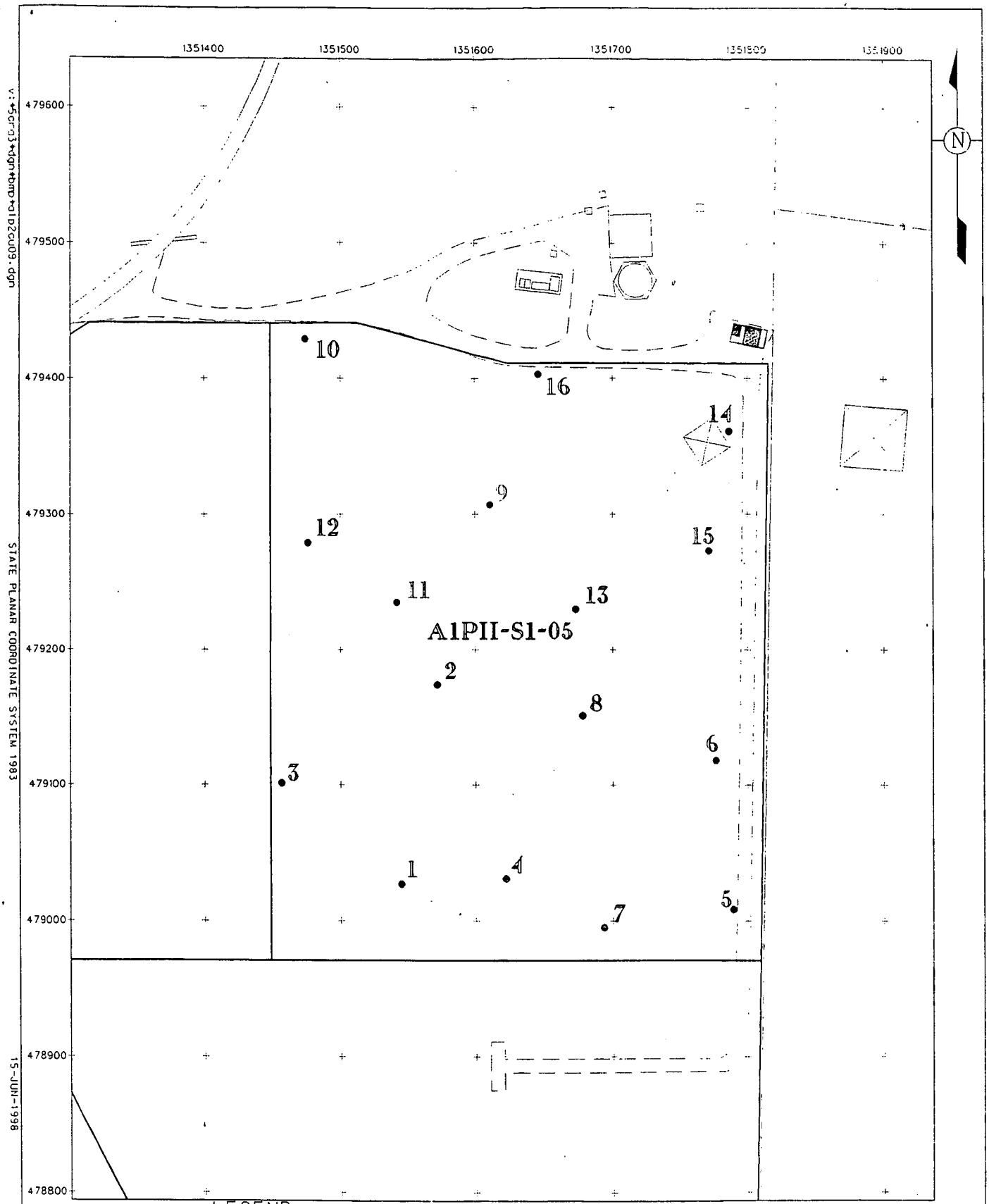
Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

/* - Sample was omitted from distribution testing (** lead / *** radionuclides only) because with the relatively small sample sizes for determining distribution a single very low value can improperly cause a failure of the Shapiro-Wilk test for normality (and lognormality).
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected



LEGEND:

CERTIFICATION UNIT BOUNDARY

SAMPLE LOCATIONS

SCALE

100 50 0 100 FEET

DRAFT

FIGURE A-6. CERTIFICATION UNIT A1PII-S1-05 SAMPLE LOCATIONS

Table A-6 CU A1PII-S1-05 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-05-01	1.10 -	0.97 -	1.00 -	0.97 -	4.60 J	5.50 NV
A1PII-S1-05-02	1.10 -	0.97 -	1.00 -	0.97 -	3.20 J	6.20 NV
A1PII-S1-05-03	1.20 -	0.76 -	0.76 -	0.76 -	10.36 J	5.90 NV
A1PII-S1-05-04	1.00 -	0.89 -	0.90 -	0.89 -	7.10 J	5.00 NV
A1PII-S1-05-05	1.00 -	0.89 -	0.90 -	0.89 -	10.27 J	3.20 NV
A1PII-S1-05-05-D	1.00 -	0.80 -	0.86 -	0.80 -	11.59 J	5.20 NV
A1PII-S1-05-06	1.40 -	1.10 -	1.10 -	1.10 -	10.70 J	17.10 NV
A1PII-S1-05-07	1.20 -	1.10 -	1.20 -	1.10 -	4.60 J	5.70 NV
A1PII-S1-05-08	0.98 -	0.89 -	0.91 -	0.89 -	5.80 J	6.40 NV
A1PII-S1-05-09	1.20 -	0.99 -	1.00 -	0.99 -	15.00 J	4.10 NV
A1PII-S1-05-10	1.30 -	1.20 -	1.40 -	1.20 -	2.80 J	7.10 NV
A1PII-S1-05-11	0.96 -	0.89 -	0.96 -	0.89 -	5.80 J	5.80 NV
A1PII-S1-05-12	1.00 -	0.75 -	0.74 -	0.75 -	15.00 J	9.20 NV
A1PII-S1-05-13	0.97 -	0.77 -	0.74 -	0.77 -	10.00 J	17.50 NV
A1PII-S1-05-14	0.95 -	0.87 -	0.94 -	0.87 -	3.00 J	6.50 NV
A1PII-S1-05-15	1.20 -	1.00 -	1.00 -	1.00 -	10.83 J	4.60 NV
A1PII-S1-05-16	1.20 -	1.20 -	1.20 -	1.20 -	2.75 J	10.10 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	7.4% (LN)	35.1% (LN)	41.7% (LN)	35.1% (LN)	11.6% (LN)	1.1% (LN)
Test Procedure	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	Median
Sample Size	16	16	16	16	16	16
Est. Mean*	1.11	0.95	0.99	0.95	7.87	6.05 **
UCL	1.17	1.02	1.07	1.02	11.03	7.10
Prob.	--	--	--	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.40 -	1.20 -	1.40 -	1.20 -	15.00 J	17.50 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	7 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Arsenic is the average of the 8th and 9th ranked sample results. These two values are "5.9 NV" (..-03) and "6.2 NV" (..-02). The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

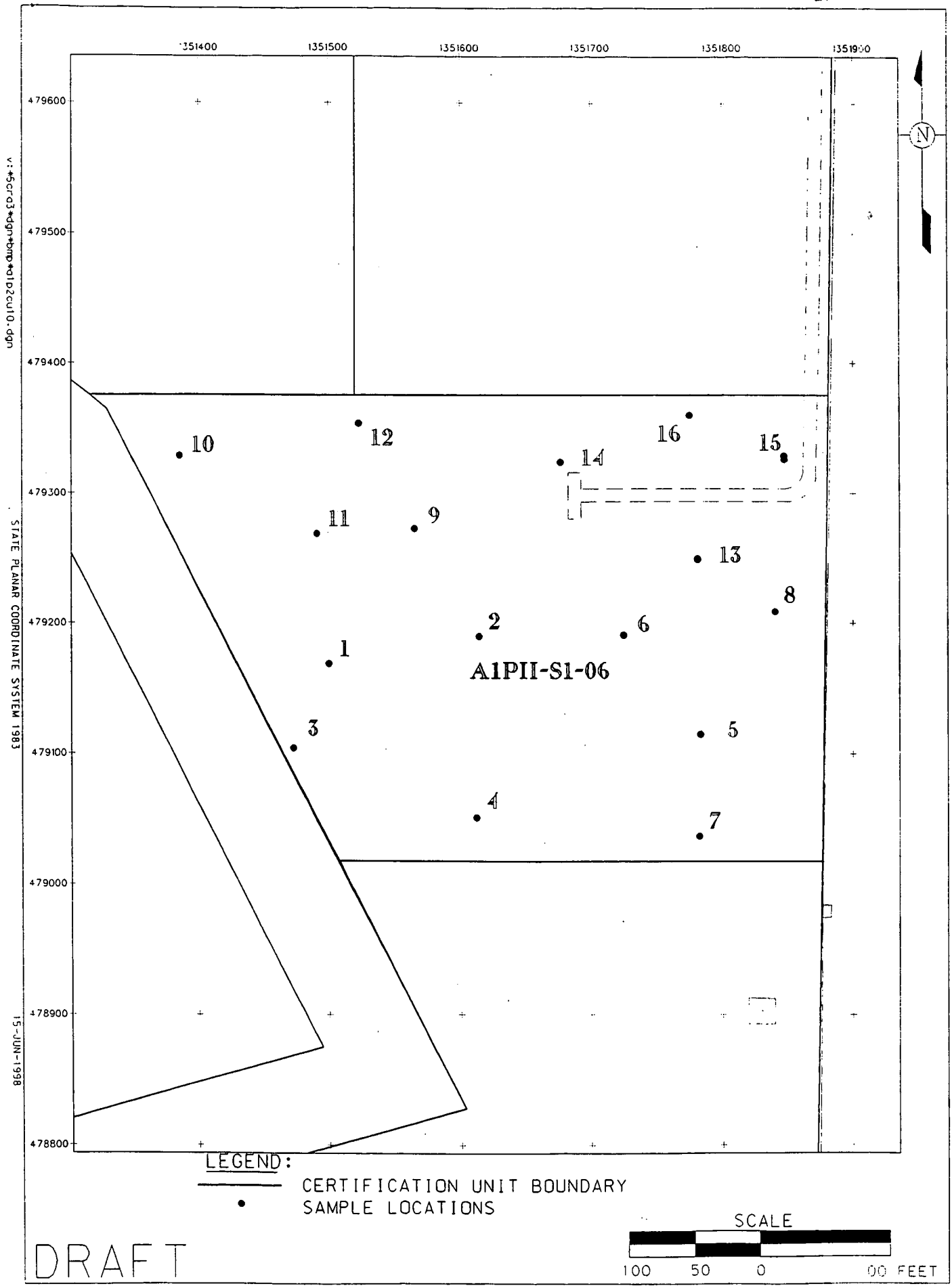


FIGURE A-7. CERTIFICATION UNIT A1PII-S1-06 SAMPLE LOCATIONS

Table A-7 CU A1PII-S1-06 Summary Statistics

Area 1 Phase II Certification Statistics

	RADIONUCLIDES					METALS	
Station Number	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-06-01	1.35 -	1.19 -	1.15 -	1.18 -	12.90 -	4.70 NV	51.30 NV
A1PII-S1-06-02	1.17 -	1.12 -	1.11 -	1.12 -	12.50 -	4.90 NV	19.10 NV
A1PII-S1-06-03	1.29 -	1.25 -	1.22 -	1.25 -	12.00 -	6.60 NV	22.60 NV
A1PII-S1-06-04	1.12 -	1.13 -	1.15 -	1.13 -	14.30 -	4.60 NV	22.70 NV
A1PII-S1-06-05	1.05 -	1.00 -	1.01 -	1.00 -	7.35 -	3.90 NV	24.80 NV
A1PII-S1-06-06	1.12 -	1.13 -	1.12 -	1.13 -	13.60 -	5.90 NV	20.50 NV
A1PII-S1-06-06-D	1.21 -	1.03 -	1.04 -	1.03 -	13.00 -	4.20 NV	19.30 NV
A1PII-S1-06-07	1.04 -	0.98 -	0.97 -	0.98 -	10.30 -	3.80 NV	18.90 NV
A1PII-S1-06-08	1.14 -	1.06 -	1.04 -	1.06 -	14.90 -	3.50 NV	23.70 NV
A1PII-S1-06-09	1.11 -	1.07 -	1.05 -	1.07 -	9.50 -	6.70 NV	18.10 NV
A1PII-S1-06-10	1.20 -	0.90 -	0.88 -	0.90 -	11.50 -	4.40 NV	23.50 NV
A1PII-S1-06-11	1.07 -	1.09 -	1.08 -	1.09 -	11.00 -	5.50 NV	34.70 NV
A1PII-S1-06-12	1.42 -	1.22 -	1.24 -	1.22 -	11.60 -	5.20 NV	28.20 NV
A1PII-S1-06-13	1.17 -	1.10 -	1.10 -	1.10 -	11.70 -	7.20 NV	27.30 NV
A1PII-S1-06-14	1.24 -	1.22 -	1.21 -	1.22 -	15.30 -	6.80 NV	19.10 NV
A1PII-S1-06-15	1.22 -	1.15 -	1.15 -	1.15 -	20.20 -	5.80 NV	20.50 NV
A1PII-S1-06-16	1.12 -	1.02 -	1.01 -	1.02 -	9.30 UJ	6.20 NV	16.80 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	68.9% (LN)	88.8% (N)	83.0% (N)	90.7% (N)	58.1% (N)	65.1% (N)	2.4% (LN)
Test Procedure	t-Test (LN)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	Median
Sample Size	16	16	16	16	16	16	16
Est. Mean*	1.18	1.10	1.09	1.10	12.08	5.36	22.65 **
UCL	1.23	1.14	1.14	1.14	13.61	5.75	24.80
Prob.	--	--	--	--	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.42 -	1.25 -	1.24 -	1.25 -	20.20 -	7.20 NV	51.30 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--	--
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	1 Pass	2 Pass

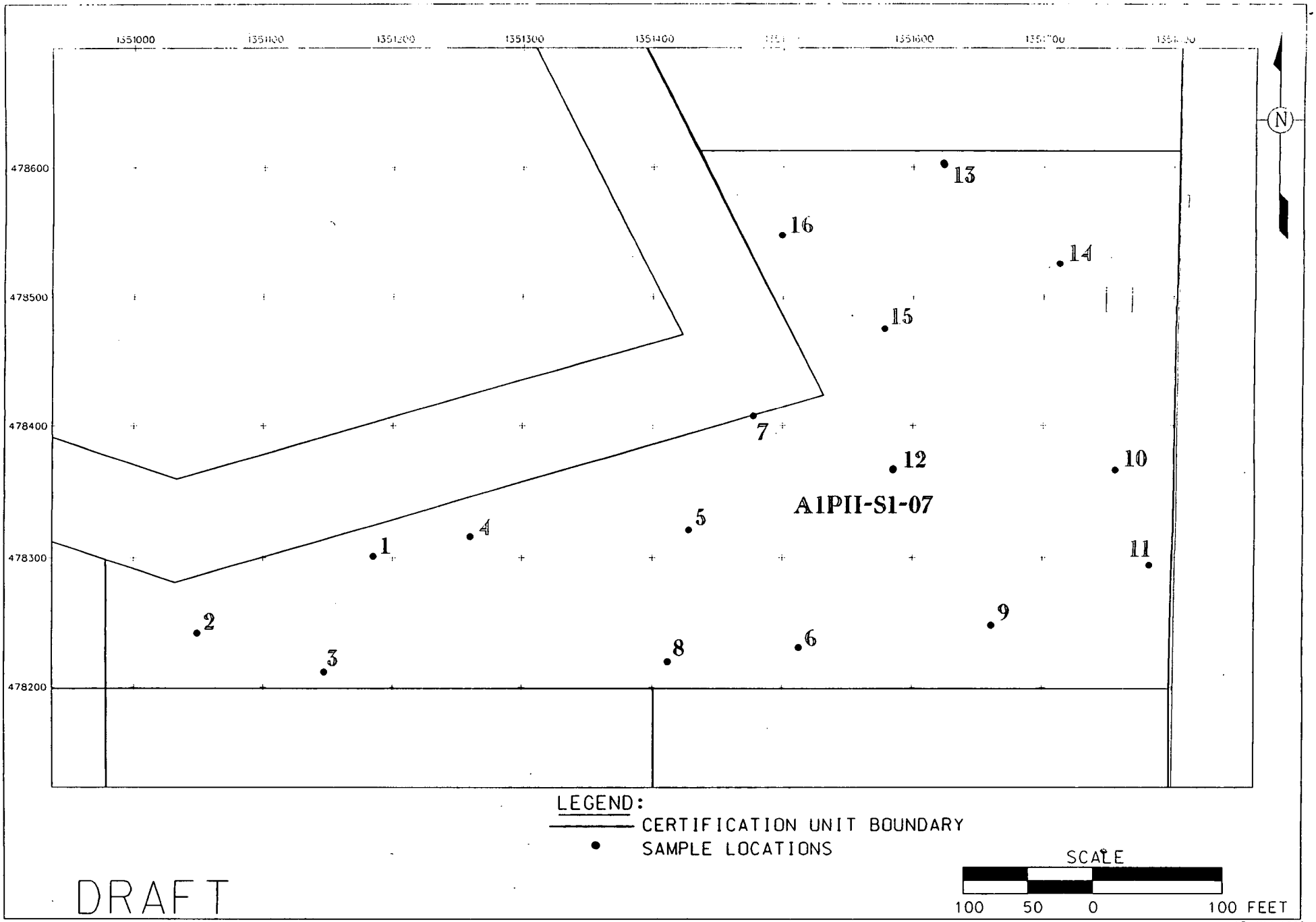
Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Lead is the average of the 8th and 9th ranked sample results. These two values are "22.6 NV" (..-03) and "22.7 NV" (..-04). The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected



