FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

GEOTECHNICAL SAMPLING AND TESTING PLAN AREA 1 PHASE II

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GEOTECHNICAL SAMPLING AND TESTING PLAN
FOR
AREA 1 PHASE II
SOUTHEAST BORROW AREA

SOIL CHARACTERIZATION AND EXCAVATION PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

A/E	architect/engineer
A1PII	Area 1 Phase II
APM	Area Project Manager
ASL	Analytical Support Level
ASTM	American Society for Testing Materials
BCY	bank cubic yards
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CG&E	Cincinnati Gas and Electric
COC	constituent of concern
DOE	US Department of Energy
DQO	Data Quality Objective
EPA	US Environmental Protection Agency
FAL	Field Activity Log
FDF	Fluor Daniel Fernald
FEMP	Fernald Environmental Management Project
GIS	Geographic Information System
GMA	Great Miami Aquifer
GSTP	Geotechnical Sampling and Testing Plan
ICY	in-place cubic yards
IEMP	Integrated Environmental Montoring Plan
MW	monitoring well
OEPA	State of Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	Operable Unit
PPE	personal protective equipment
QA/QC	quality assurance/quality control
ROD	Record of Decision

SCEP	Soil Characterization and Excavation Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SEBA	Southeast Borrow Area
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
STP	Sewage Treatment Plant
WAC	waste acceptance criteria

1.0 INTRODUCTION

This Geotechnical Sampling and Testing Plan (GSTP) has been prepared to support planned excavation activities for Area 1 Phase II (A1PII) at the Fernald Environmental Management Project. A1PII encompasses approximately 150 acres in the southeastern portion of the (FEMP). It includes the Sewage Treatment Plant (STP), the dissolved oxygen facility and associated electrical substations, the north access road, and the trap range. The planned activities at A1PII include remediation of facilities and surrounding soils by excavating all impacted materials, pre-treating/processing mixed waste if necessary to meet Waste Acceptance Criteria (WAC), and properly disposing either in the FEMP On-Site Disposal Facility (OSDF) or stockpiling for disposal at an appropriate off-site facility. The purpose of this GSTP is to describe the field and geotechnical laboratory activities that will be undertaken to collect geotechnical data to evaluate potential borrow material proposed for use as fill for the STP area excavation.

1.1 SCOPE

Excavation plans suggest that STP excavation will require approximately 30,000 bank cubic yards (BCY) of backfill to restore the site after excavating contaminated soils. Previous geotechnical investigations indicate the native brown clay soils in the southeast portion of the FEMP site are suitable for this purpose. One area in particular was identified to have enough topographic relief to meet the fill requirement without significant alteration of existing surface drainage patterns. This 8-acre area is referred to herein as the Southeast Borrow Area (SEBA). From review of existing geotechnical data in the area, definitive stratigraphic information and geotechnical data regarding, compaction, strength and permeability properties of soils are not sufficient to support the engineering design requirements. The physical characteristics are expected to be consistent with existing data for glacial-fluvial deposits prevalent in the FEMP vicinity. This GSTP is designed to collect data using standard procedures for evaluation of borrow soils. Since borrow soils from this area would be OSDF foundation soils when backfilled at the STP, or might be used for OSDF construction, remolded permeability, strength and compressibility tests will be conducted to allow for evaluation of soils properties with respect to OSDF design requirements. Figure 1-1 provides a general location map.

1.2 OBJECTIVES

The Southeast Borrow Area (SEBA), located in the southeastern corner of the FEMP property, represents a total of about 50,000 bank cubic yards (BCY) of borrow, assuming that an excavation scheme where gravity drainage from the excavated borrow site is used. A conservative estimate of 70% useability brings the potential volume to roughly 35,000 BCY. The SEBA is shown in Figure 1-2. Eight soil borings will be drilled in the SEBA, each to a depth of about 15 feet. Soil samples will be collected and sent to a geotechnical laboratory for testing. The geotechnical tests will include moisture content, grain size with hydrometer, Atterberg limits, Standard Proctor compaction, remolded permeability, remolded strength and remolded consolidation tests. The test plan for the geotechnical samples is defined in Section 3.0.

1.2 BACKGROUND

1.2.1 FEMP

The Amended Consent Agreement for the FEMP includes provisions that obligate DOE to prepare records of decision (RODs) documenting the selected remedy for each of the five Operable Units (OUs) and to prepare corresponding remedial design and remedial action work plans to implement the remedies addressed in the RODs.

The RODs for OU2, OU3, and OU5 include remedies that substantially effect A1PII. The OU5 ROD prescribes the remedy for environmental media (soil, sediment, ground water and perched water) including concentrations of individual contaminants determined to be protective of human health and the environment. The OU3 Interim and final RODs document the remedial decisions for above grade structures and other improvements, including the STP and associate drying beds. The OU2 ROD calls for development of the OSDF, including the STP excavation site.

1.2.2 SCEP

The Soils Characterization Excavation Project (SCEP) is assigned responsibility at the FEMP for the removal of at-grade and below-grade facilities; excavation and disposition of contaminated soil, sediment, impacted material and debris, contaminated perched water; pre-certification and certification of sitewide soil such as A1PII; and final site restoration. Within the scope of the SCEP, DOE has isolated Area 1 for early remediation relative to other areas of the FEMP, primarily to allow development of the OSDF. To accomplish that purpose, the SCEP has been divided into several task

level projects based on site geography and logistics of remediation, such as Area 1. Area 1 is further divided into three sequential phases (i.e., A1PI, A1PII and A1PIII).

1.2.3 A1PII

Geographically, A1PII consists of 150 acres in the southeastern quadrant of the FEMP and includes two contiguous tracts. The easternmost tract is comprised of approximately 145 acres bounded on the North by A1PI, on the east and south by the FEMP property line, and on the west by the ditch on the east side of the main South and North Access Roads northward along the top of the berm bordering the Former Production Area fence. The second tract lies west of the South Access Road and comprises about 5 acres bounded on the east by the top of the western bank of a ditch along the west side of the South Access Road, on the north and east by the crest of the east bank of the channelized upper reaches of an unnamed tributary to Paddy's Run, and on the south by the top of the north bank of a ditch running westward from the South Access Road to the unnamed tributary.

Planned remediation of A1PII consists of excavating and disposing of at-grade and below-grade soil, debris, structures and utilities, as necessary to achieve FRLs for constituents of concern (COCs), and interim restoration in a manner consistent with final land use. Planned remediation also addresses contaminated perched groundwater which, if encountered, will be removed during soil excavation and treated, as appropriate. DOE will dispose of excavated solid materials in the OSDF if they meet the WAC established for that facility. If the materials do not meet the WAC, DOE will treat and ship to an offsite facility.

1.2.4 GSTP for A1PII

In support of design and construction of the OSDF, geotechnical investigations were required to obtain engineering and geotechnical data on soils from the potential borrow sources and on soils designated for use in OSDF disposal cell construction.

Specifically, one of the disposal facility cells for the OSDF will be superimposed on the footprint of the STP once the structures are removed and the soil underneath is remediated. The excavation will include the removal of all contaminated soil and perched ground water producing a fill requirement of roughly 30,000 BCY. The SEBA has been identified as a potential source of fill material. The objective of the GSTP is therefore to conduct field efforts and geotechnical laboratory testing necessary

to confirm the properties of the borrow soils in the SEBA to provide data to evaluate it's suitability for fill at the STP excavation site.

1.3 CONDITIONS

The proposed location and depth for geotechnical borings are based on existing geotechnical information near the proposed investigative areas, and estimated excavation contours at the SEBA. The Scope of Work included in this GSTP is based on the current understanding of site conditions. Revisions to the borrow source field and laboratory work may be necessary to ensure that the objectives are satisfied as the investigation proceeds. The field geologist or engineer will have the authority to make discretionary changes in the field as required to achieve the stated objectives of the GSTP. Discussions with the U.S. Environmental Protection Agency (EPA) and Ohio EPA (OEPA) will be conducted prior to modification of the fieldwork should significant changes be required in GSTP scope.

2.0 SUMMARY OF PREVIOUS GEOTECHNICAL INVESTIGATIONS

Previous geotechnical data within and in the immediate vicinity of the SEBA applicable to the engineering design to the SEBA were reviewed and found to be limited. Borings within and in the immediate vicinity of the SEBA are G2-208, G2-150, G2-150A, G2-153, and Monitoring Wells 2733, 3733, 2432, 3432, and 4432. Figure 1-2 shows the boring locations.

Boring G2-208 is a boring that may likely represent condition in the northern portion of the SEBA. The log of boring G2-208 indicates brown clay from land surface to a depth of roughly six feet. A brown sand interval extends to 7.5 feet, with brown clay below to 10.5 feet. Gray clay is then present to the bottom of the boring at 24.5 feet. Geotechnical laboratory test data from Boring G2-208 consists or grain-size and Atterberg Limits tests on a composite sample of brown and gray clay auger cuttings from Borings G2-208 and G2-205 (located about 250 feet northwest of Boring G2-208). A standard proctor compaction test was also performed on this sample. These test results are found in *Geotechnical Data and Evaluation Report for East and South Field Borrow Areas* (PARSONS 1996). This sandy lean clay (CL) sample had a maximum dry density of 122.5 pounds per cubic foot (pcf) and an optimum moisture content of 12.3 percent.