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STATE PLANAR COORDINATE SYSTEM 1983

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FIGURE A-8. CERTIFICATON UNIT A1PII-S1-07 SAMPLE LOCATIONS

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Table A-8 CU A1PII-S1-07 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-07-01	1.10 -	1.10 -	1.10 -	1.10 -	10.20 J	6.40 -	16.80 -
A1PII-S1-07-02	1.20 -	1.10 -	1.00 -	1.10 -	6.60 J	5.10 -	25.70 -
A1PII-S1-07-03	1.20 -	1.10 -	1.10 -	1.10 -	11.00 J	4.40 J	16.90 -
A1PII-S1-07-04	1.20 -	1.10 -	1.20 -	1.20 -	11.90 J	8.50 -	19.70 -
A1PII-S1-07-05	1.30 -	1.24 -	1.33 -	1.24 -	5.15 J	5.10 -	16.10 U
A1PII-S1-07-06	1.10 -	1.10 -	1.10 -	1.10 -	10.18 J	4.60 -	26.40 -
A1PII-S1-07-07	1.40 -	1.20 -	1.20 -	1.20 -	7.40 J	10.00 -	23.80 -
A1PII-S1-07-07-D	1.40 -	1.10 -	1.20 -	1.20 -	9.80 J	8.40 -	15.60 U
A1PII-S1-07-08	1.30 -	1.10 -	1.10 -	1.20 -	4.90 J	4.60 -	16.10 U
A1PII-S1-07-09	1.10 -	1.00 -	1.10 -	1.10 -	5.40 J	6.20 -	18.20 -
A1PII-S1-07-10	1.20 -	1.10 -	1.20 -	1.20 -	6.20 J	4.60 -	14.10 U
A1PII-S1-07-11	1.10 -	1.00 -	1.00 -	1.00 -	9.10 J	9.80 J	26.90 -
A1PII-S1-07-12	1.80 -	1.60 -	1.70 -	1.70 -	6.00 J	8.30 -	23.30 -
A1PII-S1-07-13	1.40 -	1.20 -	1.20 -	1.20 -	8.00 J	3.40 -	10.70 UJ
A1PII-S1-07-14	1.30 -	1.10 -	1.10 -	1.20 -	7.00 J	7.60 -	14.60 UJ
A1PII-S1-07-15	1.20 -	1.20 -	1.20 -	1.20 -	10.00 J	7.10 J	18.80 J
A1PII-S1-07-16	1.40 -	1.10 -	1.10 -	1.10 -	8.80 J	7.10 J	18.90 J
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	1.4% (LN)	0.0% (LN)	0.1% (LN)	0.0% (LN)	30.1% (N)	54.1% (LN)	not tested
Test Procedure	Median	Median	Median	Median	t-Test (N)	t-Test (LN)	Proportions
Sample Size	16	16	16	16	16	16	16
Est. Mean*	1.20	1.10	1.10	1.20	8.14	6.45	18.50 **
UCL	1.30	1.20	1.20	1.20	9.13	7.25	19.48
Prob.	- -	- -	- -	- -	- -	- -	0.009%
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.80 -	1.60 -	1.70 -	1.70 -	11.90 J	10.00 -	26.90 -
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -
a posteriori Sample Size calculation	6 Pass	3 Pass	6 Pass	6 Pass	2 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not vali

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Lead is the average of the 8th and 9th ranked sample results. These two values are "18.2 -" (..-09) and "18.8 J" (..-15). The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

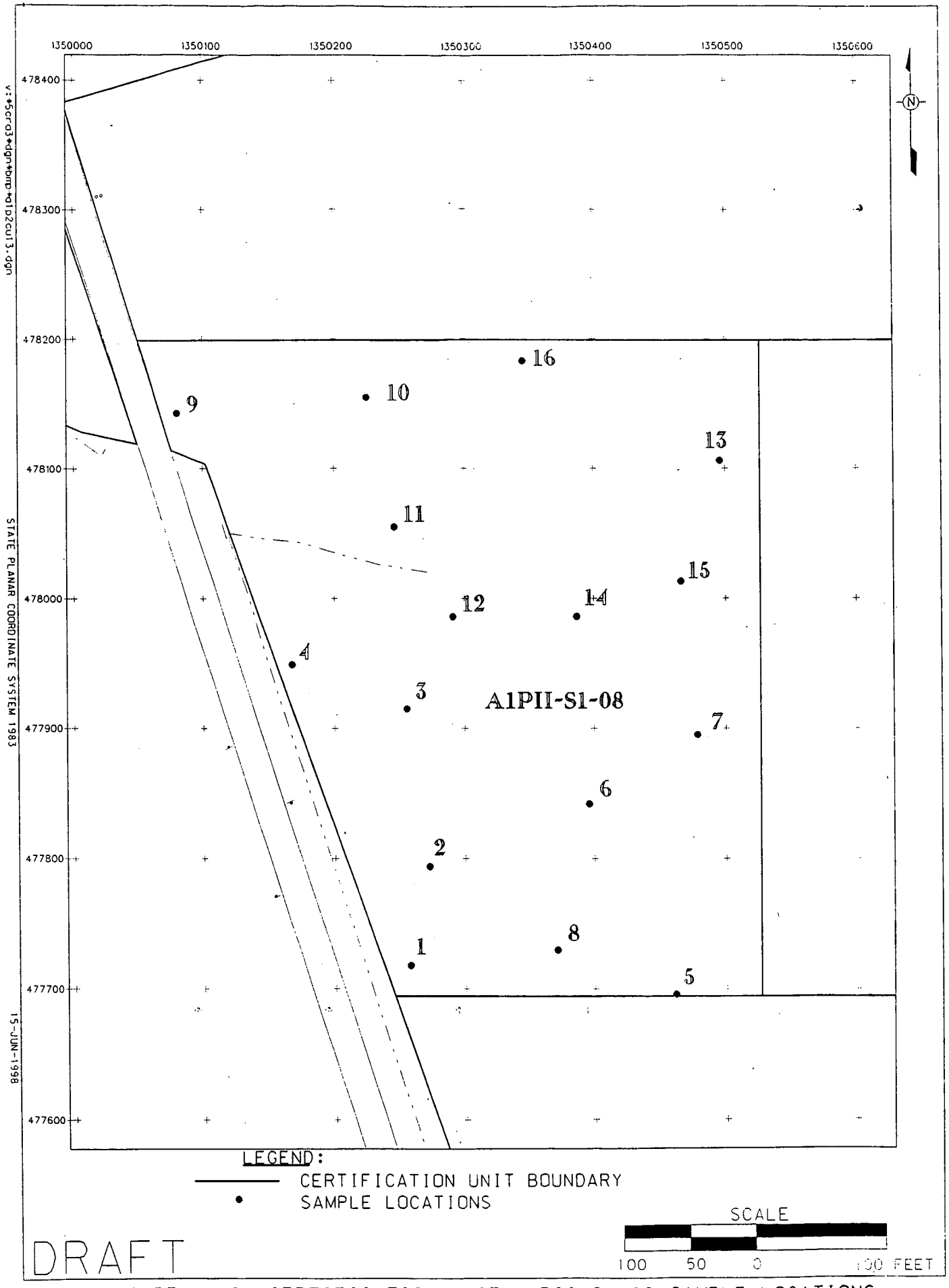

FIGURE A-9. CERTIFICATION UNIT A1PII-S1-08 SAMPLE LOCATIONS

Table A-9 CU A1PII-S1-08 Summary Statistics

Area 1 Phase 2 Characterization for Reuse Statistics

	RADIONUCLIDES					METALS
Station Number	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-08-01	1.18 -	1.22 -	1.24 -	1.22 -	12.65 J	4.70 NV
A1PII-S1-08-02	1.13 -	0.89 -	0.87 -	0.89 -	8.12 J	3.50 NV
A1PII-S1-08-03	1.17 -	1.09 -	1.16 -	1.09 -	6.77 J	4.10 NV
A1PII-S1-08-04	1.11 -	0.89 -	0.91 -	0.89 -	9.13 J	3.70 NV
A1PII-S1-08-05	1.15 -	1.06 -	1.10 -	1.06 -	4.16 J	4.30 NV
A1PII-S1-08-06	1.22 -	1.12 -	1.13 -	1.12 -	8.69 J	3.90 NV
A1PII-S1-08-07	1.17 -	1.06 -	1.11 -	1.06 -	8.56 J	2.40 NV
A1PII-S1-08-08	1.23 -	1.16 -	1.23 -	1.57 -	5.88 J	4.50 NV
A1PII-S1-08-08-D	1.30 -	1.12 -	1.23 -	1.12 -	8.68 J	4.70 NV
A1PII-S1-08-09	1.16 -	0.95 -	0.93 -	0.95 -	10.73 J	6.10 NV
A1PII-S1-08-10	1.06 -	0.86 -	0.86 -	0.86 -	12.16 J	7.60 NV
A1PII-S1-08-11	1.19 -	1.01 -	1.01 -	1.01 -	3.49 J	9.40 NV
A1PII-S1-08-12	1.05 -	0.99 -	1.00 -	0.99 -	7.71 J	2.60 NV
A1PII-S1-08-13	1.15 -	1.07 -	1.12 -	1.07 -	10.36 J	6.10 NV
A1PII-S1-08-14	1.02 -	0.87 -	0.86 -	0.87 -	2.69 J	6.00 NV
A1PII-S1-08-15	0.98 -	0.82 -	0.83 -	0.82 -	5.60 J	6.10 NV
A1PII-S1-08-16	1.09 -	1.01 -	1.05 -	1.01 -	14.92 J	2.70 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	85.8% (N)	71.9% (N)	26.1% (N)	9.5% (LN)	91.7% (N)	77.4% (LN)
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (N)	t-Test (LN)
Sample Size	16	16	16	16	16	16
Est. Mean*	1.13	1.00	1.03	1.03	8.40	4.89
UCL	1.17	1.05	1.08	1.11	9.88	5.66
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.30 -	1.22 -	1.24 -	1.22 -	14.92 J	9.40 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	3 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valida

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

MDC Corrected

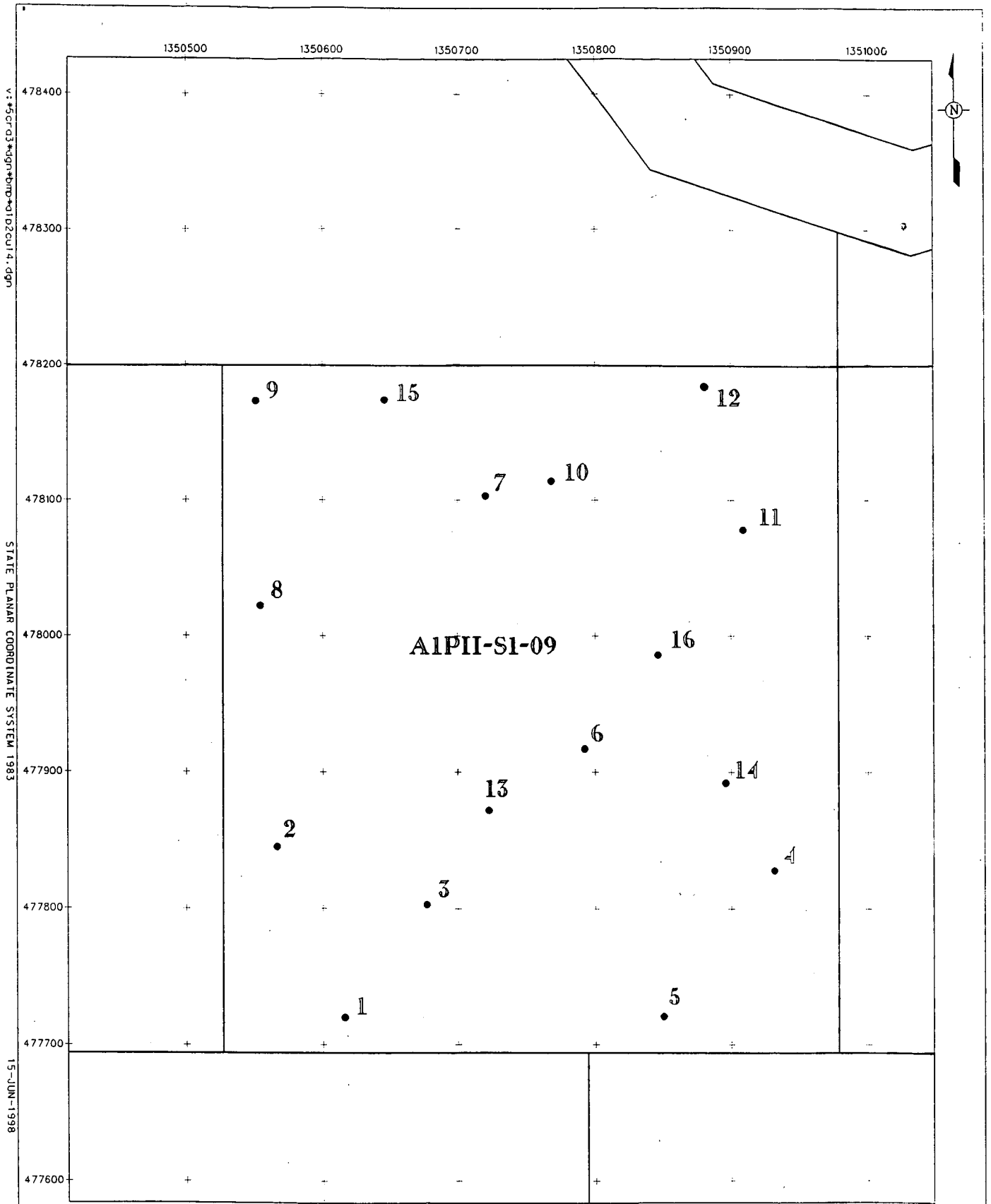

FIGURE A-10. CERTIFICATION UNIT A1PII-S1-09 SAMPLE LOCATIONS

Table A-10 CU A1PII-S1-09 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-09-01	1.17 -	1.15 J	1.14 J	1.15 J	11.20 -	2.70 NV
A1PII-S1-09-02	1.25 -	1.17 J	1.17 J	1.17 J	12.10 -	3.30 NV
A1PII-S1-09-03	1.12 -	1.09 J	1.07 J	1.09 J	8.87 -	3.50 NV
A1PII-S1-09-04	1.28 -	1.24 J	1.21 J	1.24 J	11.70 -	4.00 NV
A1PII-S1-09-05	1.27 -	1.37 J	1.35 J	1.37 J	12.20 -	4.60 NV
A1PII-S1-09-06	1.20 -	1.23 J	1.22 J	1.23 J	14.60 -	4.60 NV
A1PII-S1-09-07	1.19 -	1.27 J	1.24 J	1.27 J	15.40 -	4.00 NV
A1PII-S1-09-08	0.96 -	0.89 J	0.86 J	0.89 J	6.97 -	4.90 NV
A1PII-S1-09-09	1.19 -	1.20 J	1.18 J	1.20 J	12.70 -	4.60 NV
A1PII-S1-09-09-D	1.12 -	1.29 -	1.27 -	1.29 -	12.20 -	5.20 NV
A1PII-S1-09-10	1.25 -	1.25 J	1.24 J	1.25 J	17.30 -	4.80 NV
A1PII-S1-09-11	1.36 -	1.35 J	1.31 J	1.35 J	13.10 -	4.20 NV
A1PII-S1-09-12	1.32 -	1.35 J	1.37 J	1.35 J	15.10 -	4.80 NV
A1PII-S1-09-13	1.25 -	1.25 J	1.22 J	1.25 J	11.70 -	4.30 NV
A1PII-S1-09-14	1.20 -	1.20 J	1.20 J	1.20 J	12.90 -	5.80 NV
A1PII-S1-09-15	1.26 -	1.30 J	1.28 J	1.30 J	16.30 -	5.60 NV
A1PII-S1-09-16	1.08 -	1.15 J	1.12 J	1.15 J	11.60 -	4.10 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	21.8% (N)	5.1% (N)	6.4% (N)	5.1% (N)	64.5% (N)	95.8% (N)
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)
Sample Size	16	16	16	16	16	16
Est. Mean*	1.21	1.22	1.20	1.22	12.73	4.40
UCL	1.25	1.27	1.26	1.27	13.89	4.67
Prob.	--	--	--	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.36 -	1.37 J	1.37 J	1.37 J	17.30 -	5.80 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	3 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valida

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

MDC Corrected

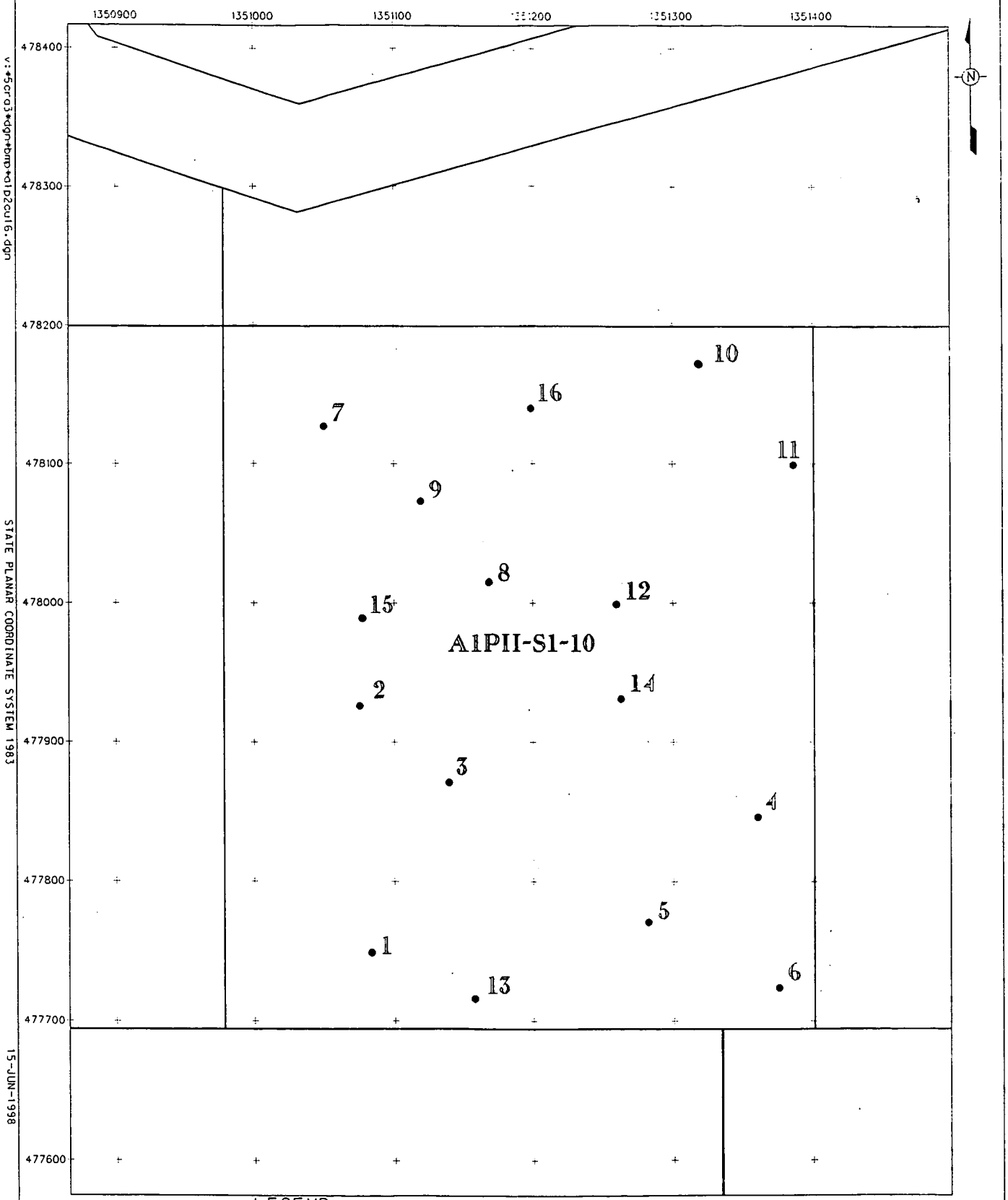

FIGURE A-11. CERTIFICATION UNIT A1PII-S1-10 SAMPLE LOCATIONS

Table A-11 CU A1PII-S1-10 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-10-01	1.16 -	1.11 -	1.15 -	1.11 -	8.13 J	5.50 NV
A1PII-S1-10-02	1.11 -	1.03 -	1.07 -	1.03 -	6.84 J	4.20 NV
A1PII-S1-10-03	1.10 -	1.16 -	1.28 -	1.16 -	4.86 J	5.10 NV
A1PII-S1-10-04	1.14 -	1.04 -	1.07 -	1.04 -	6.54 J	4.70 NV
A1PII-S1-10-05	1.16 -	1.05 -	1.14 -	1.05 -	5.25 J	8.40 NV
A1PII-S1-10-06	1.18 -	1.13 -	1.15 -	1.13 -	8.50 J	5.40 NV
A1PII-S1-10-07	1.03 -	0.79 -	0.78 -	0.79 -	11.76 J	4.20 NV
A1PII-S1-10-08	1.08 -	1.10 -	1.18 -	1.10 -	5.50 J	4.40 NV
A1PII-S1-10-09	1.15 -	1.09 -	1.16 -	1.09 -	9.48 J	6.00 NV
A1PII-S1-10-10	1.10 -	0.91 -	0.91 -	0.91 -	11.81 J	5.00 NV
A1PII-S1-10-10-D	1.11 -	1.16 -	1.21 -	1.16 -	6.64 J	5.00 NV
A1PII-S1-10-11	1.13 -	1.13 -	1.16 -	1.13 -	5.80 J	4.30 NV
A1PII-S1-10-12	1.22 -	1.00 -	1.04 -	1.00 -	7.98 J	4.90 NV
A1PII-S1-10-13	1.06 -	0.83 -	0.83 -	0.83 -	9.13 J	4.40 NV
A1PII-S1-10-14	1.22 -	1.04 -	1.09 -	1.04 -	4.82 J	6.00 NV
A1PII-S1-10-15	1.15 -	1.04 -	1.11 -	1.04 -	9.26 J	4.70 NV
A1PII-S1-10-16	1.22 -	1.19 -	1.30 -	1.19 -	7.06 J	5.40 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	63.8% (N)	1.2% (N)	2.9% (N)	1.2% (N)	47.7% (LN)	2.6% (LN)
Test Procedure	t-Test (N)	Wilcoxon	Wilcoxon	Wilcoxon	t-Test (LN)	Median
Sample Size	16	16	16	16	16	16
Est. Mean*	1.14	1.07 **	1.15 **	1.07 **	7.69	4.95 **
UCL	1.16	- -	- -	- -	8.85	5.40
Prob.	- -	0.024%	0.024%	0.024%	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.22 -	1.19 -	1.30 -	1.19 -	11.81 J	8.40 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	3 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = *no data qualifier*
"NV" = not validated
"UNV" = not detected, not valida

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for these parameters is the average of the 8th and 9th ranked sample results.
Radium-228: The two values are "1.053 -" (..-05) and "1.092 -" (..-09).
Thorium-228: The two values are "1.141 J" (..-05) and "1.149 J" (..-01).
Thorium-232: The two values are "1.053 -" (..-05) and "1.092 -" (..-09).
Arsenic: The two values are "4.9 NV" (..-12) and "5.0 NV" (..-10/..-10-D).
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

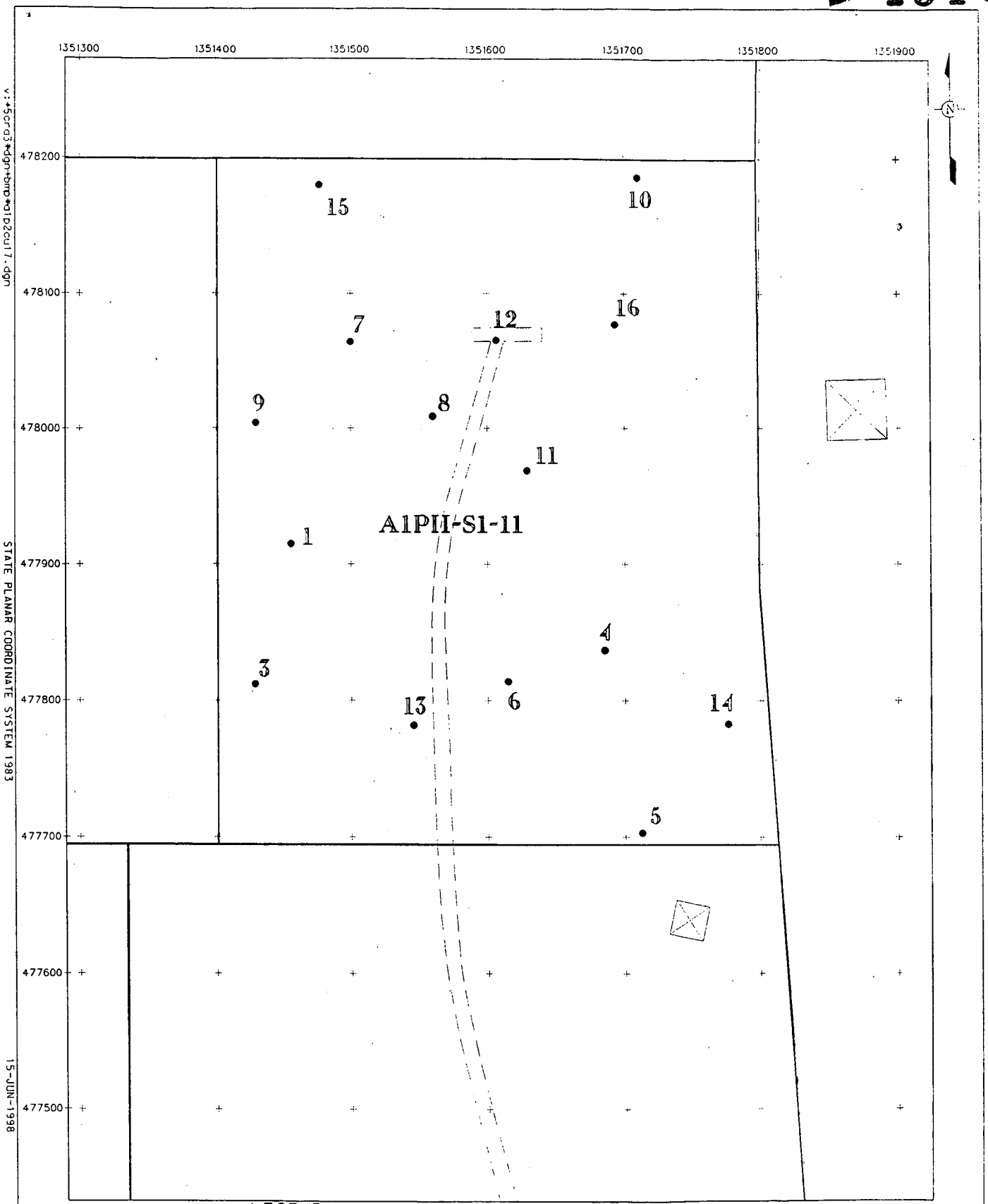

FIGURE A-12. CERTIFICATION UNIT A1PII-S1-11 SAMPLE LOCATIONS

Table A-12 CU A1PII-S1-11 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-11-01	1.29 -	1.22 J	1.24 J	1.22 J	11.00 J	5.70 UJ
A1PII-S1-11-02	1.51 -	1.42 J	1.42 J	1.42 J	15.10 J	6.60 UJ
A1PII-S1-11-03	1.38 -	1.31 J	1.32 J	1.31 J	10.50 J	5.50 UJ
A1PII-S1-11-04	1.25 -	1.23 J	1.24 J	1.23 J	13.90 J	4.50 UJ
A1PII-S1-11-05	1.30 UJ	2.20 UJ	1.30 J	2.20 UJ	5.67 J	6.50 UJ
A1PII-S1-11-06	1.16 -	1.10 J	1.12 J	1.10 J	11.30 J	2.90 UJ
A1PII-S1-11-07	1.20 -	1.18 J	1.20 J	1.18 J	5.25 J	5.00 UJ
A1PII-S1-11-08	1.30 -	1.19 J	1.20 J	1.19 J	10.80 J	3.10 UJ
A1PII-S1-11-09	1.24 -	1.22 J	1.25 J	1.22 J	13.50 J	3.80 UJ
A1PII-S1-11-10	1.25 -	1.11 J	1.12 J	1.11 J	7.30 J	3.80 UJ
A1PII-S1-11-11	1.23 -	1.43 J	1.24 J	1.43 J	5.09 J	5.70 UJ
A1PII-S1-11-11-D	1.20 -	1.19 J	1.20 J	1.19 J	10.40 J	3.80 UJ
A1PII-S1-11-12**	0.58 -	0.39 UJ	0.31 UJ	0.39 UJ	4.20 UJ	3.50 UJ
A1PII-S1-11-13	1.26 -	1.26 J	1.28 J	1.26 J	12.20 J	4.30 UJ
A1PII-S1-11-14	1.39 -	1.09 J	1.09 J	1.09 J	7.53 J	6.50 UJ
A1PII-S1-11-15	1.24 -	1.17 J	1.18 J	1.17 J	14.30 J	4.10 UJ
A1PII-S1-11-16	1.29 -	1.19 J	1.18 J	1.19 J	15.30 J	3.30 UJ
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	0.0% (N)	0.0% (N)	0.0% (N)	0.0% (N)	31.9% (N)	not tested
Test Procedure	Median	Median	Median	Median	t-Test (N)	Proportions
Sample Size	16	16	16	16	16	16
Est. Mean*	1.25	1.19	1.20	1.19	10.38	2.20
UCL	1.29	1.23	1.24	1.23	12.08	- -
Prob.	- -	- -	- -	- -	- -	0.009%
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.51 -	2.20 UJ	1.42 J	2.20 UJ	15.30 J	6.60 UJ
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	3 Pass	3 Pass	3 Pass	3 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not validat

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

MDC Corrected

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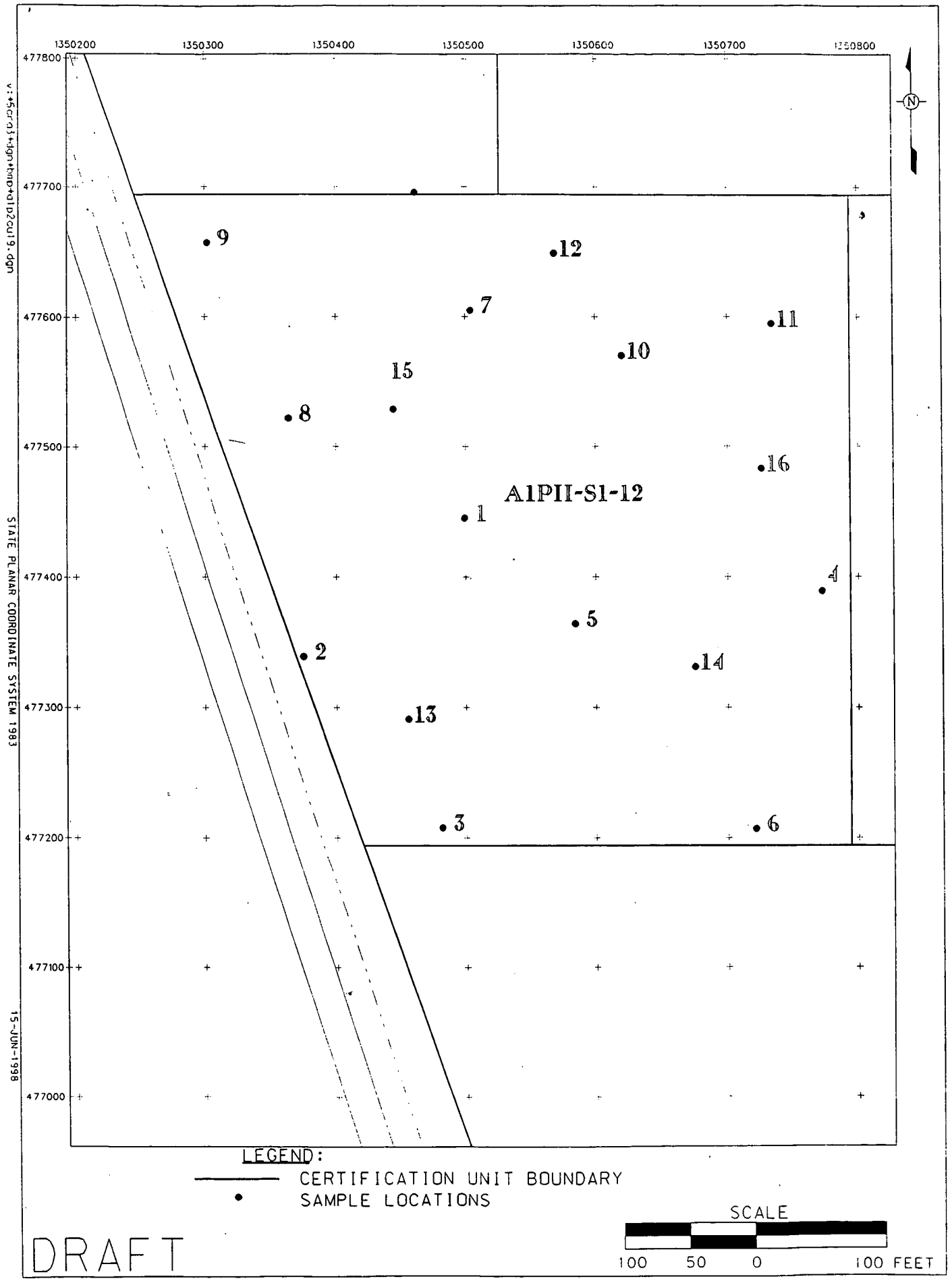


FIGURE A-13. CERTIFICATION UNIT A1PII-S1-12 SAMPLE LOCATIONS

Table A-13 CU A1PII-S1-12 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-12-01	1.63 -	1.38 J	1.51 J	1.38 J	8.79 J	3.70 NV
A1PII-S1-12-02	1.44 -	1.31 J	1.43 J	1.31 J	6.06 J	4.70 NV
A1PII-S1-12-03	1.42 -	1.00 J	1.03 J	1.00 J	6.70 J	4.80 NV
A1PII-S1-12-04	1.30 -	1.19 J	1.33 J	1.19 J	4.31 J	3.40 NV
A1PII-S1-12-05	1.13 -	1.08 J	1.10 J	1.08 J	5.99 J	2.60 NV
A1PII-S1-12-06	1.12 -	1.01 J	1.04 J	1.01 J	5.96 J	3.90 NV
A1PII-S1-12-07	1.19 -	1.09 J	1.15 J	1.09 J	3.77 J	2.70 NV
A1PII-S1-12-08	1.19 -	1.07 J	1.10 J	1.07 J	8.44 J	2.80 NV
A1PII-S1-12-09	1.23 -	1.13 J	1.15 J	1.13 J	6.25 J	4.00 NV
A1PII-S1-12-10	1.19 -	0.99 J	1.02 J	0.99 J	7.54 J	3.10 NV
A1PII-S1-12-11	1.20 -	0.99 J	1.03 J	0.99 J	4.01 J	2.30 NV
A1PII-S1-12-12	1.17 -	0.91 J	0.91 J	0.91 J	7.99 J	3.50 NV
A1PII-S1-12-12-D	1.17 -	1.02 J	1.12 J	1.02 J	4.26 J	4.13 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	3.1% (LN)	4.99% (LN)	3.0% (LN)	4.99% (LN)	46.7% (N)	68.6% (LN)
Test Procedure	Wilcoxon	Wilcoxon	Wilcoxon	Wilcoxon	t-Test (N)	t-Test (LN)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.20	1.08	1.11	1.08	6.32	3.52
UCL	- -	- -	- -	- -	7.19	3.90
Prob.	0.126%	0.126%	0.126%	0.126%	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.63 -	1.38 J	1.51 J	1.38 J	8.79 J	4.80 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	3 Pass	2 Pass	3 Pass	3 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