Borings G2-150 and G2-150A are located near the south portion of the SEBA. Brown clay interspersed with sand and silt is present from grade elevation to a depth of 10 feet. Gray clay with interbeds of sand occur from 10 feet to the bottom of the boring at 15 feet. Boring G2-150A is roughly 3 feet from Boring G2-150. A similar lithology is therefore expected in these two borings. Below the 15 foot horizon, Boring G2-150A shows silty clayey sand with gravel that grades in color from gray to greenish gray with depth. The greenish gray pattern persists with variations in stiffness and moisture content to roughly 23 feet. Underlying the clay is sand with gravel to total depth explored of 25 feet. Geotechnical laboratory test data from Borings G2-150 and G2-150A consists of moisture content, grain-size, and Atterberg Limits tests at various depths. Additionally an unconsolidated undrained triaxial compression test of an undisturbed gray clay sample was previously performed. These test results are found in PARSONS 1996. A brown clay sample from 2.5 to 4 feet depth classified as a lean clay (CL). A brown clay sample from 7.5 to 9 feet classified as a sandy lean clay (CL). The gray clay generally classified as sandy lean clays (CL) with varying gravel. Moisture contents of clays in the 25 foot soil profile ranged from about 11 to 25 percent and, in general, decreased with depth.

Boring G2-153 is located to the northwest of the SEBA. Light olive brown clay interspersed with sand is present to a depth of 7.5 feet and underlain with small deposits of gravel to roughly 16.5 feet. Below 16.5 feet the clay becomes greenish gray with scattered gravel to the bottom of the boring at 20 feet. Geotechnical laboratory test data from Boring G2-153 consists of moisture content, grain-size, and Atterberg Limits tests at various depths. Additionally unconsolidated undrained triaxial compression tests of an undisturbed brown clay and an undisturbed gray clay sample were previously performed. These test results are found in PARSONS 1996. The brown and gray clays classified as sandy lean clays (CL). Moisture contents of clays in the 20 foot soil profile ranged from about 9 to 15 percent.

Monitoring Wells 2733 and 3733 are located at the southern boundary of the SEBA. The lithology of Monitoring Well 2733 shows brown clay from ground surface to a depth of 10.5 feet. The brown clay is underlain by gray clay with increasing sand and silt content with depth. The gray clay rests upon the GMA at a depth of approximately 36.5 feet. In Boring 3733, brown clay occurs from grade to a depth of 11.5 feet. Gray clay with increasing silt content underlies the brown clay until the GMA at 38.5 feet.

Monitoring Wells 2432, 3432 and 4432 are located near the northernmost extent of the SEBA. The lithology of Monitoring Well 4432 shows brown clay from ground surface to a depth of 12 feet. The brown clay is underlain by predominantly gray clayey silt (with some sand intervals) to a depth of 39 feet. The sand and gravels of the GMA underlay the gray clayey silt to a depth of about 213 feet where the boring was terminated in gray shale bedrock.

3.0 FIELD SAMPLING AND TESTING PLAN

The data generated by this geotechnical investigation is necessary to determine engineering properties of the soils within the SEBA (Figure 1-2). This information will be used to establish compaction, slope stability, and settlement design parameters for soil placed as backfill at the STP area excavation site. Current estimates indicate a fill requirement of approximately 30,000 BCY. There are no archive soil samples available for testing for the area under investigation. Therefore, the information gathered from this plan will be the primary source of geotechnical data available for the area. The sample collection methods, field procedures, and standards for sampling and testing are described in this section. References for each procedure are listed in Tables 3-1 and 3-2.

The activities outlined in the Environmental Monitoring Standard Operating Procedure (SOP), ADM-02, Field Project Prerequisites, will be completed prior to drilling and sample collection activities.

Changes to the sampling plan made in the field based on conditions encountered will be documented in accordance with Section 6.6. Sampling locations and test requirements may be modified in the field by the architect/engineer (A/E) to reflect encountered conditions.

3.1 GEORPROBE® SAMPLING REQUIREMENTS

Van-mounted geoprobe rigs will be used to recover representative soil samples in the SEBA. Geotechnical testing of samples will be conducted at an off-site geotechnical laboratory. Due to the nature of the investigation, analytical sampling will not be required during this study.

Procedures to be used during field activities are derived from several FEMP program plans, procedures, ASTM guidance, and EPA sources. FEMP program plans, specifically the Sitewide CERCLA (Comprehensive Environmental Response, Compensation and Liability Act) Quality Assurance Project Plan (SCQ) and FEMP department standard operating procedures will be used as guidance documents.

3.1.1 Cultural and Natural Resources

Sitewide monitoring of natural resource impacts associated with this study will be conducted under the Natural Resources Impact Monitoring Plan, which is part of the Integrated Environmental Monitoring Plan (IEMP). No additional archeological surveys are planned under this GSTP. However, if unanticipated cultural resources are discovered, project personnel will isolate the affected area, stop work and contact Cultural Resources.

3.2 SOUTHEAST BORROW AREA FIELD PROGRAM

From a geotechnical engineering standpoint, soils used to fill the STP deep excavation will have to meet the following criteria:

- Be a good structural soil (modest to high strength, low compressibility and low organic content),
- Provide for a stable toe of the OSDF berm,
- Be certified to meet FRLs applicable to A1PII ,
- Be available and transportable to the excavation site during filling operations,
- Be a low permeability soil placed in a manner to minimize new pathways to the underlying Great Miami Aquifer (GMA) (for certain areas and/or elevations within the backfilled STP excavation footprint).

In addition to the general requirements above, soil that will be used for OSDF construction must meet the definition of an inorganic soil according to the Unified Soil Classification System (USCS) and ASTM D-2487.

As described in Section 2.0, the existing geotechnical data for the FEMP does not adequately characterize soil of the SEBA for use as engineered fill. A geotechnical investigation is therefore required to collect the appropriate samples for testing with consideration of the planned use of the borrow materials. Eight soil borings will be drilled in the SEBA. The proposed borings are shown on Figure 1-2. The planned depth of each boring is about 15 feet.

The volume borrow material expected from the SEBA is approximately 50,000 BCY if the entire area could be excavated in a manner that allows for the post-excavation topography to be gravity drained. Realistically, this volume may not be achieved for a variety of reasons, such as boundary restrictions due to easements, excavation slope stability considerations, or sand deposits which may make some of

the material unsuitable for use as a select fill. As mentioned earlier, conservative estimates assume that 70%, or 35,000 BCY, of the bulk inventory will be suitable as fill for the STP area. Considering the volume required, geometry necessary to achieve gravity drainage, and the stratigraphic descriptions described in Section 2, the borrow material to achieve this required volume will likely come entirely from the brown clay unit. The maximum anticipated excavation depths at the SEBA is no more than about 12 to 15 feet below land surface Use of the brown clay for as a construction material is consistent with the current design approach for the OSDF. Thus, this investigation focuses on classifying the soils in the brown clay unit, and their remolded properties. Table 3-3 lists the sample locations and approximate sample depth.

3.2.1 Soil Boring and Sampling

Northing and easting coordinates for the soil borings in the SEBA are presented in Table 3-4. Each boring will have a total depth of approximately 15 feet.

Cincinnati Gas and Electric (CG&E) has an electrical right-of-way that traverses the SEBA from about Boring SEBA-1 to Boring SEBA-7. The right-of-way is for two electrical towers located just outside the north and South boundaries of the SEBA, as shown in Figure 1-2. CG&E personnel will be notified of the planned activity in the SEBA and FDF will disclose any information that is pertinent to the physical status and maintenance of the right-of-way. There is also a Midvalley, 20-inch, crude oil pipeline running north and south, roughly 50 feet west of the SEBA. The invert elevation of the pipe is roughly 7 ft below grade. Since the pipeline exists outside the boundary of the polygon, concerns regarding its impact on the investigation are expected to be minimal.

A minimum of three tests for Natural Moisture Content (ASTM D-2216) will be performed on samples from each boring.

Standard Proctor compaction tests (ASTM D 698) will be performed on a bulk sample of soil from each boring. The samples will be recovered from a combination of clay cuttings acquired using a geoprobe auger and a geoprobe macrocore sampler. Grain Size with Hydrometer (ASTM D 422) tests and Atterberg limits (ASTM D 4318) will be performed on each bulk sample undergoing a Standard Proctor compaction test. Results from grain-size and Atterberg limits tests provide information that can be used to classify the soils according to the USCS.

Remolded permeability (ASTM D 5084) and consolidation tests (ASTM D 2435) will be performed on samples remolded to simulate planned compaction requirements to provide information regarding compacted soil permeability and settlement characteristics. Remolded strength tests (ASTM D 2850 and ASTM D 4767) will also be performed on remolded samples to determine soil strength parameters for slope stability and foundation evaluations associated with design of the OSDF disposal cell at the backfilled STP Area..

Visual field logging by a geologist or geotechnical engineer will be performed to describe the lithologies observed during drilling using ASTM D 2488 guidelines. The geologist or geotechnical engineer will also examine and describe any sand or silt units which may be encountered. Such units, if extensive, may place constraints on the use of the borrow material as fill in the OSDF.