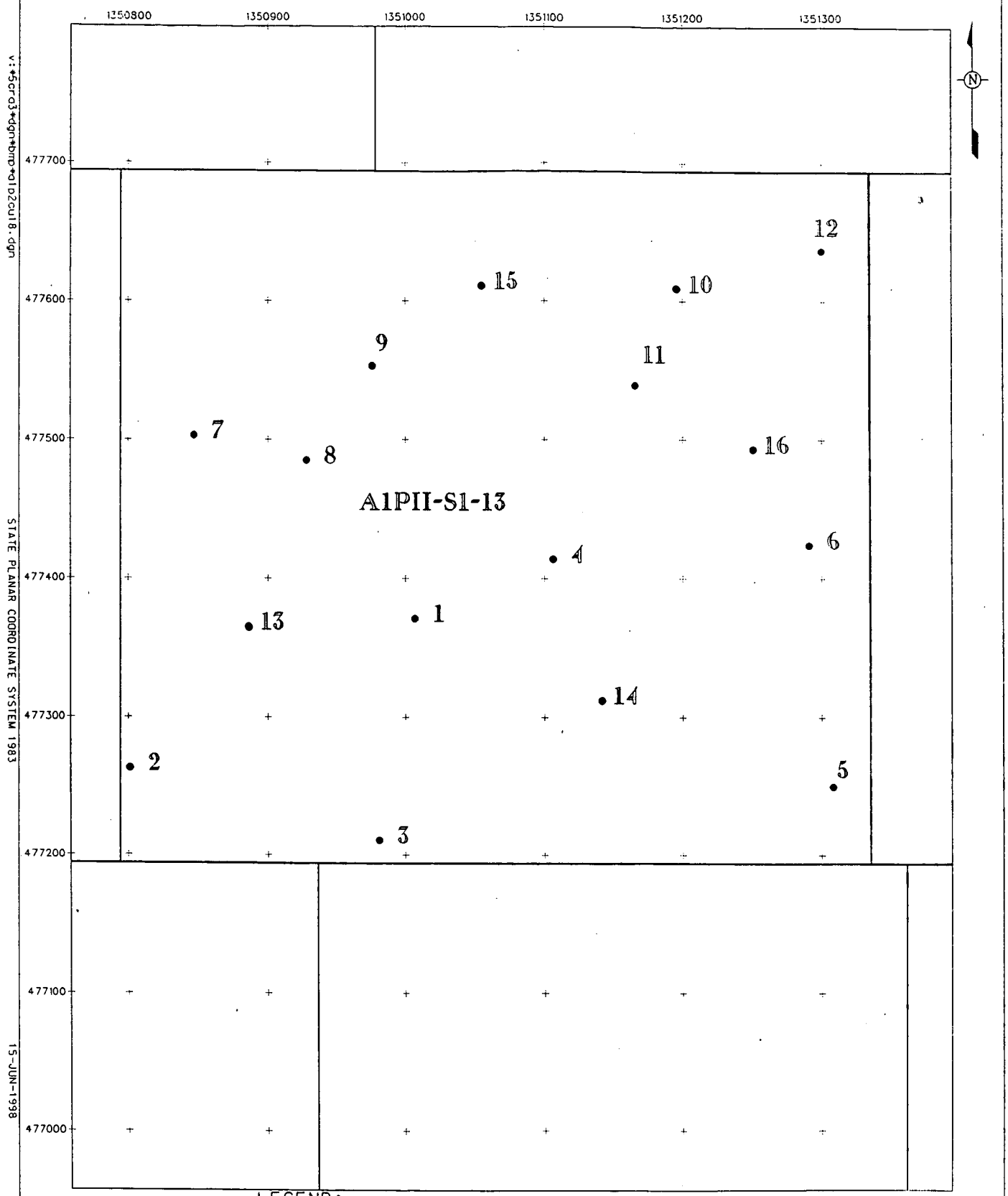


FIGURE A-14. CERTIFICATION UNIT A1PII-S1-13 SAMPLE LOCATIONS

Table A-14 CU A1PII-S1-13 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-13-01	1.27 J	1.03 J	1.03 J	1.03 J	8.84 J	3.80 NV
A1PII-S1-13-01-D	1.09 J	0.84 J	0.85 J	0.84 J	5.49 J	4.18 NV
A1PII-S1-13-02	1.26 J	1.19 J	1.26 J	1.19 J	3.36 J	3.90 NV
A1PII-S1-13-03	1.18 J	1.05 J	1.06 J	1.05 J	8.19 J	4.30 NV
A1PII-S1-13-04	1.48 J	1.15 J	1.16 J	1.15 J	3.74 J	7.10 NV
A1PII-S1-13-05	1.20 J	1.04 J	1.04 J	1.04 J	5.87 J	4.80 NV
A1PII-S1-13-06	1.14 J	1.07 J	1.12 J	1.07 J	8.01 J	3.90 NV
A1PII-S1-13-07	1.28 J	1.11 J	1.16 J	1.11 J	6.51 J	3.90 NV
A1PII-S1-13-08	1.21 J	1.18 J	1.27 J	1.18 J	4.18 J	3.10 NV
A1PII-S1-13-09	1.31 J	1.21 J	1.27 J	1.21 J	9.11 J	4.80 NV
A1PII-S1-13-10	1.24 J	1.09 J	1.14 J	1.09 J	9.69 J	4.44 NV
A1PII-S1-13-11	1.13 J	0.85 J	0.85 J	0.85 J	9.53 J	5.68 NV
A1PII-S1-13-12	1.31 J	1.23 J	1.31 J	1.23 J	4.38 J	4.10 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	38.2% (LN)	17.8% (N)	38.5% (N)	17.8% (N)	12.6% (N)	28.0% (LN)
Test Procedure	t-Test (LN)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.25	1.10	1.14	1.10	6.78	4.52
UCL	1.30	1.16	1.21	1.16	8.03	4.93
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.48 J	1.23 J	1.31 J	1.23 J	9.69 J	7.10 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

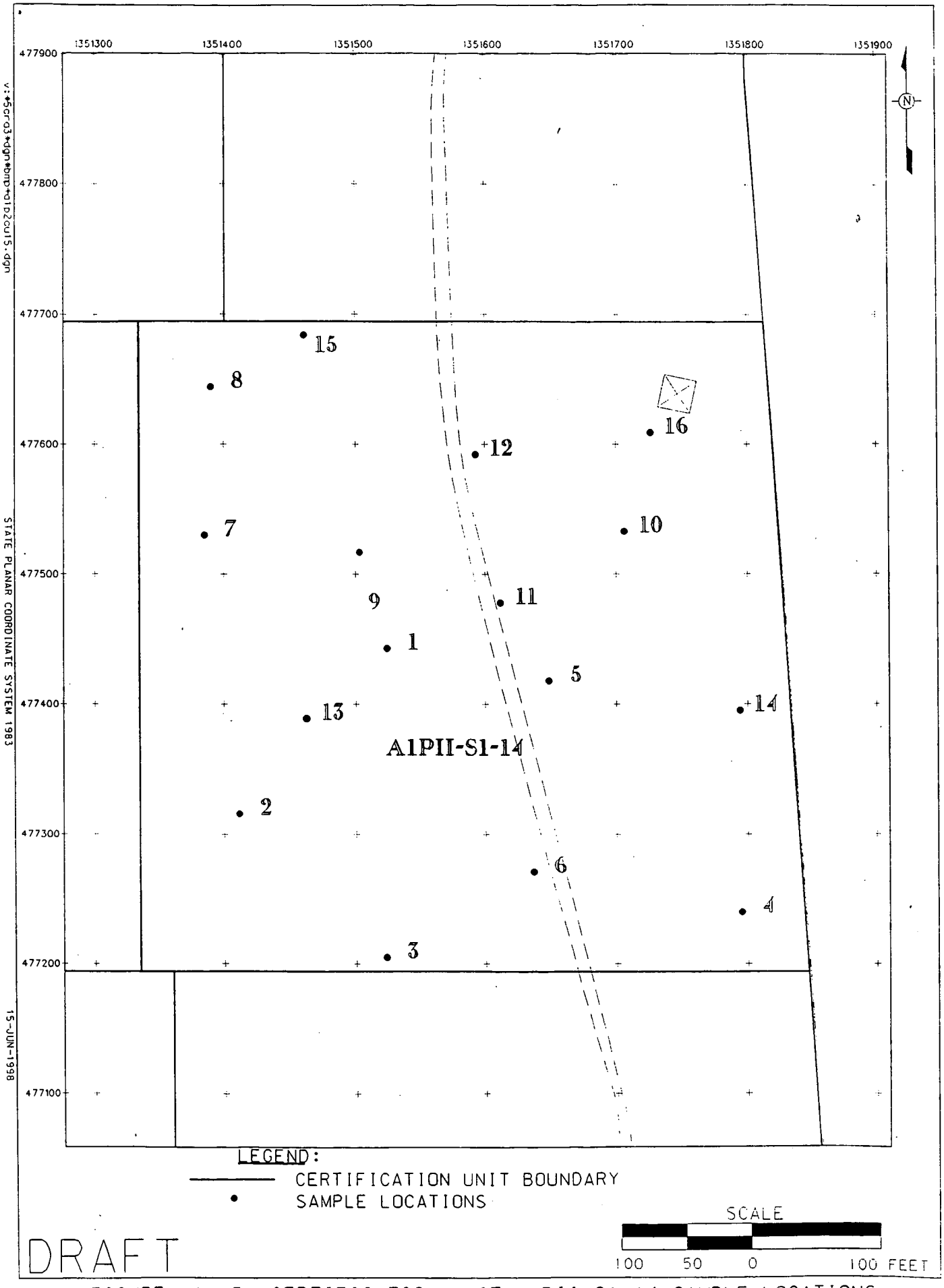


FIGURE A-15. CERTIFICATION UNIT A1PII-S1-14 SAMPLE LOCATIONS

Table A-15 CU A1PII-S1-14 Summary Statistics

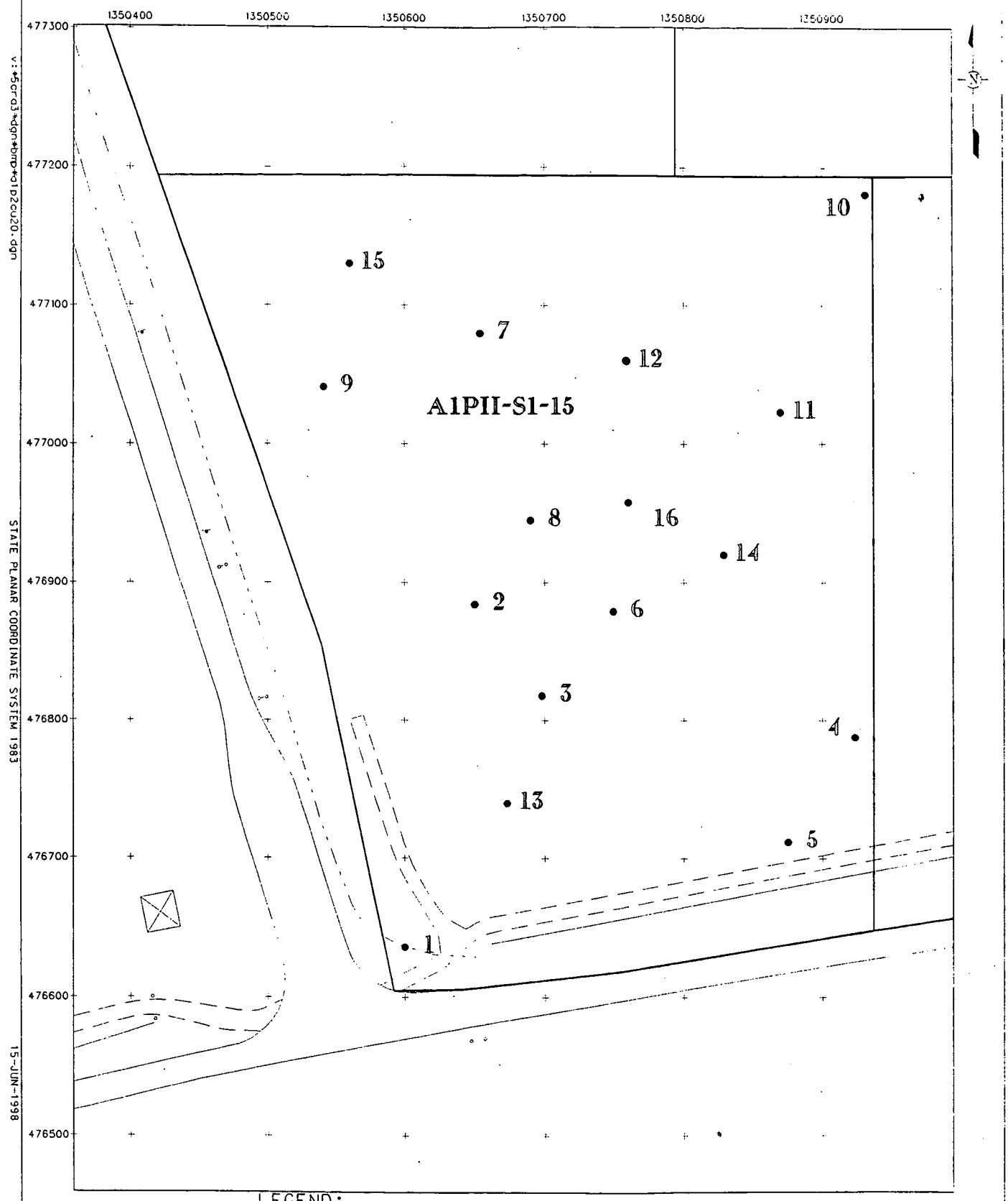
Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-14-01	1.25 -	1.02 -	1.06 J	1.02 -	9.37 J	6.10 NV
A1PII-S1-14-02-D	1.23 -	1.01 -	1.04 J	1.01 -	3.91 J	5.20 NV
A1PII-S1-14-02	1.33 -	1.07 -	1.11 J	1.07 -	3.06 J	4.80 NV
A1PII-S1-14-03	1.20 -	1.09 -	1.15 J	1.09 -	5.19 J	5.90 NV
A1PII-S1-14-04	1.31 -	1.20 -	1.31 J	1.20 -	3.83 J	9.20 NV
A1PII-S1-14-05	1.27 -	1.01 -	1.01 J	1.01 -	6.45 J	4.80 NV
A1PII-S1-14-06	1.19 -	0.81 -	0.81 J	0.81 -	7.10 J	6.70 NV
A1PII-S1-14-07	1.29 -	1.18 -	1.29 J	1.18 -	4.47 J	8.00 NV
A1PII-S1-14-08	1.25 -	1.00 -	0.99 J	1.00 -	6.37 J	9.80 NV
A1PII-S1-14-09	1.31 -	1.08 -	1.11 J	1.08 -	7.60 J	6.00 NV
A1PII-S1-14-10	1.33 -	1.14 -	1.21 J	1.14 -	4.16 J	0.14 UNV
A1PII-S1-14-11	1.23 -	1.01 -	1.03 J	1.01 -	8.33 J	6.20 NV
A1PII-S1-14-12	1.34 -	1.12 -	1.19 J	1.12 -	5.38 J	6.50 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	45.7% (N)	18.2% (N)	78.6% (N)	17.9% (N)	57.7% (LN)	6.9% (N)
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (N)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.28	1.06	1.11	1.06	6.04	6.21
UCL	1.30	1.12	1.18	1.12	7.21	7.17
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.34 -	1.20 -	1.31 J	1.20 -	9.37 J	9.80 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valida

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

MDC Corrected



LEGEND:

——— CERTIFICATION UNIT BOUNDARY

• SAMPLE LOCATIONS

SCALE

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FIGURE A-16. CERTIFICATION UNIT A1PII-S1-15 SAMPLE LOCATIONS

Table A-16 CU A1PII-S1-15 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-15-01	1.21 J	1.00 J	1.07 J	1.00 J	4.96 J	5.79 NV
A1PII-S1-15-02	1.35 J	1.23 J	1.23 J	1.23 J	5.34 J	3.47 NV
A1PII-S1-15-03	1.44 J	1.41 J	1.39 J	1.41 J	8.79 J	5.31 NV
A1PII-S1-15-03-D	1.23 J	1.05 J	1.11 J	1.05 J	8.07 J	4.75 NV
A1PII-S1-15-04	1.29 J	1.20 J	1.30 J	1.20 J	4.08 J	3.43 NV
A1PII-S1-15-05	1.17 J	0.98 J	1.00 J	0.98 J	7.57 J	3.66 NV
A1PII-S1-15-06	1.21 J	1.03 J	1.10 J	1.03 J	9.66 J	4.81 NV
A1PII-S1-15-07	1.20 J	1.10 J	1.10 J	1.10 J	4.10 J	3.17 NV
A1PII-S1-15-08	1.16 J	1.07 J	1.07 J	1.07 J	4.64 J	3.42 NV
A1PII-S1-15-09	1.22 J	1.07 J	1.10 J	1.07 J	6.84 J	4.88 NV
A1PII-S1-15-10	1.27 J	1.13 J	1.15 J	1.13 J	3.76 J	5.01 NV
A1PII-S1-15-11	1.23 J	1.03 J	1.03 J	1.03 J	7.06 J	4.49 NV
A1PII-S1-15-12	1.35 J	1.04 J	1.07 J	1.04 J	6.82 J	5.57 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	31.3% (LN)	11.8% (LN)	10.0% (LN)	11.8% (LN)	49.0% (LN)	16.8% (N)
Test Procedure	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (LN)	t-Test (N)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.26	1.11	1.13	1.11	6.16	4.42
UCL	1.30	1.17	1.19	1.17	7.42	4.79
Prob.	--	--	--	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.44 J	1.41 J	1.39 J	1.41 J	9.66 J	5.79 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	3 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = *no data qualifier*
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