3.2.2 Sampling Procedure

A van-mounted geoprobe rig will be used to advance geotechnical soil borings to the appropriate depths in the SEBA. A macrocore sampler will be used to recover samples during boring operations. The macro core geoprobe will allow the field geologist or engineer to recover the required lithologic information for each soil boring. The internal diameter of the geoprobe sampler is 1.5 inches, which is not enough to produce the sample material volume required for a bulk sample. Therefore, after the geoprobe operation is complete, the hole will be either over-bored with an auger down to the desired sample depth, or an adjacent boring will be completed to collect the required sample volume. Cuttings from the auger will be combined with the geoprobe material to produce the required volume of sample material necessary to perform the tests (about 10 gallons per bulk sample). As mentioned earlier, the field geologist or engineer will have the authority to modify the field program in lieu of sample volume requirements or conditions encountered in the field.

A hand-held pocket penetrometer will be used to estimate unconfined compressive strength on some of the core sample material.

Continuous sampling at each location from the surface to a planned total depth of 15 feet will be conducted using the Geoprobe® Macro-core sampler. The field geologist or engineer will describe the soil in accordance with ASTM D 2488, as appropriate, and record classifications on a lithologic log (see Appendix B). A field technician will maintain the Field Activity Log (FAL) (see Appendix B).

All SEBA samples will be field screened by a sampling technician with a beta/gamma detector for radionuclides. No organic chemical contamination is suspected in the area, therefor no PID reading will be required.

Planned boring depths, type and depth of samples, and corresponding geotechnical testing required for each sample are identified in Table 3-3. A summary of geotechnical laboratory testing related to the 8 soil borings is summarized in Table 3-5.

After drilling and sampling is completed at each sample location, volclay grout will be used to backfill the hole to the ground surface as required. This will be accomplished via a tremie line for small-diameter holes (less than 3 inches). The augered holes will be abandoned by pouring batches of grout into the borehole from the surface with periodic tamping to prevent bridging at the direction of the field geologist.

Field crews (including field geologists and engineers) are to pay special attention to the drilling operations as the drilling depths approach the bottom of the planned boring depths. Grouting equipment and supplies are to be located at the drill site for quick response in the event of an actual GMA penetration. In addition, the field geologist will be given authority to lessen the depth of boring, based on observed changes in test samples brought to the surface.

From, the stratigraphy descriptions presented in Section 2, penetration of the GMA with the 15 foot planned borings is not likely. Previous studies have shown that the GMA in this area is roughly 38 feet below the ground surface, which places the total depth of the proposed borings at a minimum of 20 feet above the GMA. In the unlikely event that the GMA is penetrated, the cement plug will not be placed at the top of the boring for at least several days to assure that subsidence of grout into the GMA is not occurring. If the grout is found to be subsiding into the GMA, then additional grout will be placed in the hole and observed until subsidence stops. If required, borings can be over drilled and regrouted.

DOE will notify both EPA and OEPA in the event that the GMA is penetrated during this investigation.

3.3 WASTE HANDLING AND DISPOSAL

During the investigation, most bore cuttings will be used as geotechnical test material. As a result, field waste is expected to be minimal. The composition of waste will be primarily clay laden with sand, silt, gravel, or organics, representing a very small percentage of the total bulk volume retrieved.

The current plan is for all drill cuttings to be periodically removed from around the boreholes and stored on a plastic sheet close to the drilling location. The cuttings will be segregated, field tested, and placed in the sample containers specified in Tables 3-3 and 3-5. Waste cuttings, or those cuttings that are not suitable to be used as representative test material, will then be scattered in the general vicinity of the boreholes after the drilling operation and a subsequent radiological survey are complete.

Investigation derived wastewater, generated from the decontamination of drilling and sampling equipment, will be handled in accordance with FEMP waste management policies.

3.3.1 Equipment Decontamination

All equipment, tools, and other items coming in contact with the sampled media will be wiped clean of soil or rinsed with potable water as required by the field geologist. All equipment will come to the field clean. Equipment and sampling tools will be decontaminated after removal from the field. Level I decontamination will be required if radiological screening identify elevated radiation levels. Decontamination methods will be documented in field logs.

3.3.2 PPE Requirements

All work performed within the SEBA shall be performed in PPE as required by the Project Specific Health and Safety requirements matrix and the FDF Work Permit (refer to Section 5.0 of this GSTP for further discussion).

3.4 PROJECT SURVEYING

Land surveying will be performed at all on-site drilling locations using the 1983 NAD coordinate system. Surveying results will be reviewed by a State of Ohio Registered Professional Land Surveyor. All surveyed locations will be accurate to the nearest 0.10 feet elevation accuracy. Survey points will be located to within 0.5 feet horizontal accuracy and integrated into the existing FEMP Geographic

Information System (GIS), and incorporated into the site Geotechnical Database developed by Parsons and into the Sitewide Environmental Database (SED).

3.5 SUPPLEMENTAL SAMPLING REQUIREMENTS

3.5.1 Field QC Samples

Since no analytical samples will be taken, field QC samples will not be collected during the Geotechnical Investigation.

3.5.2 Sample Equipment and Materials

All samples will be collected with equipment which is functional, designed for the specific purposes of the sampling event, and properly decontaminated. Sampling will be accomplished with equipment made of nonreactive materials.

Sampling containers will be composed of materials which are commonly used for the type of media to be sampled. All sample containers will be of the volume necessary for geotechnical analysis.

3.5.3 Sample Collection Documentation

The collection of soil and subsoil materials are documented on the following forms:

- Sample Collection Log
- Field Activity Log
- Lithologic Log
- Chain of Custody/Request for Analysis Record
- Chain of Custody/Request for Analysis Change Request Form
- Borehole Abandonment Log

Examples of these forms are shown in Appendix B.

A Sample Collection Log will be completed which summarizes all samples collected from a single borehole. A lithologic log will be completed for soil borings when appropriate. Furthermore, all field investigation work is documented in detail on a daily basis using the Field Activity Log. The method used for borehole abandonment will be specified in the abandonment log (see Appendix B).

Any changes to the approved work plan will be approved in accordance with Section 6.6 of this GSTP.

3.5.4 Data Management

Data management will be implemented so that information collected during the investigation will be properly managed following completion of field activities. As specified in Section 5.1 of the SCQ, sampling teams shall describe daily activities on FALs sufficient for the sampling team to reconstruct a particular situation without reliance on memory. Sample Collection Logs shall be completed according to instructions specified in Appendix B of the SCQ. To assure proper documentation has been completed during field activities and that documentation has been completed correctly, field documentation shall be validated as described in Section D.5 of the SCQ.

Geotechnical test data will be verified by A1PII project personnel and by Parsons personnel. Laboratory data and field documentation will be entered into the SED. Hard-copy documentation will be entered into the SED. Hard-copy documents are kept in permanent storage in the project files. Electronic databases may also be permanently archived in a neutral ASCII file format.

Copies of all field data packages will be forwarded to the appropriate A1PII project personnel upon completion of field records verification.

3.6 SAMPLE MANAGEMENT

3.6.1 Sample Identification and Labeling

A unique sample number will be assigned to each sample collected. Each sample container will also be affixed with a sample label containing, at a minimum, the information specified on Form 3-2, Appendix B of the SCQ.

3.6.2 Sample Chain of Custody Records and Field Data Documentation

Sample custody procedures as outlined in the SCQ will be observed throughout the sample handling process from field collection to shipment or delivery of the samples to the laboratory. The Chain of Custody/Request for Analysis form will be completed for all samples. Any changes to the log will be submitted on a Chain of Custody/Request for Analysis Change Request Log (see Appendix B).

3.7 FIELD EQUIPMENT METHODS

3.7.1 Field Equipment Calibration

Field equipment to be used during this investigation is divided into the categories of health and safety monitoring and field screening and monitoring. At a minimum, all equipment will be operated and calibrated according to the equipment manufacturer's specifications. All instruments are calibrated to manufacturers' specifications. Written logs of equipment calibration are maintained by the appropriate personnel in charge of performing the instrument calibrations.

3.7.2 Documentation of Calibration

Separate logbooks are kept for each type of instrumentation. The logbooks contain a history not only of the instrument calibration but also of any unusual or irregular problems noted during the use of that particular instrument. Two separate documents are used to record calibration of instruments. The forms are labeled as follows:

- Instrument Calibration Log
- Field Activity Log

3.8 LABORATORY METHODS

Geotechnical testing performance requirements shall be used as guidelines for evaluating laboratory capability to provide specific analytical services to the FEMP. The off-site geotechnical laboratory will be an FDF. approved laboratory meeting SCQ requirements. The geotechnical laboratory must have a NRC licence to handle potentially contaminated soil samples.

3.9 SAMPLE TESTING

Sample testing will be performed in accordance with the guidance and requirements contained in the this GSTP. This task consists of sample management; quality control; and data reduction and reporting. These subjects are discussed in detail in the SCQ. Geotechnical samples will not be validated but will comply with the standards referenced in this document.

Sample management and control will be in accordance with this GSTP. Sample custody will be maintained and documented from the time of collection through testing. Appropriate records will be maintained in the chain-of-custody process for sample tracking and control during shipment.

Data reduction and reporting will be in accordance with Section 2.3.3 (Data Quality Objectives, or DQOs) of the SCQ. Numerical analysis, including manual calculations, mapping, and computer modeling, will be documented and subjected to peer review.

Once the samples are collected and sent to the appropriate laboratory for testing, field information will be received to verify that all required field information is complete and accurate; the information will then be forwarded to Data Quality Management. Field records generated for Analytical Support Level (ASL) E analyses will be forwarded to QA as a second level of field records verification following review.

The laboratory will then analyze the samples per the requirements set forth in the GSTP. After the laboratory has analyzed the samples and verified that the quality of the data meets the requirements of the analytical method, and that all deliverables are included, the data will be delivered to Parsons representatives to perform the following tasks:

- Verify that all required deliverables have been received.
- Verify that contract performance requirements have been met. These contract performance requirements will be identified in the GSTP.
- Enter data into the appropriate Parsons database.
- Copy data packages and deliver them to Data Quality Management personnel. The original of the data packages will be stored in a secure location.
- Confirm with an initial screening that the appropriate information is present.
- Log the package into a tracking database.
- Ensure that all QC information required to qualify data is present with supporting documents which can impact qualification of data from the laboratory.

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TABLE 3-1
SOIL SAMPLING AND TESTING
REFERENCE GUIDELINES

Administrative Procedures	Reference Documents
QA/QC	SCQ Sections 4, 5, 10, and 11; Appendix A/Table 2-2; Appendix D; Appendix J
Chain of Custody	EW-0002 (SSOP-0018), Chain of Custody/Request for Analysis Record for Sample Control
Corrective Action	SCQ Volume I, Section 15.2;
Daily Logs	SCQ Appendix J, Subsection J.4.1
Document Change Request	SCQ Volume I, Section 4.4.3.2;

Field Procedures	Reference Documents
Geoprobe® Sampling Methods	EQT-06, "Geoprobe® Model 5400 - Operation and Maintenance"
Soil Sampling	SMPL-01, Solids Sampling
Borehole Abandonment	ASTM D5299-42 "Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes and Other Devices for Environmental Activities" and SCQ Appendix J OAC 3745-9-10 "Abandonment of Test Holes and Wells" ASTM C150-92 "Standard Specification for Portland Cement"
Decontamination	SMPL-01, "Solids Sampling"

Sample Handling/ Laboratory Procedures	Reference Documents
Geotechnical Sampling and Testing Methods	ASTM reference standards as shown in Table 3-2

TABLE 3-2
SUMMARY OF ASTM PROCEDURES

Test No.	Title
D 420	Standard Guide for Investigating and Sampling Soil and Rock
D 422	Standard Test Method for Particle Size Analysis for Soils
D 698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
D 1452	Standard Practice for Soil Investigation and Sampling by Auger Borings
D 2216	Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock
D 2435	Standard Test Method for One-Dimensional Consolidation Properties of Soils
D 2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D 2488	Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
D 2850	Standard Test Method for Unconsolidated Undrained Compressive Strength of Cohesive Soils in Triaxial Compression
D 4220	Standard Practices for Preserving and Transporting Soil Samples
D 4318	Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
D 4767	Standard Test Method for Consolidated-Undrained Triaxial Compressive Test on Cohesive Soils
D 5084	Standard Test Method for Measurement of Hydraulic Conductivity of Saturated porous Materials Using a Flexible Wall
D 5299	Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities

TABLE 3-3
GEOTECHNICAL SAMPLING AND TESTING PLAN

Boring Number	Depth (feet)	Geotechnical Tests	Sample Type
SEBA-1	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL	Bulk
SEBA-2	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2+CONr+UUr +CUr	Bulk
SEBA-3	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2+CONr+UUr +CUr	Bulk
SEBA-4	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2	Bulk
SEBA-5	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL	Bulk
SEBA-6	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2+CONr+UUr +CUr	Bulk
SEBA-7	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2	Bulk
SEBA-8	0-5	MC	Jar
	5-10	MC	Jar
	10-15	MC	Jar
	0-15	SP+GS+AL+Pr2+CONr+UUr +CUr	Bulk

Notes:

1. The definitions of the geotechnical laboratory testing are as follows:
   MC = Moisture Content, ASTM D 2216.
   GS = Grain Size/Hydrometer, ASTM D 422 (includes SG = Specific Gravity, ASTM D854).
   AL = Atterberg Limits, ASTM D 4318.
   SP = Standard Proctor, ASTM D 698, five-point test.

TABLE 3-3
(continued)

Pr2 = Remolded Permeability, ASTM D 5084, 2 tests
CONr = Remolded Consolidation Test, ASTM D 2435
UUr = Remolded Unconsolidated, Undrained Triaxial Compression Test, ASTM D 2850, saturated, single point test
CUr = Remolded Consolidated, Drained Triaxial Compression Test with pore pressure measurements, ASTM D 4767, three-point test

2. Samples intervals shown in this table are approximate. Actual sample intervals will be determined by the field geotechnical engineer/geologist based on conditions encountered in the field.

3. Sample Type:
Jar = Moisture Tight Jar (250 or 500 ml)
Bulk = Bulk sample (10-gallon moisture tight drum or equivalent container(s))

4. Target remolding conditions for strength, consolidation and permeability tests: 95 % of Maximum Dry Density based on Standard Proctor at Optimum Moisture Content.

5. Target remolding conditions for permeability tests:

Test 1 - 95 % of Maximum Dry Density based on Standard Proctor at Optimum Moisture Content.
Test 2 - 100 % of Maximum Dry Density based of Standard Proctor at Optimum Moisture Content.

6. See Figure 1-2 for boring locations.

7. An alpha/beta (A/B) screen sample shall be collected from the 0-6" interval at each boring location.

8. The planned bulk samples described in this table are soils from the brown clay unit. If a significant interval of the gray clay unit is encountered (about 5 feet or greater of the gray clay unit within 15-foot boring), a bulk sample (s) or may be collected as directed by the field geotechnical engineer. The sample(s) of gray clay will either sent to the geotechnical laboratory for testing or archived. The field geeotechnical engineer has discretion to assign the gray clay bulk sample the tests outlined in this table, or assign an additional series of tests (e.g., SP+GS+AL+Pr2+CONr+UUr+CUr, etc.).

TABLE 3-4
PLANNED BORING COORDINATES
SOUTHEAST BORROW AREA

Boring	Northing (NAD 1983)	Easting (NAD 1983)
SEBA-1	476919	1351659
SEBA-2	476920	1351515
SEBA-3	477135	1351410
SEBA-4	477354	1351423
SEBA-5	477349	1351559
SEBA-6	477571	1351535
SEBA-7	477757	1351640
SEBA-8	477981	1351704

TABLE 3-5
NUMBER OF TESTS AND SAMPLE VOLUME
SOUTHEAST BORROW AREA

Test	Total Number	Sample Requirement
Moisture Content (MC) ASTM D 2216	24	1 x 250 ml (or 500 ml) moisture tight glass jar.
Standard Proctor (SP) ASTM D 698	8	(Note 1)
Grain Size w/ Hydrometer (GS) ASTM D 422	8	(Note 1)
Atterberg Limits (AL) ASTM D 4318	8	(Note 1)
Remolded Consolidation (CONr) ASTM D 2435	4	(Note 1)
Remolded Unconsolidated Undrained Triaxial Compression (UUr) ASTM D 2850	4	(Note 1)
Remolded Consolidated Undrained Triaxial Compression (CUr) ASTM D 4767	4	(Note 1)
Remolded Permeability (Pr2) ASTM D 5084	6	(Note 1).

[1] One 10-gallon moisture tight drum (or equivalent) full of soil to provides enough sample material for the following combination of tests: GS+AL+SP+CONr+UUr+CUr+Pr2.

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section defines the roles and responsibilities of team members who will be sampling and testing the SEBA. General project responsibilities are illustrated in Figure 4-1 and a project schedule is presented as Table 4-1. The Project Team will provide all of the technical, regulatory, and administrative input required for field work, under the direction of the A1PII APM. The SCEP and Soil and Water Division will provide programmatic management and support to the A1PII Project Team as required.

4.1 ORGANIZATIONAL RESPONSIBILITIES

The A1PII project team will be responsible for implementing the geotechnical investigation. The work is divided into the following objective:

- Prepare DQOs;
- Perform overall planning, integration and execution.
- Prepare the GSTP per regulatory guidance for conducting field investigations, sampling and testing tasks;
- Provide oversight and technical representation to subcontractors,
- Provide continuous coordination with sand and gravel personnel,
- Oversee and manage field sampling activities; and
- Approve and document scope variances and field changes.

Sampling for this project will be performed by a drilling subcontractor and personnel from the FDF Environmental Monitoring Department.

Managerial oversight of the project will be provided by the A1PII APM. Engineering oversight will be provided by the A1PII Engineering Manager. The following functional groups will be assigned to assist the Engineering Manager in performing the geotechnical investigation.

- Engineering Task Manager - responsible for implementing the geotechnical investigation program objectives and reviewing data.
- Soil and Water Projects - responsible for obtaining the required subcontract services.

- Drilling Subcontractor - responsible for drilling equipment and proper execution of drilling activities in accordance with the approved GSTP.

- Environmental Monitoring - responsible for the following:
  - supervising the drilling subcontractor in the field and performing geoprobe borings
  - ensuring the proper sampling equipment is available and in serviceable condition
  - ensuring that proper sampling containers are available
  - collecting samples in accordance with the approved GSTP
  - completing field activity logs, sample collection logs and Chain of Custody/Request for Analysis forms
  - labeling, handling, and storing samples prior to sample delivery/shipment
  - preparing off-site shipment of samples
  - assuring that drill cutting and decontamination water are disposed properly
  - manage waste dispositioning and borehole abandonment

- Parsons Engineering Inc. - responsible for the following:
  - developing the technical portions of the GSTP including determining the locations and depths of sampling, and which specific tests will be performed.
  - providing technical guidance during drilling and sampling operations
  - overseeing sample testing
  - providing equipment and technical support to perform grain-size analysis on archived samples
  - developing lithographic boring logs
  - interpreting geotechnical data
  - preparing the geotechnical report

- Safety and Health - responsible for assuring the safe conduct of on-site investigation field activities and for overall health of site workers.