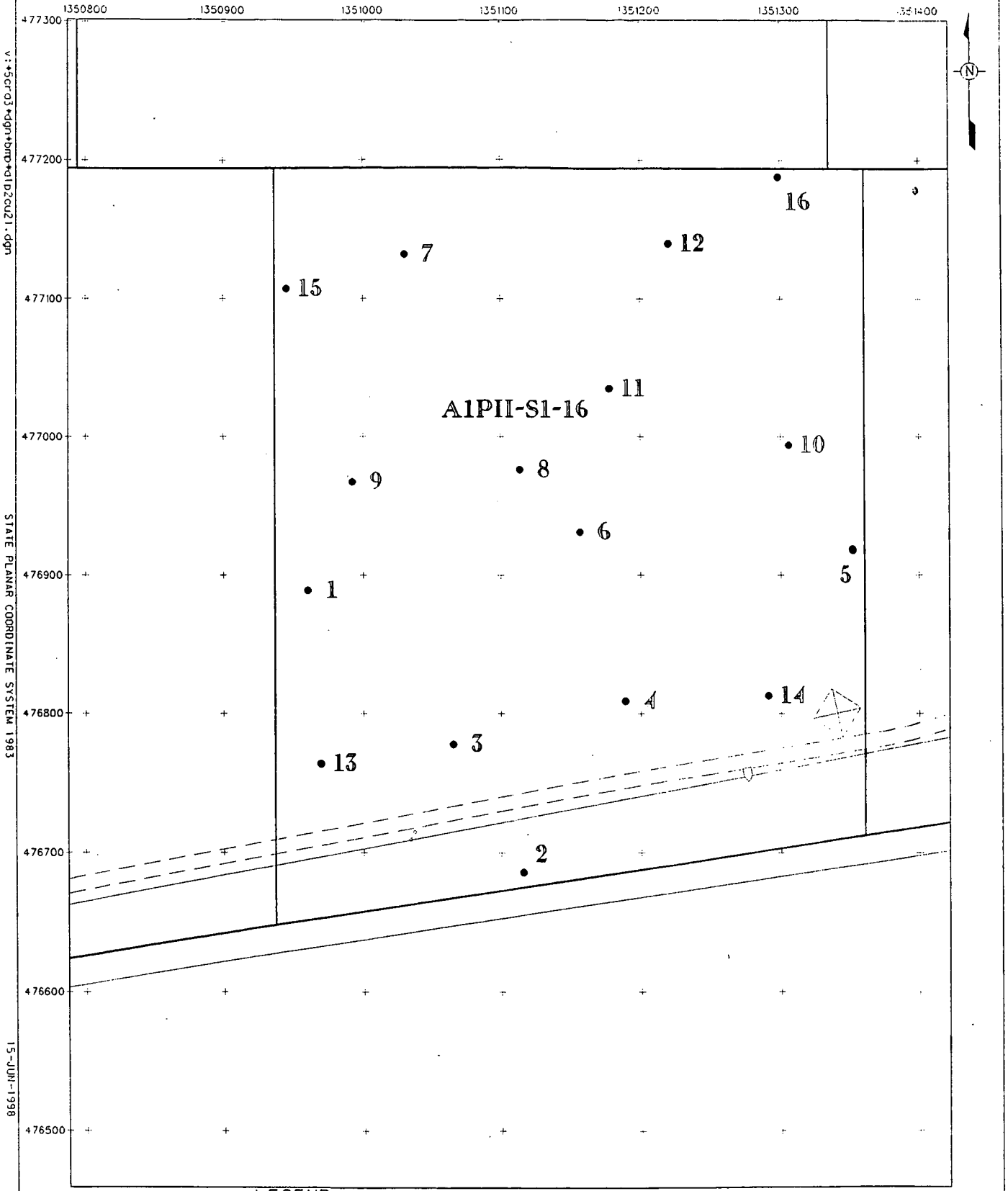


FIGURE A-17. CERTIFICATION UNIT A1PII-S1-16 SAMPLE LOCATIONS

Table A-17 CU A1PII-S1-16 Summary Statistics

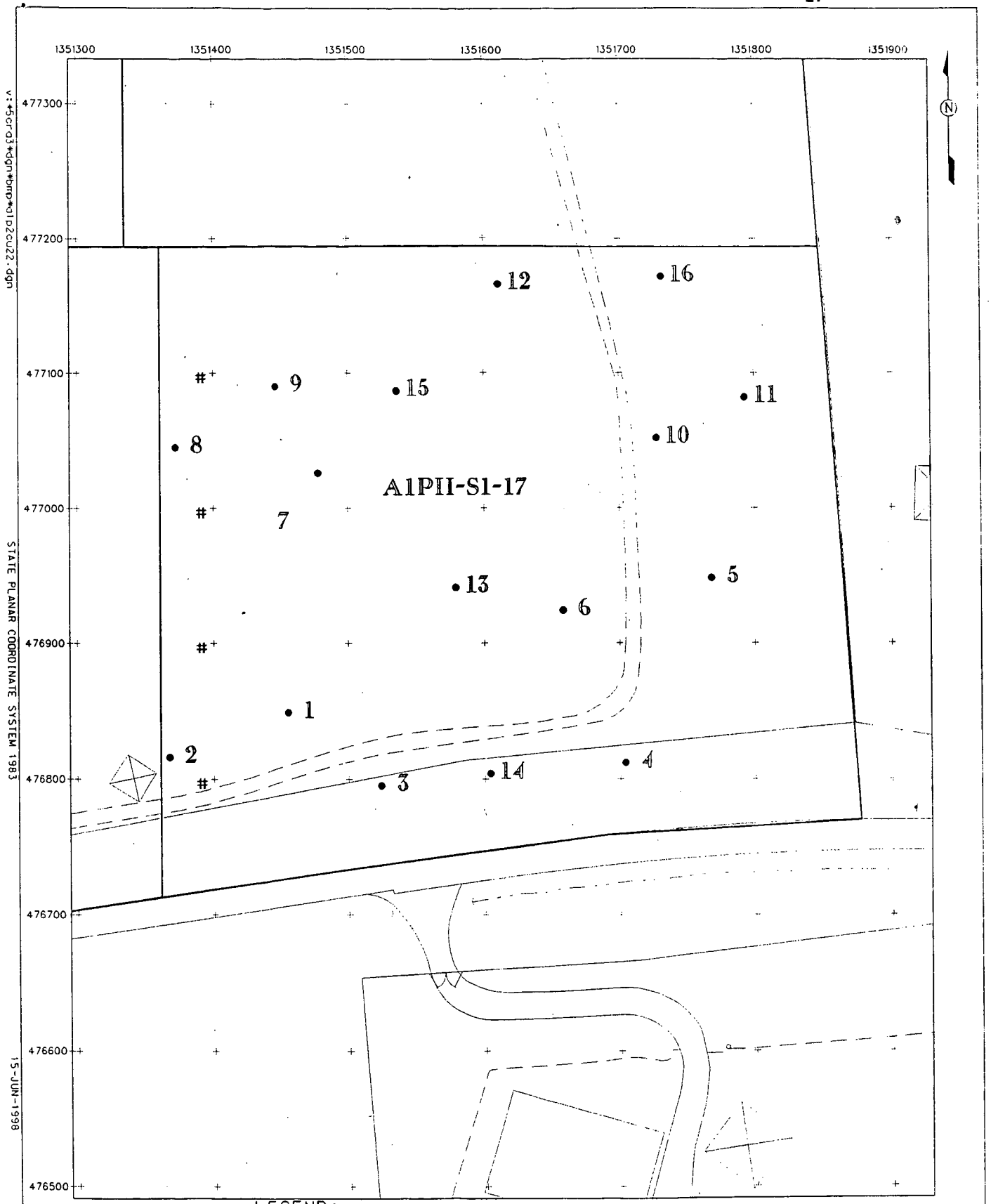
Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-16-01	1.10 J	1.10 J	1.10 J	1.10 J	2.86 J	2.87 NV
A1PII-S1-16-02	0.88 J	0.70 J	0.73 J	0.70 J	4.00 J	4.05 NV
A1PII-S1-16-03	1.20 J	1.10 J	1.10 J	1.10 J	7.90 J	4.31 NV
A1PII-S1-16-04	1.30 J	1.10 J	1.20 J	1.12 J	4.70 J	4.18 NV
A1PII-S1-16-04-D	1.10 J	0.84 J	0.84 J	0.84 J	5.50 J	2.93 NV
A1PII-S1-16-05	1.10 J	0.99 J	1.00 J	1.00 J	5.90 J	3.47 NV
A1PII-S1-16-06	1.20 J	1.10 J	1.10 J	1.10 J	7.30 J	6.96 NV
A1PII-S1-16-07	1.20 J	0.95 J	0.98 J	0.95 J	6.80 J	3.70 NV
A1PII-S1-16-08	1.30 J	1.10 J	1.10 J	1.12 J	3.30 J	4.02 NV
A1PII-S1-16-09	1.20 J	1.10 J	1.20 J	1.10 J	7.90 J	2.83 NV
A1PII-S1-16-10	1.10 J	1.00 J	1.10 J	1.04 J	8.50 J	3.01 NV
A1PII-S1-16-11	1.20 J	1.10 J	1.20 J	1.10 J	4.00 J	4.66 NV
A1PII-S1-16-12	1.30 J	1.10 J	1.10 J	1.10 J	7.10 J	4.84 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	2.3% (N)	0.0% (N)	0.3% (N)	0.0% (N)	28.1% (N)	41.7% (LN)
Test Procedure	Wilcoxon	Median	Wilcoxon	Median	t-Test (N)	t-Test (LN)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.20	1.10	1.10	1.10	5.92	4.08
UCL	--	1.10	--	1.10	6.94	4.54
Prob.	0.108%	--	0.110%	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.30 J	1.10 J	1.20 J	1.12 J	8.50 J	6.96 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--
a posteriori Sample Size calculation	2 Pass	3 Pass	2 Pass	3 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected



LEGEND:

——— CERTIFICATION UNIT BOUNDARY

• SAMPLE LOCATIONS

SCALE

100 50 0 100 FEET

DRAFT

FIGURE A-18. CERTIFICATION UNIT A1PII-S1-17 SAMPLE LOCATIONS

Table A-18 CU A1PII-S1-17 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-S1-17-01	1.02 -	1.11 -	1.07 -	1.11 -	8.51 -	3.19 NV
A1PII-S1-17-02	0.93 -	1.03 -	0.96 -	1.03 -	7.93 -	3.08 NV
A1PII-S1-17-03	1.05 -	1.01 -	0.99 -	1.01 -	8.52 -	3.27 NV
A1PII-S1-17-04	1.00 -	1.03 -	1.02 -	1.03 -	7.04 -	4.88 NV
A1PII-S1-17-05	1.12 -	0.97 -	0.95 -	0.97 -	9.68 -	4.29 NV
A1PII-S1-17-05-D	0.95 -	0.82 -	0.81 -	0.82 -	7.11 -	5.22 NV
A1PII-S1-17-06	1.04 -	0.92 -	0.92 -	0.92 -	8.88 -	2.34 NV
A1PII-S1-17-07	1.16 -	1.12 -	1.13 -	1.12 -	10.40 -	3.90 NV
A1PII-S1-17-08	1.16 -	1.07 -	1.06 -	1.07 -	9.16 -	4.30 NV
A1PII-S1-17-09	1.13 -	1.02 -	1.02 -	1.02 -	9.73 -	3.80 NV
A1PII-S1-17-10	1.14 -	1.07 -	1.09 -	1.07 -	9.36 -	4.50 NV
A1PII-S1-17-11	1.16 -	1.09 -	1.09 -	1.09 -	9.33 -	5.90 NV
A1PII-S1-17-12	1.21 -	1.15 -	1.13 -	1.15 -	10.40 -	4.10 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	36.2% (N)	93.1% (N)	64.3% (N)	93.1% (N)	68.5% (N)	99.6% (N)
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)
Sample Size	12	12	12	12	12	12
Est. Mean*	1.09	1.05	1.04	1.05	9.08	4.04
UCL	1.14	1.08	1.07	1.08	9.59	4.43
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.21 -	1.15 -	1.13 -	1.15 -	10.40 -	5.90 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

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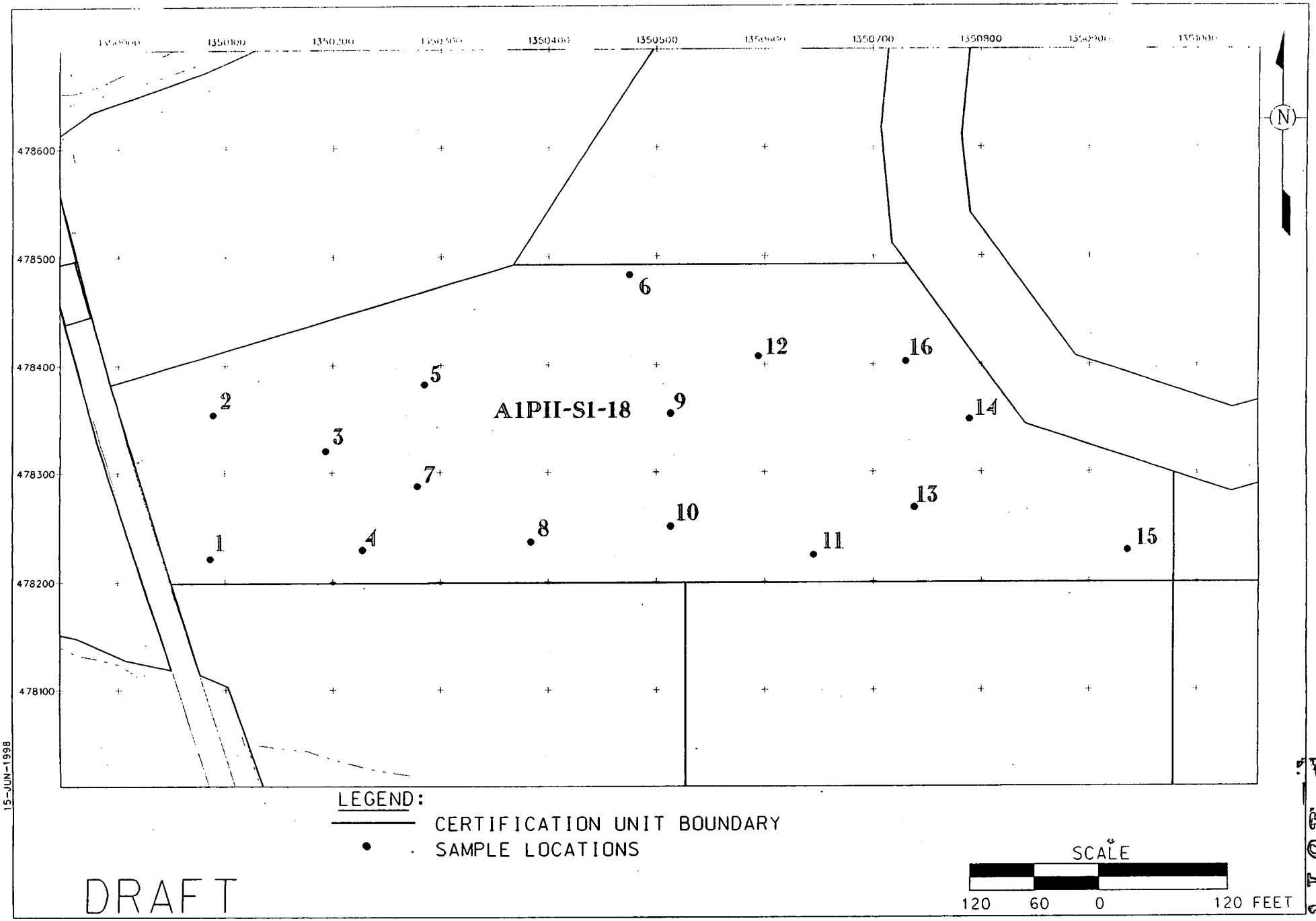

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STATE PLANAR COORDINATE SYSTEM 1983