- Quality Assurance (QA) - responsible for the following independent investigation activities:
  - assuring field activities follow the identified procedures/GSTP
  - providing QA oversight of subcontractor activities
  - assuring that any deviations from the scope of work are properly documented
  - approve data quality objectives and the GSTP

- Project Controls - responsible for tracking costs and scheduling data.

- Regulatory Programs - responsible for assuring that the regulatory basis for design is met by the proposed data collection activity.

- Engineering - responsible for identifying underground utilities.

4.2 RESPONSIBILITY MATRIX

The following is a responsibility breakdown of the geotechnical field investigation tasks.

1.	Procurement	
a.	Drilling	FDF Subcontractor
b.	Geotechnical Testing	A/E and A/E Contracted Laboratory
2.	Access	
a.	On-site Access Coordination	FDF
b.	Vehicle/Equipment Inspection	FDF
c.	Site Access Training	FDF
d.	Health & Safety Training	FDF
3.	Permits and Approvals	
a.	Site Penetration Permits	FDF
b.	Other Site Permits/Approvals	FDF
4.	QA/QC Activities	
a.	Overall QA/QC Management	A/E+FDF
b.	Field Activities QA/QC	A/E+FDF
c.	Laboratory QA/QC	A/E
5.	Field Investigation Program	
a.	Scope of Field Program	A/E+FDF
b.	Health & Safety Management/Oversight	FDF
c.	Field Health & Safety	A/E+FDF
d.	Location Surveying	FDF
e.	Specify Sample Depth, Type, Quantity	A/E
f.	Document Sampling Methods are in accordance with ASTM Standards	A/E
g.	Coordinate On-site Equipment Moves	A/E+FDF
h.	Prepare Boring Logs	A/E
I.	Collect Samples	FDF
j.	Prepare Field Notes and Documents	A/E+FDF
k.	Coordinate Sample Movement/Release	FDF
6.	Interpretation of Results	
a.	Classify tested material	A/E
b.	Characterize and define the geotechnical properties (including permeability) of the granular material	A/E
c.	Characterize and define the geotechnical properties of non-granular materials	A/E
d.	Develop design slopes for excavation of Soils where appropriate.	A/E
e.	Develop grading and site restoration recommendations for areas affected by	

	impacted soil removal	A/E
f.	Develop dewatering requirements and make relevant recommendations.	A/E

4.3 SAMPLING SCHEDULE

Sampling will be accomplished according to the schedule contained in Table 4-1. The EPA and OEPA will be notified prior to the beginning of field activities.

TABLE 4-1
PROJECT SCHEDULE

Activity	Start	Finish
Geotechnical Field Work [1]	1/5/98	1/16/98
Samples Shipped to Laboratory	1/19/98	1/20/98
Laboratory Testing	1/21/98	2/20/98
Draft Geotechnical Report Preparation [2]	2/23/98	3/27/98

1. Field work includes drilling, logging, sampling and some sample shipment to the geotechnical laboratory.
2. Geotechnical Report prepared by Parsons.

5.0 HEALTH AND SAFETY

The most successful health and safety programs ensure that involved personnel have received adequate training before field work begins. Personnel will be made aware of all physical, radiological, and chemical hazards which may be encountered by training throughout this project.

All FDF and subcontractor personnel who will be performing fieldwork during this project will be required to have participated in all Occupational Safety and Health Administration (OSHA)-mandated 1910.120 Hazardous Waste Site Worker training. In addition, all applicable annual refresher training will have been taken by the individuals.

Field personnel participating in the project will be briefed on FEMP requirements and Project Specific Health and Safety Requirements Matrix, and the GSTP.

In summary, employee awareness and clearly delineated lines of authority and responsibility have been designed to provide for effective health and safety related knowledge specific to each activity.

5.1 GEOTECHNICAL SAMPLING AND TESTING PLAN

All aspects of this GSTP will be performed in accordance with all existing applicable U.S. DOE, U.S. EPA, OSHA, and State of Ohio health and safety regulations. Additionally, all practices will be managed in accordance with commonly accepted practices used in the hazardous waste industry.

A FEMP Work Permit will be obtained prior to performing any fieldwork. This FEMP Work Permit will include a Penetration Permit that must be issued for each sample location prior to drilling, trenching, or soil boring activities may begin. Before a Penetration Permit is obtained, the area of concern is investigated and compared against the site database for underground utilities in the area. No drilling, trenching or soil borings will be performed without a valid Penetration Permit being obtained prior to actual performance of the fieldwork.

Field activities require a health and safety requirements matrix. A health and safety representative will monitor the activities of the field crew for each project or subtask. Health and safety plans provide for the hazards typically encountered by personnel when performing the specified fieldwork.

Proper equipment to be used for health and safety monitoring and personnel protection will be specified in Attachment B of the Project Specific Health and Safety Plan (Personnel Environmental Monitoring Action Levels). Criteria for the selection of monitoring equipment and protective clothing will also be detailed in Attachment A of the Project Specific Health and Safety Plan (Health and Safety Requirements Matrix) and may be further augmented during the issuance of FEMP Work Permits.

Personnel associated with the task are required to read and understand the Project Specific Health and Safety Plan prior to either entering the immediate work zone or performing field work.

5.2 RADIOLOGICAL MONITORING AND CONTROL

Monitoring results, which exceed FEMP-determined exposure guidelines, will be further evaluated as to the possible source(s). Measures necessary to reduce personnel exposure to radiation will be implemented. Such measures may include, but are not limited to, personnel training, employee exposure monitoring, increased personnel monitoring, and the use of personnel protective equipment.

If the responsible radiological technician assigned to the field activities identifies a real or potential radiological condition which could result in an unsafe condition, then that person has the responsibility to cease field operations until such time as the unsafe condition has been corrected.

5.3 NON-RADIOLOGICAL MONITORING AND CONTROL

Monitoring of potential health and safety problems associated with non-radiological hazards are evaluated by a health and safety technician. Also, all field crews are responsible for hazard awareness and recognition. Task-specific training is designed to enhance the performance of all fieldwork using good and safe work practices.

Evaluating the potential for personnel exposure to organic contaminants will be achieved mainly through the use of a Photoionization Detector. Other equipment which could potentially be used include oxygen meters, and combustible gas indicators. Personal protective equipment (PPE) requirements for non-radiological hazards will be determined by FDF health and safety personnel prior to the execution of field activities.

If the responsible industrial hygiene representative assigned to the field activities identifies a real or potential condition which could result in an unsafe condition, then that person has the responsibility to cease field operations until such time as the unsafe condition has been corrected.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The primary objectives of the QA/QC sections of this plan relate to the collection of engineering/ geotechnical information needed to support the remedial design of the former production area. Specific objectives of this field sampling effort will be designed, organized, and implemented in a manner which will optimize the collection of information which meets DQOs.

6.1 DATA COMPLETENESS AND VERIFICATION

For the purposes of this GSTP data, completeness and verification are defined as follows.

6.1.1 Data Completeness

A sufficient number of successful measurements, at least 90 percent, should be obtained to characterize the extent and nature of soils within the former plant area.

6.1.2 Data Verification

After data are received, the data will be reviewed for consistency with the requirements specified in the DQO and the GSTP. The A/E will control and verify calculations based on the A/E's internal procedures.

6.2 TRAINING

All FEMP employees and subcontractors assigned to this project will be required to participate in a series of regularly scheduled training sessions designed to enhance employee awareness of individual responsibilities and duties in the project. Field staff will receive comprehensive project and task specific training. Daily project "Tailgate Safety Meetings" will augment health and safety and project objectives training conducted prior to the project start. Refer to Section 4.4 of the SCQ for additional details.

6.3 FIELD DATA PACKAGE VALIDATION

Data validation will be performed by the FDF Environmental Monitoring Department on all field data packages.

6.4 PERFORMANCE AND SYSTEM ASSESSMENTS

To verify compliance with the SCQ and project-specific requirements, the FEMP project manager and designated FEMP QA organization shall be responsible for scheduling and conducting QA surveillance. Assessments are available to the EPA upon request to DOE-FN. EPA may conduct external audits of FEMP activities covered by the 1991 Amended Consent Agreement, as required.

As a minimum, GSTP audits shall consist of evaluation of project QA program and procedures, effectiveness of implementation, and review of associated project documentation. Surveillance may cover applicable laboratory activities, field operations and documentation, and final reports. Planned QA oversight of Parsons and Geotechnical subcontractor testing will be conducted by FEMP QA.

As a minimum, surveillance shall consist of monitoring/observing ongoing project activity and work areas to verify item and activity conformance to specified requirements. Surveillance shall be scheduled, planned, and documented. Refer to Section 12 of the SCQ for additional details.

6.5 CHANGES TO THE GSTP

Changes to the sampling and testing plan may be required during implementation of this geotechnical investigation. Any work performed that is not in accordance with the requirements identified in this GSTP must be documented and approved prior to implementation. There will be three levels of variance approval used for documenting and controlling changes to the scope of this investigation (minor variances, significant variances, and programmatic variances).

Variances considered as GSTP change pages to be incorporated into subsequent GSTP revisions.

Variances can be initiated by the Parson's Field Geologist, A1PII Field Geologist, A1PII Sampling Technician, A1PII Task Manager, A1PII Engineering Manager, or A1PII Project Manager. Any changes which could significantly affect the remedial design will be discussed with the agencies prior to implementation.

6.5.1 Minor Changes

Minor Variances will be made primarily to document and authorize minor changes to the scope of the investigation. Minor variances will be documented on the Variance Form (see Appendix C), will be marked in the appropriate box as a minor variance, and must be approved by the A1PII Field Geologist

(field supervision) prior to implementation. All minor variances will be post-approved by the A1PII Task Manager and A1PII QA Representative to assure proper documentation. The only changes that may be documented and authorized as a minor variance are minor changes directly related to sampling/drilling activities, associated testing [not changing the total number of tests (per test type) being performed], boring location, and boring depth (not penetrating the GMA).

6.5.2 Significant Changes

Significant variances will be made to document and authorize changes to the scope of work that are significant in nature. Significant variances will be documented on a Variance Form (see Appendix C), will be marked in the appropriate box as a standard variance, and will require approval from the A1PII Task Manager, the A1PII Engineering Manager and the A1PII QA representative prior to implementation.

6.5.3 Programmatic Changes

Programmatic variances will be made to document and authorize changes to the scope of work that are programmatic (large in scope). Programmatic variances will be documented on a Variance Form (see Appendix C), will be marked in the appropriate box as a programmatic variance, and will require approval from the A1PII Task Manager, the A1PII Engineering Manager, the A1PII QA representative, and the A1PII Project Manager prior to implementation.

A1PII Engineering Document Control shall be responsible for keeping a project variance log and maintaining the original variances. The project variance log and original variances will become part of the overall permanent project file. Engineering Document Control will distribute variances to the appropriate project personnel.

6.5.4 SCQ Project Specific Application

Section 6.5 will be used for controlling and documenting changes to the GSTP. As such the following modifications to Section 15.4 of the SCQ will be implemented for this geotechnical investigation in accordance with Section 3.3.2 of the SCQ:

- The A1PII Field Geologist shall have approval authority for minor variances.
- The A1PII Engineering Manager shall have approval authority for significant variances.

- The A1PII Project Manager shall have approval authority for programmatic variances.
- Variances will be used to document permanent changes to the GSTP.
- A1PII Engineering Document Control shall have the responsibility for maintaining the project variance log.
- Approval from the SCEP Quality Assurance Representative will not be required prior to implementation of minor variances.
- Post-approvals from both the Quality Assurance representative and the A1PII Task Manager will be required on minor variances.
- Documentation of the intended time, date, and location of variance implementation and the time allotted for comments and resolution will not be required. Proper documentation of the approval date will be required on both the variance form and the variance log.
- Neither SCQ Form 4.1.1 nor SCQ Form 15-3 will be used to document or authorize variances or changes to the GSTP during this geotechnical investigation. The variance form located in Appendix D of this GSTP will be used during this geotechnical investigation to document and authorize variances and changes to the GSTP.

6.6 NON-CONFORMANCES

GSTP non-conformances are defined as project activities which have been completed, but are subsequently found not to have been performed in accordance to the GSTP. A non-conformance may have significant impact to the usability of field- or laboratory-derived investigation results. Resolution of a project non-conformance will be the responsibility of the Program Manager. The Quality Assurance Representative will be responsible for documenting non-conformances in accordance with site procedures.