FIGURE A-19. CERTIFICATION UNIT A1PII-S1-18 SAMPLE LOCATIONS

Table A-19 CU A1PII-S1-18 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-18-01	1.43 -	1.13 -	1.11 -	1.13 -	12.00 -	6.30 NV	33.30 NV
A1PII-S1-18-02	1.02 -	1.08 -	1.04 -	1.08 -	17.70 -	6.70 NV	27.50 NV
A1PII-S1-18-03	1.30 -	1.19 -	1.17 -	1.19 -	19.00 -	5.50 NV	20.00 NV
A1PII-S1-18-04	1.14 -	1.09 -	1.07 -	1.09 -	14.30 -	4.40 NV	16.90 NV
A1PII-S1-18-05	1.19 R	1.21 R	1.16 R	1.21 R	15.30 R	6.60 NV	21.50 NV
A1PII-S1-18-06	1.13 -	1.10 -	1.06 -	1.10 -	15.90 -	4.90 NV	30.60 NV
A1PII-S1-18-06-D	1.14 -	1.11 -	1.11 -	1.11 -	18.40 -	5.10 NV	33.40 NV
A1PII-S1-18-07	1.09 -	1.14 -	1.09 -	1.14 -	13.80 -	4.90 NV	19.50 NV
A1PII-S1-18-08	1.08 -	1.07 -	1.04 -	1.07 -	13.10 -	3.40 NV	16.50 NV
A1PII-S1-18-09	1.16 -	1.15 -	1.14 -	1.15 -	18.60 -	4.00 NV	18.10 NV
A1PII-S1-18-10	1.06 -	1.04 -	1.01 -	1.04 -	15.50 -	3.50 NV	17.90 NV
A1PII-S1-18-11	1.18 -	1.09 -	1.06 -	1.09 -	14.10 -	3.60 NV	17.50 NV
A1PII-S1-18-12	1.13 -	1.07 -	1.04 -	1.07 -	15.80 -	4.90 NV	21.70 NV
A1PII-S1-18-13	1.22 -	1.13 -	1.09 -	1.13 -	22.10 -	6.70 NV	23.40 NV
A1PII-S1-18-14	1.16 -	1.09 -	1.05 -	1.09 -	17.40 -	5.10 NV	18.40 NV
A1PII-S1-18-15	0.97 -	0.99 -	0.96 -	0.99 -	5.36 -	3.20 NV	12.50 NV
A1PII-S1-18-16	1.16 -	1.20 -	1.19 -	1.20 -	18.70 -	7.00 NV	18.20 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	49.7% (LN)	81.2% (N)	90.9% (N)	81.2% (N)	18.8% (N)	18.9% (LN)	17.0% (LN)
Test Procedure	t-Test (LN)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (LN)
Sample Size	15	15	15	15	15	16	16
Est. Mean*	1.15	1.10	1.08	1.10	15.72	5.07	21.03
UCL	1.20	1.13	1.11	1.13	17.52	5.58	23.07
Prob.	--	--	--	--	--	--	--
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.43 -	1.20 -	1.19 -	1.20 -	22.10 -	7.00 NV	33.40 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--	--
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	1 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

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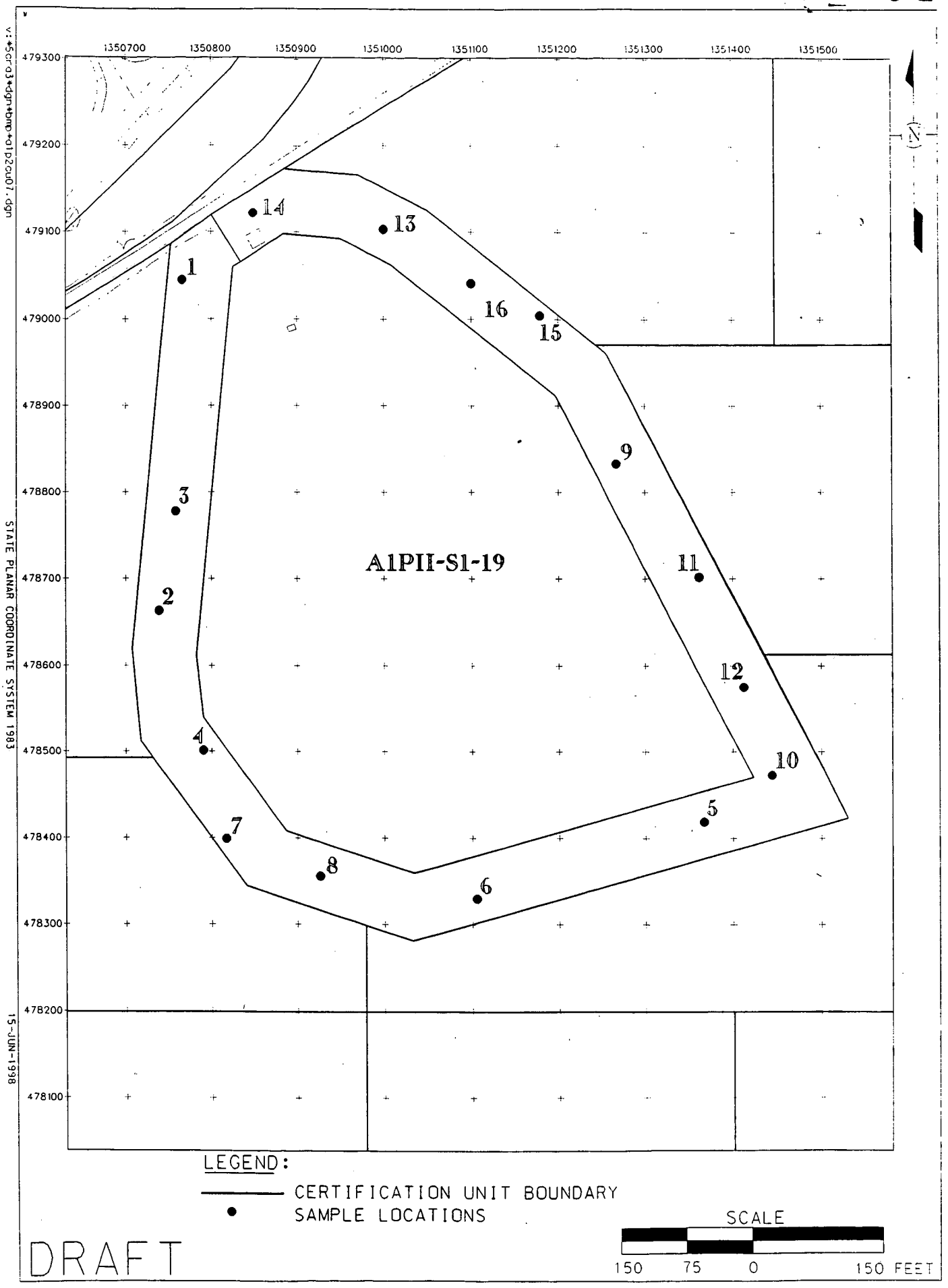


FIGURE A-20. CERTIFICATION UNIT A1PII-S1-19 SAMPLE LOCATIONS

Table A-20 CU A1PII-S1-19 Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS	
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Lead
A1PII-S1-19-01	1.12 -	0.93 -	0.91 -	0.93 -	11.30 -	23.10 NV	27.60 NV
A1PII-S1-19-02	1.23 -	1.15 -	1.10 -	1.15 -	31.80 -	4.40 NV	21.50 NV
A1PII-S1-19-03	1.17 -	1.08 -	1.05 -	1.08 -	21.50 -	7.20 NV	18.60 NV
A1PII-S1-19-04	1.19 -	1.17 -	1.13 -	1.17 -	15.30 -	6.70 NV	23.10 NV
A1PII-S1-19-05	1.15 -	1.00 -	0.97 -	1.00 -	13.10 -	9.30 NV	22.90 NV
A1PII-S1-19-06	1.12 -	1.04 -	1.02 -	1.04 -	15.00 -	2.80 NV	22.30 NV
A1PII-S1-19-07-D	1.06 -	1.08 -	1.07 -	1.08 -	18.50 -	8.60 NV	34.90 NV
A1PII-S1-19-07	1.10 -	1.14 -	1.12 -	1.14 -	21.10 -	5.80 NV	74.30 NV
A1PII-S1-19-08	1.10 -	1.01 -	1.00 -	1.01 -	14.50 -	5.50 NV	23.10 NV
A1PII-S1-19-09	1.11 -	1.02 -	1.03 -	1.02 -	13.50 -	4.00 NV	40.20 NV
A1PII-S1-19-10	1.20 -	1.04 -	1.00 -	1.04 -	9.77 -	37.10 NV	1152.00 NV
A1PII-S1-19-11	1.21 -	1.12 -	1.09 -	1.12 -	14.20 -	3.10 NV	14.80 NV
A1PII-S1-19-12	1.27 -	1.09 -	1.08 -	1.09 -	10.60 -	6.90 NV	24.90 NV
A1PII-S1-19-13	0.87 -	0.83 J	0.81 -	0.83 -	18.70 -	5.10 NV	6.70 NV
A1PII-S1-19-14	1.07 -	0.87 J	0.86 -	0.87 -	6.94 -	10.40 NV	20.50 NV
A1PII-S1-19-15	1.11 -	1.00 -	0.98 -	1.00 -	21.60 -	4.30 NV	23.40 NV
A1PII-S1-19-16	1.09 -	1.01 -	0.97 -	1.01 -	18.10 -	4.91 NV	54.10 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	400.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%
W-statistic Prob. #	2.5% (N)	46.9% (N)	38.6% (N)	46.9% (N)	96.7% (LN)	7.8% (LN)	0.0% (LN)
Test Procedure	Wilcoxon	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (LN)	Median
Sample Size	16	16	16	16	16	16	16
Est. Mean*	1.12	1.03	1.01	1.03	16.14	8.61	23.10
UCL	- -	1.07	1.05	1.07	19.39	11.56	27.60
Prob.	0.024%	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.27 -	1.17 -	1.13 -	1.17 -	31.80 -	37.10 NV	1152.00 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	2 Pass	2 Pass	8 Pass	4 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not validated

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

MDC Corrected

980000

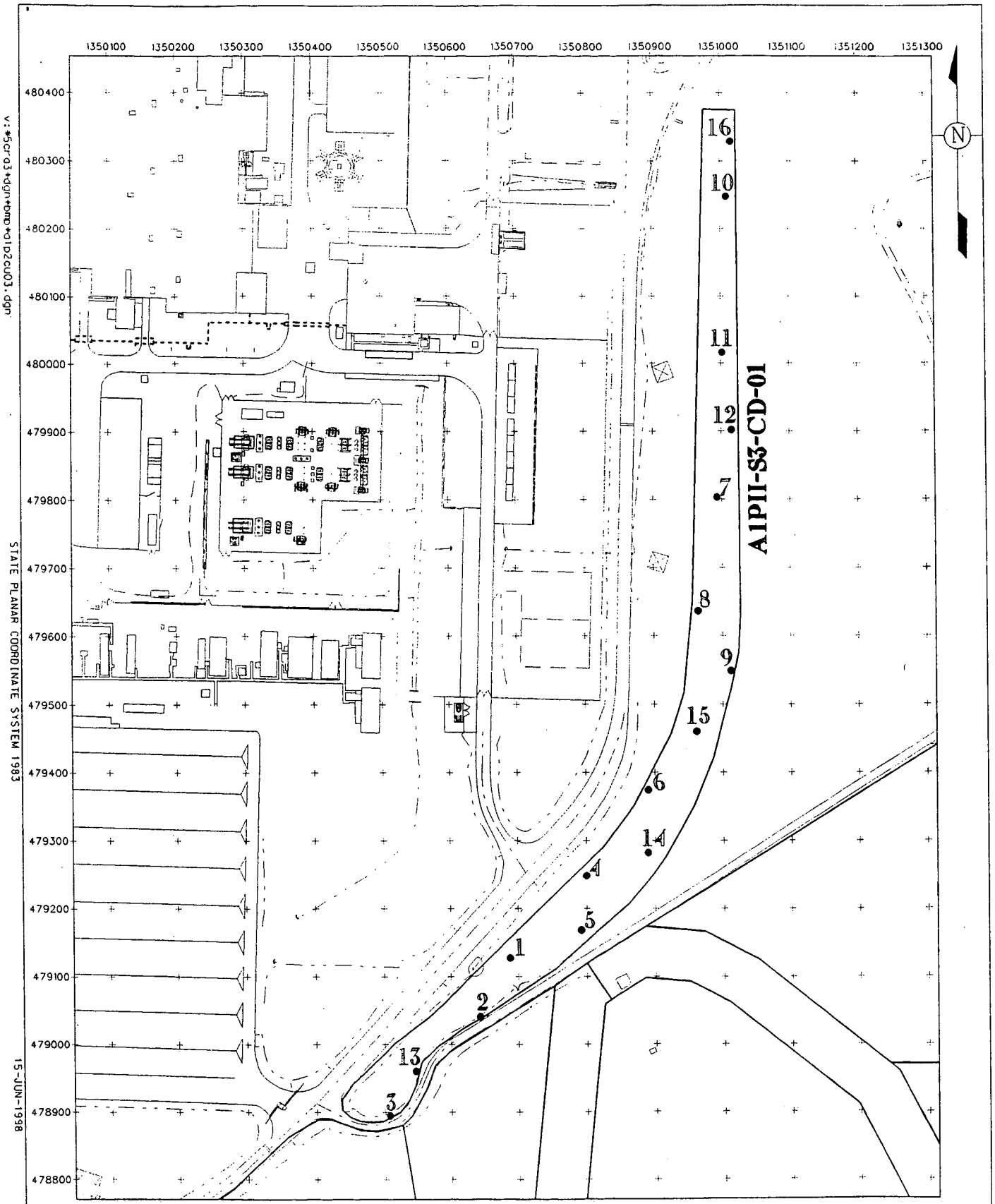


FIGURE A-21. CERTIFICATION UNIT A1PII-S3-CD SAMPLE LOCATIONS

Table A-21 CU A1PII-S3-CD Summary Statistics

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic
A1PII-CD-01-01	1.02 -	0.99 -	0.98 J	0.99 -	5.70 UJ	3.30 NV
A1PII-CD-01-02	1.99 -	1.65 -	1.57 -	1.65 -	102.00 -	8.00 NV
A1PII-CD-01-03	1.43 -	1.22 -	1.21 -	1.22 -	6.30 UJ	8.20 NV
A1PII-CD-01-03-D	1.44 -	1.32 -	1.31 -	1.32 -	4.70 J	12.00 NV
A1PII-CD-01-04	1.17 -	1.23 -	1.18 -	1.23 -	10.90 -	3.10 NV
A1PII-CD-01-05	0.77 -	0.76 -	0.74 J	0.76 -	8.50 UJ	4.90 NV
A1PII-CD-01-06	1.29 -	1.36 -	1.31 -	1.36 -	22.00 -	5.50 NV
A1PII-CD-01-07	1.29 -	1.27 -	1.22 -	1.27 -	29.30 -	2.90 NV
A1PII-CD-01-08	1.18 -	1.17 -	1.16 -	1.17 -	28.20 -	6.80 NV
A1PII-CD-01-09	1.16 -	1.16 -	1.14 -	1.16 -	26.60 -	7.40 NV
A1PII-CD-01-10	1.08 -	1.35 -	1.33 -	1.35 -	51.20 -	4.30 NV
A1PII-CD-01-11	1.22 -	1.17 -	1.13 -	1.17 -	51.20 -	5.10 NV
A1PII-CD-01-12	1.37 -	1.32 -	1.30 -	1.32 -	16.90 -	3.70 NV
A1PII-CD-01-13	1.04 -	1.10 -	1.05 J	1.10 -	6.30 UJ	6.10 NV
A1PII-CD-01-14	1.20 -	1.18 -	1.15 -	1.18 -	8.13 -	6.50 NV
A1PII-CD-01-15	1.21 -	1.16 -	1.14 -	1.16 -	14.50 -	5.00 NV
A1PII-CD-01-16	1.34 -	1.22 -	1.26 -	1.22 -	40.70 -	6.20 NV
FRL	1.70	1.80	1.70	1.50	82.00	12.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg
Conf. Level	95%	95%	95%	95%	95%	90%
W-statistic Prob. #	13.8% (LN)	18.3% (N)	26.7% (N)	18.3% (N)	59.2% (LN)	84.4% (LN)
Test Procedure	t-Test (LN)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (LN)
Sample Size	16	16	16	16	16	16
Est. Mean*	1.24	1.21	1.19	1.21	28.80	5.69
UCL	1.36	1.30	1.26	1.30	63.58	6.56
Prob.	- -	- -	- -	- -	- -	- -
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.99 -	1.65 -	1.57 -	1.65 -	102.00 -	12.00 NV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -
a posteriori Sample Size calculation	4 Pass	2 Pass	3 Pass	5 Pass	5 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not validat