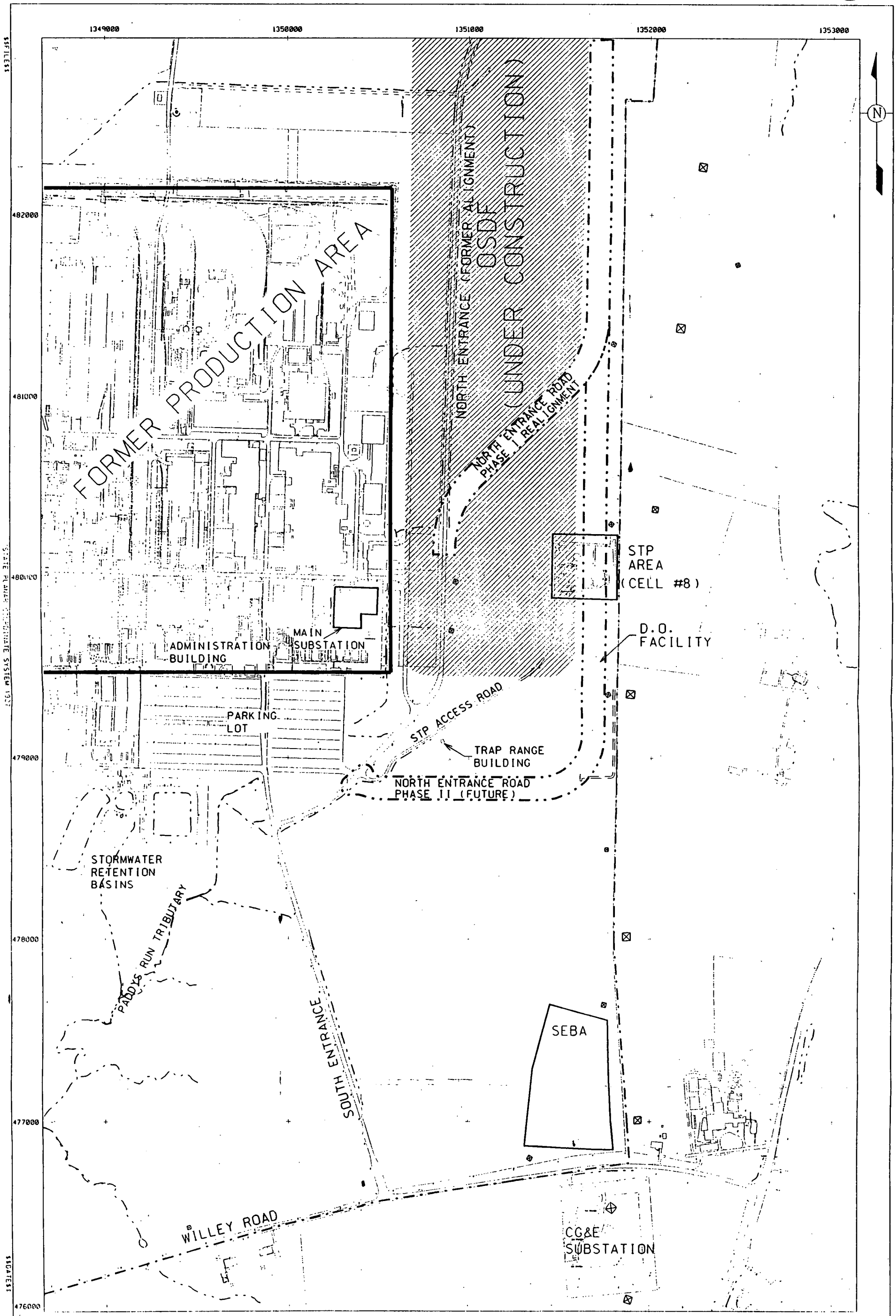

FIGURE 1-1. AREA 1, PHASE II BOUNDARIES AND MAJOR FEATURES

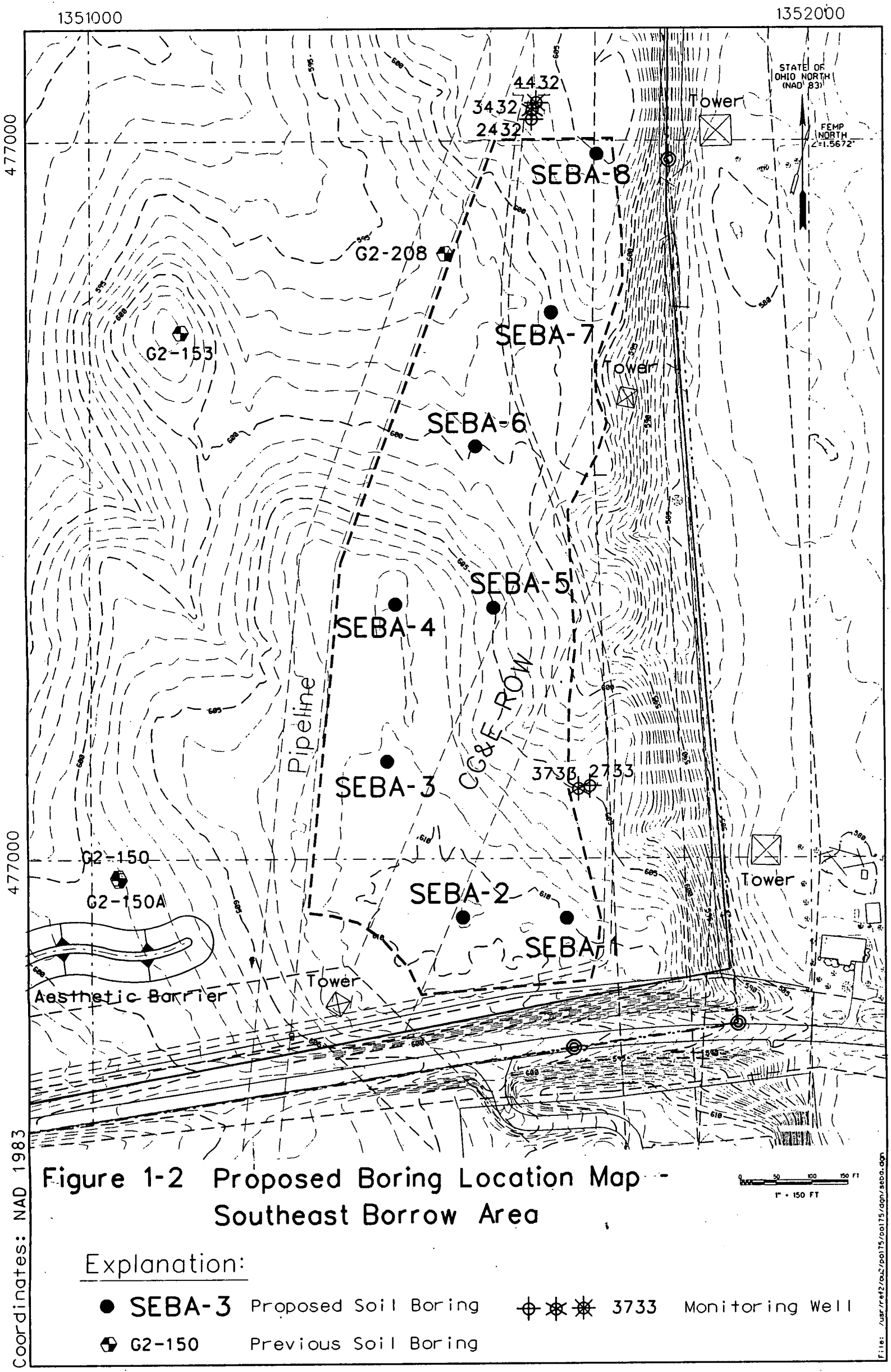

Figure 1-2 Proposed Boring Location Map - Southeast Borrow Area

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APPENDIX A

PROJECT SPECIFIC DATA QUALITY OBJECTIVES

Control Number: _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Geotechnical Sampling and Testing Plan, Soil Characterization and Excavation Project, Area 1 Phase II

Number: SL-050

Revision: 1

Effective Date: November, 1997

Contact Name: Stephen T. Garland

Approval: William D. Kelley **Date:** 11/20/97
William D. Kelley
DQO Coordinator

Stephen T. Garland **Date:** 11/20/97
Stephen T. Garland
Area Project Manager

Reinhard Friske **Date:** 11-20-97
Reinhard Friske
QA/QC

Rev. #	0	1	2				
Effective Date:	11/12/97	11/19/97					

DATA QUALITY OBJECTIVES
Geotechnical Sampling and Testing Plan, Area 1 Phase II

Members of Data Quality Objectives (DQO) Scoping Team

The members of the DQO team include the Area Project Manager, a project engineer, a field lead, a geologist, a sampling supervisor, and a data management lead.

1.0 Statement of Problem

In support of design and construction of the On-Site Disposal Facility (OSDF), geotechnical investigations are required to obtain engineering and geotechnical data on soils from the potential borrow sources and on soils designated for use in OSDF cell construction. Specifically, one of the cells for the OSDF will be superimposed on the footprint of the Sewage Treatment Plant (STP) once the plant is removed and the soil underneath is remediated. The excavation will include the removal of all contaminated soil and perched ground water. The resulting deep excavation area will require back fill materials to restoration and OSDF design grades. The Southeast Borrow Area (SEBA) is located in the southeastern corner of the FEMP property and has been identified as a potential source of fill material. The objective of the Geotechnical Sampling and Testing Plan (GSTP) is therefore to conduct all field efforts and laboratory experiments necessary to confirm the strength properties of the brown clay in the SEBA and designate or deny it as suitable fill for the STP deep excavation and other OSDF cell construction.

The location of the SEBA was chosen based on the following:

- Proximity to the On-Site Disposal Facility
- Availability of large volumes of non-contaminated brown and gray clays
- Convertibility of existing roads to haul roads
- Ability to gravity drain surface waters without ponding (during and after construction)

2.0 Identify the Decision

The information generated by the geotechnical investigation study along with the available data are essential in determining the geotechnical properties (including the strength, compressibility, and hydraulic conductivity) on materials used to construct the disposal facility liner, cap, and perimeter berm systems, and to determine the engineering properties of the Operable Unit 2 waste fill materials. The data obtained through this investigation will support engineering analyses for the disposal facility design, including remolded permeabilities, settlement, strength, slope stability and other design parameters.

2.1 From an engineering and geotechnical standpoint, soils used to fill the STP deep excavation will have to meet the following criteria:

- Be a good structural soil (modest to high compressive strength with low organic content),
- Provide enough mass to stabilize the ground surrounding and underlying the toe of the OSDF,
- Be certified to meet FRLs applicable to A1PIII,
- Be available and transportable to the excavation site during filling operations,
- Be placed in a manner that would not provide new pathways to the underlying Great Miami Aquifer (GMA), i.e., have a lower permeability (at least near the GMA).

2.2 In addition to the general requirements above, soil that will be used for OSDF construction must meet the definition of inorganic clay according to the Unified Soil Classification System (USCS) and ASTM D-2487

3.0 Inputs That Affect the Decision

The existing data set of geotechnical information for the FEMP does not include an evaluation of the SEBA. A geotechnical investigation is therefore required to collect the appropriate samples for testing with consideration of the planned use of the borrow materials. Geotechnical engineers have determined that eight soil borings in the SEBA will be an adequate number to qualify the borrow material. The proposed borings are located evenly within the polygon which defines the boundary of the SEBA study area and will provide an even distribution of data for the entire area, which is adequate to determine soil suitability for fill. The estimated soil volume may not be achieved for a variety of reasons, including shrinkage of the SEBA area due to CG&E structures and the Mid-valley oil pipeline, slope stability considerations during excavation, sand or gravel deposits which may make some of the material unsuitable as backfill. The final volume of qualified borrow material will be calculated based on the geotechnical data results.

The depth of the borings will be specified in the GSTP. The borings will be of sufficient depth to gather the sample volumes and soil strata to adequately support the required geotechnical testing and the DQO decision rule.

The geotechnical testing will be to ASTM methods which will be listed in the GSTP. All data will meet the specification requirements of the ASTM methods. The geotechnical engineers writing the geotechnical report will verify the data results.

4.0 The Boundaries of the Situation

All soil sampling will occur in the SEBA. Sampling will be limited to the brown and grey clays within the boundary area to a depth of 15 feet, excluding sand, silt or gravel inclusion within the area. Sampling will be limited to collection of geotechnical samples.

5.0 Decision Rule

The result of the geotechnical sampling and testing will be summarized in the geotechnical investigation report. The information obtained from this investigation will assist personnel in calculating borrow material volumes, determining STP fill suitability, and OSDF use of SEBA material. The primary objectives of the geotechnical sampling/testing are:

- Define the geotechnical properties of subsurface soils at the SEBA and provide geotechnical design parameters. These parameters will be used for subsequent bearing capacity, settlement and stability for analyses of the native soils under the disposal facility area.

- Provide geotechnical properties and parameters for reconstituted clay samples intended for construction of the lining material and the perimeter dikes for overall stability and settlement evaluation of the disposal facility.

- Provide geotechnical properties and parameters for the topsoil and materials similar to the intended waste materials for overall settlement evaluation of the disposal facility contents.

- Report on any relevant geotechnical findings or observations made during execution of the work that may affect the geotechnical aspects of the design, construction and performance.

  Determine the suitability of SEBA soil for STP fill.

6.0 Limits on Decision Errors

The purpose of this step is to define possible decision errors based on study findings. A false positive error would indicate that the subsurface materials have properties more conducive for cell construction. This would have an impact on location selection and design parameters. This could result from laboratory or analytical testing errors, misclassification of soil in the field or by missing a significant granular pathway during the field investigation. The consequences would be that a false positive would be discovered during construction or post-construction monitoring. This would result in a reduced factor of safety or a design upgrade.

A false negative would indicate that the soil has unacceptable properties; therefore, creating the need for using off-site material, over-designing the disposal cell or eliminating the possibility of an on-site disposal facility.

The impacts of a false positive or negative include cost, credibility, social and ecological concerns. To minimize the possibility of errors, all of the procedures will be conducted by qualified personnel. The field tests shall adhere to the appropriate ASTM or FEMP criteria.

7.0 Optimizing Design for Useable Data

Geotechnical sampling and analysis will be performed in accordance with ASTM standards. All data will be checked by the engineer in accordance with approved design procedures. Records documenting geotechnical laboratory equipment calibration will be maintained and included in the project records. Observed variability of results may result in a raise in the factor of safety in accordance with engineering practices. Any sample which retrieves an adequate quantity and acceptable configuration of material will be considered a successful sampling event.

In the event that a boring cannot be completed, a new boring will be started a within a GSTP predetermined distance from the previous unsuccessful boring. If a boring cannot be successfully completed, the event will be documented and the field geologist will determine if it is likely that results from other sampling locations will serve as an effective substitute.