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

MDC Corrected

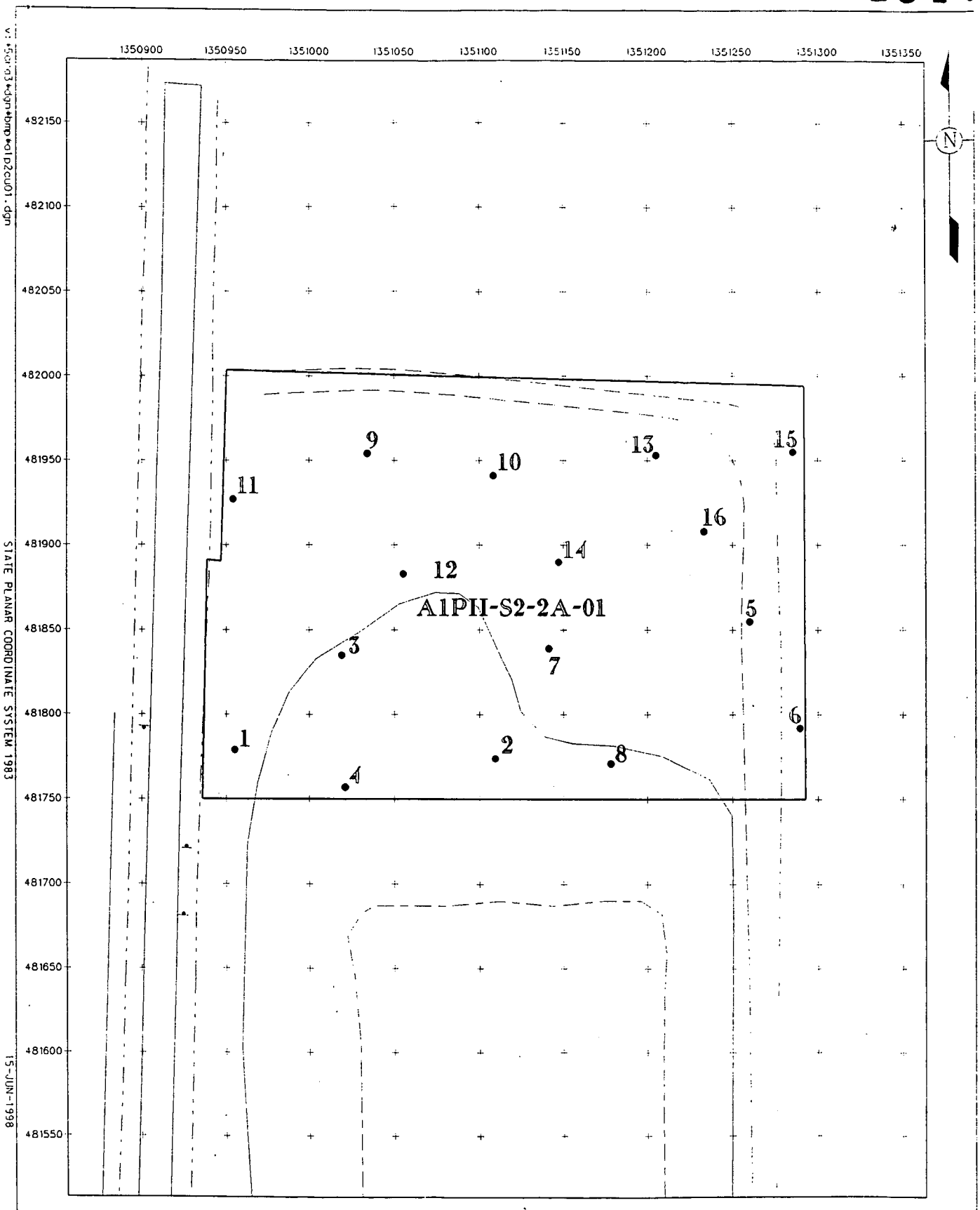


FIGURE A-22. CERTIFICATION UNIT A1PII-S2-2A-01 SAMPLE LOCATIONS

Table A-22 CU A1PII-S2-2a-01 Summary Statistics without Additional Samples

Area 1 Phase II Certification Statistics (original 16 samples)

	RADIONUCLIDES					METALS		PCBs
Station Number	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Beryllium	Araclor-1260
A1PII-S2-2A-01-01	1.21 -	1.31 -	1.30 UJ	1.31 -	5.80 UJ	10.30 NV	0.51 NV	40.00 UNV
A1PII-S2-2A-01-01-D	1.21 -	1.26 -	1.28 UJ	1.26 -	6.00 UJ	10.10 NV	0.42 NV	41.00 UNV
A1PII-S2-2A-01-02	1.19 -	1.20 -	1.20 J	1.20 -	19.80 J	12.40 NV	0.58 NV	43.00 UNV
A1PII-S2-2A-01-03	1.17 -	1.25 -	1.24 UJ	1.25 -	6.10 UJ	12.40 NV	0.42 NV	41.00 UNV
A1PII-S2-2A-01-04	1.23 -	1.24 -	1.22 J	1.24 -	15.30 J	7.90 NV	0.65 NV	43.00 UNV
A1PII-S2-2A-01-05	1.14 -	1.15 -	1.14 J	1.15 -	9.36 J	10.40 NV	0.52 NV	39.00 UNV
A1PII-S2-2A-01-06	1.50 -	1.29 -	1.28 J	1.29 -	6.17 J	8.60 NV	0.83 NV	43.00 UNV
A1PII-S2-2A-01-07	0.91 -	0.96 -	0.92 UJ	0.96 -	5.50 UJ	9.20 NV	0.50 NV	45.00 UNV
A1PII-S2-2A-01-08	1.24 -	1.27 -	1.25 J	1.27 -	22.80 J	11.20 NV	0.51 NV	46.00 UNV
A1PII-S2-2A-01-09	1.24 -	1.36 -	1.37 UJ	1.36 -	5.00 UJ	8.10 NV	0.50 NV	42.00 UNV
A1PII-S2-2A-01-10	1.22 -	1.35 -	1.36 UJ	1.35 -	5.00 UJ	7.90 NV	0.43 NV	42.00 UNV
A1PII-S2-2A-01-11	1.24 -	1.38 -	1.36 UJ	1.38 -	5.90 UJ	9.70 NV	0.48 NV	43.00 UNV
A1PII-S2-2A-01-12	1.24 NV	1.30 NV	1.34 UNV	1.30 NV	5.07 UNV	11.90 NV	0.45 NV	44.00 UNV
A1PII-S2-2A-01-13	0.85 -	0.90 -	0.87 UJ	0.90 -	4.90 UJ	12.60 NV	0.68 NV	42.00 UNV
A1PII-S2-2A-01-14	1.13 -	1.25 -	1.27 J	1.25 -	7.30 J	7.50 NV	0.50 NV	43.00 UNV
A1PII-S2-2A-01-15	1.38 -	1.30 -	1.32 UJ	1.30 -	6.50 UJ	6.70 NV	0.62 NV	44.00 UNV
A1PII-S2-2A-01-16	1.36 -	1.43 -	1.46 J	1.43 -	11.00 J	9.20 NV	0.83 NV	41.00 UNV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	1.50	130.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
W-statistic Prob. #	6.8% (N)	1.2% (N)	1.5% (N)	1.2% (N)	not tested	44.6% (LN)	8.1% (LN)	not tested
Test Procedure	t-Test (N)	Wilcoxon	Wilcoxon	Wilcoxon	Proportions	t-Test (LN)	t-Test (LN)	Proportions
Sample Size	16	16	16	16	16	16	16	16
Est. Mean*	1.20	1.28	1.28	1.28	6.17 J	9.76	0.56	0
UCL	1.27	--	--	--	--	10.47	0.61	--
Prob.	--	0.024%	0.024%	0.024%	0.009%	--	--	0.009%
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.50 -	1.43 -	1.46 J	1.43 -	22.80 J	12.60 NV	0.83 NV	46.00 UNV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	--	--	--
a posteriori Sample Size calculation	2 Pass	3 Pass	3 Pass	4 Pass	3 Pass	5 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

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

MDC Corrected

Table A-22a CU A1PII-S2-2a-01 Summary Statistics with Additional Samples

Area 1 Phase II Certification Statistics

Station Number	RADIONUCLIDES					METALS		PCBs
	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Beryllium	Araclor-1260
A1PII-S2-2A-01-01	1.21 -	1.31 -	1.30 UJ	1.31 -	5.80 UJ	10.30 NV	0.51 NV	40.00 UNV
A1PII-S2-2A-01-01-D	1.21 -	1.26 -	1.28 UJ	1.26 -	6.00 UJ	10.10 NV	0.42 NV	41.00 UNV
A1PII-S2-2A-01-02	1.19 -	1.20 -	1.20 J	1.20 -	19.80 J	12.40 NV	0.58 NV	43.00 UNV
A1PII-S2-2A-01-03	1.17 -	1.25 -	1.24 UJ	1.25 -	6.10 UJ	12.40 NV	0.42 NV	41.00 UNV
A1PII-S2-2A-01-04	1.23 -	1.24 -	1.22 J	1.24 -	15.30 J	7.90 NV	0.65 NV	43.00 UNV
A1PII-S2-2A-01-05	1.14 -	1.15 -	1.14 J	1.15 -	9.36 J	10.40 NV	0.52 NV	39.00 UNV
A1PII-S2-2A-01-06	1.50 -	1.29 -	1.28 J	1.29 -	6.17 J	8.60 NV	0.83 NV	43.00 UNV
A1PII-S2-2A-01-07	0.91 -	0.96 -	0.92 UJ	0.96 -	5.50 UJ	9.20 NV	0.50 NV	45.00 UNV
A1PII-S2-2A-01-08	1.24 -	1.27 -	1.25 J	1.27 -	22.80 J	11.20 NV	0.51 NV	46.00 UNV
A1PII-S2-2A-01-09	1.24 -	1.36 -	1.37 UJ	1.36 -	5.00 UJ	8.10 NV	0.50 NV	42.00 UNV
A1PII-S2-2A-01-10	1.22 -	1.35 -	1.36 UJ	1.35 -	5.00 UJ	7.90 NV	0.43 NV	42.00 UNV
A1PII-S2-2A-01-11	1.24 -	1.38 -	1.36 UJ	1.38 -	5.90 UJ	9.70 NV	0.48 NV	43.00 UNV
A1PII-S2-2A-01-12	1.24 NV	1.30 NV	1.34 UNV	1.30 NV	5.07 UNV	11.90 NV	0.45 NV	44.00 UNV
A1PII-S2-2A-01-13	0.85 -	0.90 -	0.87 UJ	0.90 -	4.90 UJ	12.60 NV	0.68 NV	42.00 UNV
A1PII-S2-2A-01-14	1.13 -	1.25 -	1.27 J	1.25 -	7.30 J	7.50 NV	0.50 NV	43.00 UNV
A1PII-S2-2A-01-15	1.38 -	1.30 -	1.32 UJ	1.30 -	6.50 UJ	6.70 NV	0.62 NV	44.00 UNV
A1PII-S2-2A-01-16	1.36 -	1.43 -	1.46 J	1.43 -	11.00 J	9.20 NV	0.83 NV	41.00 UNV
A1PII-S2-2A-01-17	1.27 -	1.20 -	1.20 -	1.20 -	15.26 -	6.90 NV	0.61 NV	42.00 UNV
A1PII-S2-2A-01-18	1.07 -	1.04 -	1.06 -	1.04 -	15.03 -	4.80 NV	0.49 NV	42.00 UNV
A1PII-S2-2A-01-19	1.29 -	1.20 -	1.21 -	1.21 -	9.57 -	5.80 NV	0.65 NV	41.00 UNV
FRL	1.70	1.80	1.70	1.50	82.00	12.00	1.50	130.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
W-statistic Prob. #	12.8% (N)	5.5% (N)	5.6% (N)	5.1% (N)	not tested	61.8% (N)	11.5% (LN)	not tested
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	Proportions	t-Test (N)	t-Test (LN)	Proportions
Sample Size	19	19	19	19	19	19	19	19
Est. Mean*	1.20	1.23	1.23	1.23	6.17 J	9.13	0.57	42.00 UNV
UCL	1.26	1.29	1.29	1.29	- -	9.84	0.60	- -
Prob.	- -	- -	- -	- -	0.0%	- -	- -	0.002%
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.50 -	1.43 -	1.46 J	1.43 -	22.80 J	12.60 NV	0.83 NV	46.00 UNV
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	3 Pass	3 Pass	4 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

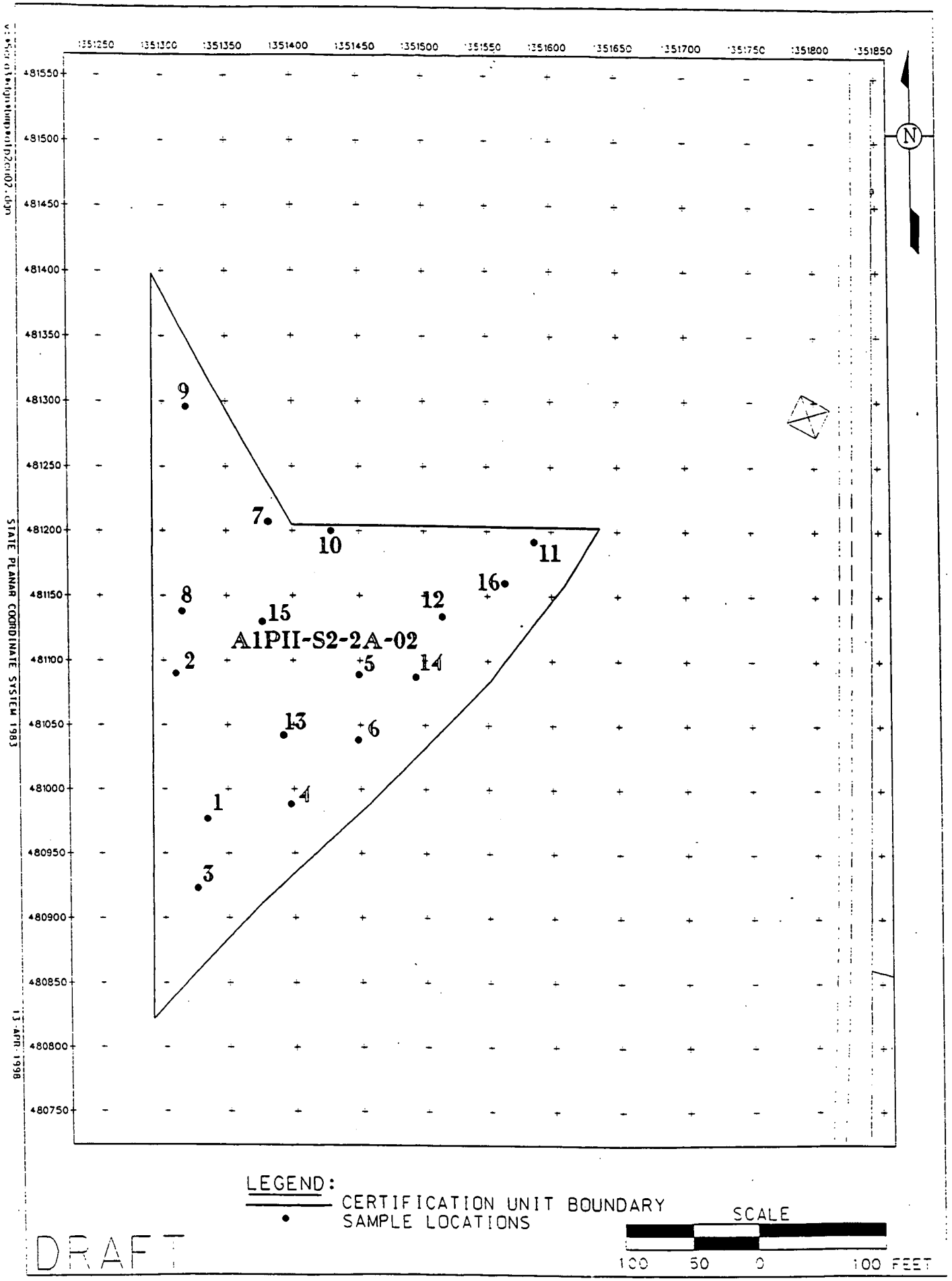
Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)

Results reported below the MDC were corrected to: "<MDC value> UJ"

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

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption. The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected



LEGEND:

CERTIFICATION UNIT BOUNDARY

SAMPLE LOCATIONS

SCALE

100 50 0 100 FEET

DRAFT

FIGURE A-23. CERTIFICATION UNIT A1PII-S2-2A-02 SAMPLE LOCATIONS

Table A-23 CU A1PII-S2-2a-02 Summary Statistics

Area 1 Phase II Certification Statistics

	RADIONUCLIDES					METALS		PCBs
Station Number	Radium-226	Radium-228	Thorium-228	Thorium-232	Uranium, Total	Arsenic	Beryllium	Araclor-1260
A1PII-S2-2A-02-01	1.33 -	1.39 -	1.38 -	1.39 -	47.10 -	5.10 -	0.47 -	47.00 U
A1PII-S2-2A-02-02-D	1.25 -	1.39 -	1.35 -	1.39 -	49.30 -	8.20 J	0.57 -	46.00 U
A1PII-S2-2A-02-02	1.27 -	1.37 -	1.35 -	1.37 -	45.60 -	8.10 -	0.53 -	46.00 U
A1PII-S2-2A-02-03	1.33 -	1.47 -	1.47 -	1.47 -	52.60 -	6.60 -	0.57 -	44.00 U
A1PII-S2-2A-02-04	1.34 -	1.53 -	1.52 -	1.53 -	62.90 -	5.20 -	0.42 -	51.00 U
A1PII-S2-2A-02-05	1.26 -	1.49 -	1.46 -	1.49 -	45.00 -	4.20 J	0.56 -	52.00 U
A1PII-S2-2A-02-06	1.28 -	1.41 -	1.42 -	1.41 -	52.20 -	5.10 J	0.49 -	43.00 U
A1PII-S2-2A-02-07	1.17 -	1.17 -	1.16 -	1.17 -	9.43 -	9.70 -	0.96 -	43.00 U
A1PII-S2-2A-02-08	1.25 -	1.44 -	1.44 -	1.44 -	60.90 -	7.10 -	0.37 -	46.00 U
A1PII-S2-2A-02-09	1.39 -	1.26 -	1.24 -	1.26 -	6.94 -	8.60 J	0.91 -	43.00 U
A1PII-S2-2A-02-10	1.27 -	1.33 -	1.32 -	1.33 -	17.90 -	8.60 -	0.57 -	39.00 U
A1PII-S2-2A-02-11	1.30 -	1.27 -	1.26 -	1.27 -	11.00 -	8.40 -	0.58 -	42.00 U
A1PII-S2-2A-02-12	1.28 -	1.39 -	1.37 -	1.39 -	49.50 -	4.90 J	0.33 -	45.00 U
A1PII-S2-2A-02-13	1.35 -	1.39 -	1.36 -	1.39 -	43.10 -	6.30 J	0.53 -	43.00 U
A1PII-S2-2A-02-14	1.26 -	1.31 -	1.29 -	1.31 -	34.40 -	5.20 J	0.47 -	42.00 U
A1PII-S2-2A-02-15	1.42 -	1.54 -	1.54 -	1.54 -	41.90 -	4.20 J	0.47 -	54.00 U
A1PII-S2-2A-02-16	1.17 -	1.32 -	1.32 -	1.32 -	38.00 -	6.50 J	0.38 -	50.00 U
FRL	1.70	1.80	1.70	1.50	82.00	12.00	1.50	130.00
Units	pCi/g	pCi/g	pCi/g	pCi/g	ug/g	mg/kg	mg/kg	ug/kg
Conf. Level	95%	95%	95%	95%	95%	90%	90%	90%
W-statistic Prob. #	53.9% (N)	83.9% (N)	98.5% (N)	83.9% (N)	5.5% (N)	24.2% (LN)	12.9% (LN)	not tested
Test Procedure	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (N)	t-Test (LN)	t-Test (LN)	Proportions
Sample Size	16	16	16	16	16	16	16	16
Est. Mean*	1.29	1.38	1.37	1.38	38.89	6.51	0.54	22.25
UCL	1.32	1.43	1.41	1.43	46.81	7.18	0.60	- -
Prob.	- -	- -	- -	- -	- -	- -	- -	0.009%
Pass / Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Max Result	1.42 -	1.54 -	1.54 -	1.54 -	62.90 -	9.70 -	0.96 -	54.00 U
2x Rule P/F	Pass	Pass	Pass	Pass	Pass	- -	- -	- -
a posteriori Sample Size calculation	2 Pass	2 Pass	2 Pass	6 Pass	3 Pass	2 Pass	2 Pass	2 Pass

Definition of Qualifiers
"J" = estimated result
"UJ" = not detected, estimated
"U" = not detected
" - " = no data qualifier
"NV" = not validated
"UNV" = not detected, not valid

Note: Est. Mean = Estimated measure of central tendency(Normal: Mean; LogNormal: Est. Mean; Non-Parametric: Median)
Results reported below the MDC were corrected to: "<MDC value> UJ"

** - The median (Est. Mean) for Aroclor-1260 is the average of the 8th and 9th ranked sample results. These two values are "44 U" (..-03) and "45 U" (..-12), the "U" was carried fo
The maximum value of the two duplicates was used in all statistical equations.

#: This is the highest reported probability of the Shapiro-Wilk W-statistic for tests for the validity of the normality assumption.
The test is performed on the raw data (untransformed) data (N) and the log-transformed data (LN) to test for lognormality.

MDC Corrected

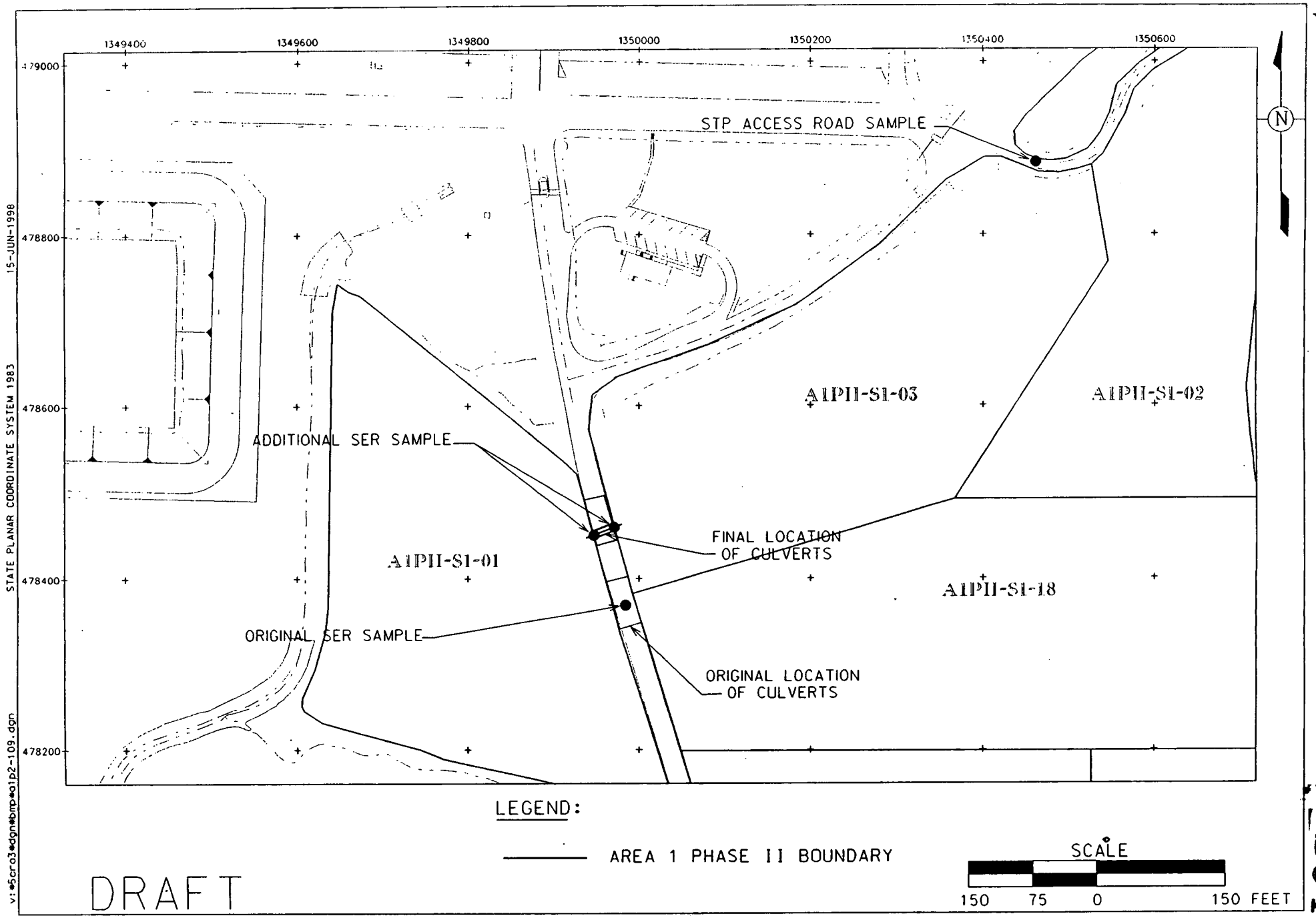


FIGURE A-24. LOCATION OF SAMPLES ON SOUTH ENTRANCE ROAD AND SEWAGE TREATMENT PLANT ACCESS ROAD

Table A-24
Results of Samples from South Entrance Road
and the Sewage Treatment Plant Access Road

Original South Entrance Road Samples

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER-01	Arsenic	6.7	NV	MG/KG
A1PII-S1-SER-01	Radium-226	1.08	-	PCI/G
A1PII-S1-SER-01	Radium-228	1.04	-	PCI/G
A1PII-S1-SER-01	Thorium-228	1.07	-	PCI/G
A1PII-S1-SER-01	Thorium-232	1.04	-	PCI/G
A1PII-S1-SER-01	Uranium, Total	19	-	MG/KG

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER-02	Arsenic	9.3	NV	MG/KG
A1PII-S1-SER-02	Radium-226	1.42	-	PCI/G
A1PII-S1-SER-02	Radium-228	1.19	-	PCI/G
A1PII-S1-SER-02	Thorium-228	1.19	-	PCI/G
A1PII-S1-SER-02	Thorium-232	1.19	-	PCI/G
A1PII-S1-SER-02	Uranium, Total	5.64	UJ	MG/KG

Additional South Entrance Road Samples

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER2-01	Arsenic	6.2	NV	MG/KG
A1PII-S1-SER2-01	Radium-226	1.2	-	PCI/G
A1PII-S1-SER2-01	Radium-228	1	-	PCI/G
A1PII-S1-SER2-01	Thorium-228	1.1	-	PCI/G
A1PII-S1-SER2-01	Thorium-232	1	-	PCI/G
A1PII-S1-SER2-01	Uranium, Total	16	-	MG/KG

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER2-02	Arsenic	8.1	NV	MG/KG
A1PII-S1-SER2-02	Radium-226	1	-	PCI/G
A1PII-S1-SER2-02	Radium-228	0.96	-	PCI/G
A1PII-S1-SER2-02	Thorium-228	0.96	-	PCI/G
A1PII-S1-SER2-02	Thorium-232	0.96	-	PCI/G
A1PII-S1-SER2-02	Uranium, Total	6	UJ	MG/KG

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER3-01	Arsenic	2.9	NV	MG/KG
A1PII-S1-SER3-01	Radium-226	0.77	-	PCI/G
A1PII-S1-SER3-01	Radium-228	0.48	-	PCI/G
A1PII-S1-SER3-01	Thorium-228	0.46	-	PCI/G
A1PII-S1-SER3-01	Thorium-232	0.48	-	PCI/G
A1PII-S1-SER3-01	Uranium, Total	3.7	-	MG/KG

Sample ID	Parameter	Results	Qualifier	Units
A1PII-S1-SER3-02	Arsenic	4.7	NV	MG/KG
A1PII-S1-SER3-02	Radium-226	1.3	-	PCI/G
A1PII-S1-SER3-02	Radium-228	1.3	-	PCI/G
A1PII-S1-SER3-02	Thorium-228	1.3	-	PCI/G
A1PII-S1-SER3-02	Thorium-232	1.3	-	PCI/G
A1PII-S1-SER3-02	Uranium, Total	7.3	UJ	MG/KG

Table A-24
Results of Samples from South Entrance Road
and the Sewage Treatment Plant Access Road

Sewage Treatment Plant Access Road Samples

Sample ID	Parameter	Results	Qualifier	Units
A1PII-STPAR-01	Arsenic	1.4	NV	MG/KG
A1PII-STPAR-01	Radium-226	1.3	-	PCI/G
A1PII-STPAR-01	Radium-228	1.24	-	PCI/G
A1PII-STPAR-01	Thorium-228	1.27	-	PCI/G
A1PII-STPAR-01	Thorium-232	1.24	-	PCI/G
A1PII-STPAR-01	Uranium, Total	4.12	UJ	MG/KG

Sample ID	Parameter	Results	Qualifier	Units
A1PII-STPAR-02	Arsenic	7.9	NV	MG/KG
A1PII-STPAR-02	Radium-226	0.417	-	PCI/G
A1PII-STPAR-02	Radium-228	0.166	UJ	PCI/G
A1PII-STPAR-02	Thorium-228	0.164	UJ	PCI/G
A1PII-STPAR-02	Thorium-232	0.166	UJ	PCI/G
A1PII-STPAR-02	Uranium, Total	0.46	UJ	MG/KG

A-25 Arsenic and Lead Results for Supplemental Treatability Data

Sample Identification	Arsenic (mg/kg)	Lead (mg/kg)
A1P2TRAP-1S-1-M	5.4	23.4
A1P2TRAP-2S-1-M	2.1	28.6
A1P2TRAP-3S-1-M	3	18.7
A1P2TRAP-4S-1-M	4	173
A1P2TRAP-5S-1-M	3.2	985
A1P2TRAP-6S-1-M	4.8	43.9
A1P2TRAP-7S-1-M	3.2	89.3
A1P2TRAP-8S-1-M	5	34.8
A1P2TRAP-9S-1-M	3.3	28.3
A1P2TRAP-10S-1-M	6	362
A1P2TRAP-11S-1-M	6.5	142
A1P2TRAP-12S-1-M	4.8	52.1
A1P2TRAP-13S-1-M	3.4	183
A1P2TRAP-14S-1-M	4.6	115
A1P2TRAP-15S-1-M	6.1	33.3
A1P2TRAP-15S-1-M-D	4.7	26.8
A1P2TRAP-16S-1-M	5.3	26.6
A1P2TRAP-17S-1-M	4.4	17.7
A1P2TRAP-18S-1-M	3.1	13.9
A1P2TRAP-19S-1-M	2.5	24.9
A1P2TRAP-20S-1-M	4.2	26.6
A1P2TRAP-21S-1-M	3.4	21.7
A1P2TRAP-22S-1-M	3.7	22.4
A1P2TRAP-23S-1-M	5.6	28.4
A1P2TRAP-24S-1-M	3.9	30.3
A1P2TRAP-25S-1-M	2.4	20.3
A1P2TRAP-26S-1-M	3.2	33.4
A1P2TRAP-27S-1-M	5	17.7
A1P2TRAP-28S-1-M	6.1	28.3
A1P2TRAP-29S-1-M	3.8	32.5
A1P2TRAP-30S-1-M	5.4	41.8
A1P2TRAP-30S-1-M-D	7.2	39.2

APPENDIX B

A1PII CERTIFICATION DESIGN LETTER COMMENT RESPONSES

DRAFT RESPONSES TO OHIO EPA COMMENTS ON THE AREA 1, PHASE II, SECTOR 1, 2a, AND CONVEYANCE DITCH CERTIFICATION DESIGN LETTER

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: — Pg #: — Line #: — Code: general
General Comment #: 1

Comment: These comments reflect our review of the original Certification Design Letter (Revision A), and Revision B and also changes to the CUs which were discussed in a telephone call on January 6, 1998. The changes to certification units A1PII-S1-01 through S1-08 were faxed to us on January 7, 1998. The area originally designated as by these eight CUs was changed to encompass 10 new CUs of different configuration. A revised map including sampling locations for the CUs should be provided to Ohio EPA.

Response: Agreed. The CUs were revised and a map was sent to OEPA and U.S. EPA in the revised Certification Design Letter.

Action: None.

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: — Pg #: — Line #: — Code: general
General Comment #: 2

Comment: There remain several conceptual problems with the 'certification for reuse' concept. These problems especially center around the sediment retention basins which will be an element of all of the remediation areas but it applies to any area where potential re-contamination may occur. In Area 1 Phase I, for example, the entire area was certified as clean and then sediment basins were installed to contain contaminated run-off from the area during remediation. The Ohio EPA will not concur with certification of a given area if future plans for that area place it at risk of re-contamination.

Our proposed solution is to concur with the certification of a given area except for that part of the area where 'certification for re-use' concept is planned. The Ohio EPA would not concur with the certification of the sedimentation basin until its footprint were remediated at some future time. This solution makes it necessary to design the individual certification units around the proposed location of the sedimentation basin. These changes were incorporated into the re-configured certification units that were faxed to us on January 7, 1998. Ohio EPA recommends incorporation of this issue into revision of the Sitewide Excavation Plan.

Response: This issue will be addressed in the next revision of the Sitewide Excavation Plan. Clearly, the sediment basins and other certification for reuse CUs must be tracked and certified after the completion of remediation activities in A1PII.

Action: None.

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: Code: general
General Comment #: 3
Comment: The Ohio EPA disagrees with the strategy to analyze 12 of the 16 soil samples for each certification unit and to archive 4 samples for future analysis if needed. We do not view the potential cost saving to be significant compared to the potential schedule impacts if the Borrow Area can not be utilized as planned for the OSDF construction. Past experience with the Area 1 Phase I project and the long turn around time for radium-226 tend to support our position. During the 1/6/98 conference call, DOE agreed to analyze 16 samples for all CUs north of and including S1-08 thru S1-11 to adequately address Ohio EPA's concern.

Response: Agreed. All CUs had 16 samples analyzed and used in the statistics, except CUs S1-12 through S1-17.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 1.0 Pg #: Line #: 38 Code: C
General Comment #: 4
Comment: The term "Group A CUs" should be defined. How are they differentiated from Group B CUs mentioned in Paragraph 1, Page 1-2?

Response: Group A CUs refer to CUs S1-01 through S1-19. Group B CUs will be in the trap range area only.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 1.0 Pg #: 1-2 Line #: 3 Code: C
General Comment #: 5
Comment: The text suggests that Group B CUs include the Trap Range. What other CUs are included in this group? How it is differentiated from Group A discussed on the preceding page?

Response: Group A CUs refer to CUs S1-01 through S1-19. Group B CUs will be in the trap range area only.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 1.0 Pg #: 1-2 Line #: 23-25 Code: C
General Comment #: 6
Comment: The language used in this sentence is unclear. It states that the conveyance ditch will be "characterized" then used as a source of fill for OSDF construction needs. It is unclear why it is not stated that the conveyance ditch CU will be certified prior to its use for borrow materials.

Response: The conveyance ditch CU is a characterize for reuse CU which has passed the certification statistics. Material excavated from this area will be considered non-impacted. Since this area will receive run-off from uncertified areas during Sector 3 remediation, it will require recertification in the future.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 2.0 Pg #: 5 Line #: 3 Code: C
General Comment #: 7
Comment: The text should clarify if the sample exhibiting matrix interferences was or was not from any portion of Area 1 Phase II Sector 1.

Response: The sample was not from Area 1, Phase II. The sample was from the Southern Waste Units.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 2.0 Pg #: 2-3 Line #: 35 Code: C
General Comment #: 8
Comment: The text should summarize how the trigger levels for the COCs were derived. Specifically, a summary of the calculations discussed in Appendix B of the document entitled "RTRAK Applicability Study" is needed.

Response: The trigger levels were set at 80 percent of the FRL, based on the best information available at the time. The current real-time Users Manual has additional information on trigger level.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 1.0 Pg #: 1-2 Line #: 23-25 Code: C
General Comment #: 9
Comment: The certification design rationale described in Appendix G of the SEP does not indicate how nondetects will be treated. The text should discuss the method that will be used for treatment of nondetects (e.g., substitution of ½ the detection limit, etc.) in the statistical analyses for certification.

Response: For nondetects, one-half of the detection limits was used in the certification statistics. This is discussed in the certification report.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: 3 Pg #: 5 Line #: Code: C
General Comment #: 10
Comment: This table's formatting should be corrected so that spurious characters do no appear in the results column. If the non-numeric characters in the column are intentional, an explanation of all qualifiers appearing in the table should be provided.

Response: A key is provided in the certification report.

Action: None.

Commenting Organization: OEPA Commentor: HSI-GeoTrans
Section #: Figs. 3 thru 6 and 8 thru 10 Pg #: Line #: Code: C
General Comment #: 11
Comment: The legend should include an explanation of what the unshaded (white) areas on these figures represent (e.g., south of the Trap Range). It appears that these areas were not characterized using real time methods or by physical sampling.

Response: The unshaded areas are those where the real-time data was unavailable. Since there is a significant amount of real-time data in adjacent areas and these areas are considered homogenous, additional real-time data was not collected.

Action: None.