Field crews (including field geologists and engineers) are to pay special attention to the boring/drilling operations as the advanced depths approach the planned boring depths. Field documentation will be completed as required by the SCQ. The USCS system will be used for soil descriptions. Grouting equipment and supplies are to be located at the drill site for quick response in the event of an actual Great Miami Aquifer (GMA) penetration. In addition, the field geologist will be given authority to lessen the depth of boring, based on observed changes in test samples brought to the surface.

Previous studies have shown that the GMA in this area is roughly 38 feet below the ground surface, which places the total depth of the proposed borings at a minimum of 20 feet above the GMA. In the unlikely event that the GMA is penetrated, the cement plug will not be placed at the top of the boring for at least several days to assure that subsidence of grout into the GMA is not occurring. If the grout is found to be subsiding into the GMA, then additional grout will be placed in the hole and observed until subsidence stops. If required, borings can be overdrilled and regrouted.

DOE will notify both EPA and OEPA in the event that the GMA is penetrated during this investigation.

All field logs will be validated by QA after the sampling group completes data checks. The completed field logs will be forwarded to Parsons for eventual incorporation into

the final geotechnical report. The samples will be shipped to an FDF approved geotechnical laboratory. The test results will be forwarded directly to Parsons.

Data Quality Objectives
Geotechnical Sampling and Testing Plan, Soil Characterization and Excavation Project, Area 1 Phase II

1A. Task/Description: Delineating the extent of contamination above the FRLs

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

RI ☐ FS ☐ RD ☐ RA ☐ R_vA ☐ OTHER ☒

1.C. DQO No.: SL-050, Rev. 1 DQO Reference No.:__

---

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

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☒

Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) ____

---

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

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

4.A. Drivers:

"Conceptual Design Report for the Engineered Waste Management Facility," "On-Site Waste Disposal Cell Pre-Design Activities Engineering Report and Supplemental Report," "Remedial Investigation Report for Operable Unit 2," "Feasibility Study Report for Operable Unit 2," "Remedial Investigation Report for Operable Unit 5," and "Predesign Investigation and Site Selection Report for the On-Site Disposal Facility."

4.B. Objective:

The information generated by the geotechnical investigation study will be used to perform the detailed design including the stability and anticipated performance evaluation of the subject clay borrow areas and off-site material sources which are pivotal to the construction of the On-Site Disposal Facility.

---

5. Site Information (Description)

Geographically, A1PII consists of 150 acres in the southeastern quadrant of the FEMP and includes two contiguous tracts. The easternmost tract is comprised of approximately 145 acres bounded on the North by A1PI, on the east and south by the FEMP property line, and on the West by the ditch on the east side of the main South and North Access Road northward along the top of the berm bordering the Former Production Area fence. The second tract lies west of the South Access Road and comprises about 5 acres bounded on the east by the top of the western bank of a ditch along the west side of the South Access Road, on the north and east by the crest of the east bank of the channelized upper reaches of an unnamed tributary to Paddy's Run, and on the South by the top of the North bank of a ditch running westward from the South Access Road to the unnamed tributary.

The Southeast Borrow Area (SEBA) is located in the southeastern corner of the FEMP property.

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference:

1. pH	☐	2. Uranium	☐	3. BTX	☐
Temperature	☐	Full Radiological	☐	TPH	☐
Specific Conductance	☐	Metals	☐	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☐	Silica	☐		

4. Cations	☐	5. VOA	☐	6. Other (specify)
Anions	☐	BNA	☒	Geotechnical;
TOC	☐	Pesticides	☐	see attachment
TCLP	☐	PCB	☐	
CEC	☐	COD	☐	

6.B. Equipment Selection and SCQ Reference:

Equipment Selection		Refer to SCQ Section
ASL A	_____	SCQ Section: _____
ASL B	_____	SCQ Section: _____
ASL C	_____	SCQ Section: _____
ASL D	_____	SCQ Section: _____
ASL E	see GSTP Geotechnical ASTM	SCQ Section: 5.3.3

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

Biased ☐ Composite ☒ Environmental ☐ Grab ☐ Grid ☐

Intrusive ☒ Non-Intrusive ☐ Phased ☐ Source ☐

DQO Number: SL-050, Rev. 1

7.B. Sample Work Plan Reference: (List the samples required. Reference draft geotechnical Sampling and Testing Plan for On-Site Clay Borrow Areas, Off-Site Material Sources, and Operable Unit 2 Waste Units.)

Background samples: Samples have been previously collected from the on-site area.

7.C. Sample Collection Reference:

Sample Collection Reference: Appendix K

---

8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	☐	Container Blanks	☐
Field Blanks	☐	Duplicate Samples	☐
Equipment Rinsate Samples	☐	Split Samples	☐
Preservative Blanks	☐	Performance Evaluation Samples	☐
Other (specify)			

8.B. Laboratory Quality Control Samples:

Method Blank	☐	Matrix Duplicate/Replicate	☐
Matrix Spike	☐	Surrogate Spikes	☐
Tracer Spike	☐		

Other (specify) _____

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

APPENDIX B

EXAMPLE FIELD FORMS

000054

SAMPLE COLLECTION LOG

PREPARED BY / BADGE NO.:	DATE:
REVIEWED BY / BADGE NO.:	DATE:
CONTROL NO:	PAGE _____ OF _____

SAMPLE LOCATION: | PROJECT NAME: | PROJECT NO:

CUSTOMER ID	SAMPLE MEASUREMENT (PID) UNITS	SAMPLE MEASUREMENT (RAD) UNITS	COLLECTION START DATE	COLLECTION START TIME	COLLECTION STOP DATE	COLLECTION STOP TIME	SAMPLE DEPTH INTERVAL UNITS	SAMPLE POINT	VISUAL DESCRIPTION OF SAMPLE

QUALITY CONTROL SAMPLES

TYPE:*	TYPE:*	TYPE:*	TYPE:*	TYPE:*
CUST. ID:	CUST. ID:	CUST. ID:	CUST. ID:	CUST. ID:
CHECK BLOCK CORRESPONDING TO ASSOCIATED CUSTOMER ID:				

COMMENTS:

FS-F-3714 (04-30-97)

* NOTE: QUALITY CONTROL SAMPLE TYPE = CONTAINER BLANK, DUPLICATE, FIELD BLANK, RINSATE, SPLIT, TRIP BLANK

FIELD ACTIVITY LOG

1096

CONTROL NO.:	PROJECT NAME / NO.:	PAGE ___ OF ___
PREPARED BY (NAME):	BADGE NO.:	DATE:
REVIEWED BY (NAME):	BADGE NO.:	DATE:

FIELD ACTIVITY SUBJECT:	GENERAL LOCATION / FACILITY DESCRIPTION:	
WEATHER CONDITIONS:	AIR TEMPERATURE:	BAROMETRIC PRESSURE (in Hg):

COMPLETE THE FOLLOWING PRIOR TO BEGINNING DAILY FIELD ACTIVITY:

NOTE: IF "NO" IS INDICATED FOR ANY ITEM, CONTACT FIELD SUPERVISOR.

	YES	NO	N/A		YES	NO
1) FIELD DATA PACKAGE AVAILABLE?				8) FIELD EQUIPMENT CHECKLIST REVIEWED?		
2) PROJECT SPECIFIC PLAN AVAILABLE?				9) PERMIT EXPIRATION DATES VALID?		
3) HEALTH AND SAFETY DOCUMENT AVAILABLE?				10) EXCLUSION ZONE ESTABLISHED AND POSTED?		
4) CONTROLLED PROCEDURES AVAILABLE?				11) DAILY SAFETY MEETING CONDUCTED AND DOCUMENTED?		
5) CONTROL / COMMUNICATIONS CENTER CONTACTED?				12) LOCATION ON MARKER AGREES WITH PROJECT SPECIFIC PLAN?		
6) EYEWASH AT ACCEPTABLE PRESSURE?				13) BOREHOLE LOCATION ON PENETRATION PERMIT?		
7) EYEWASH INSPECTED (WITHIN LAST 7 DAYS)?				14) WASTE CONTAINERS PRESENT AND LABELLED?		

TIME	DESCRIPTION OF ACTIVITY	*NOTE: IF ADDITIONAL SPACE IS REQUIRED, COMPLETE FS-F-3682-1, FIELD ACIVITY LOG (CONTINUATION PAGE).*

METER CALIBRATION

WATER QUALITY METER

MFR. NAME:	ID. NO.:	INITIALS:	TIME:	STD. SOLN. MFR.:	STD. SOLN. LOT NO.:	STD. SOLN. EXP. DATE:	STD. SOLN. OPEN DATE:

PHOTOIONIZATION DETECTOR — **PID CALIBRATION GAS:**

MFR. NAME:	ID. NO.:	INITIALS:	TIME:	ppm:	PROBE eV:	MFR.:	MFR. DATE:	TYPE:	CONC.:

ALPHA METER		BETA GAMMA METER		CALIBRATION PROBLEMS:
MFR. NAME:	SERIAL NO.:	MFR. NAME:	SERIAL NO.:	

VISITORS		TIME	
NAME(S)	ORGANIZATION(S)	ARRIVED	DEPARTED

000055

CONTROL NO.:

FEMP

LITHOLOGIC LOG

PAGE _____ OF _____

PROJECT NAME:				PROJECT NO.:		
LOCATION/NUMBER:	COORDINATES:		DATE STARTED:		DATE COMPLETED:	
SURFACE ELEVATION:	GROUNDWATER LEVEL:	DATE:	TIME:	GROUNDWATER LEVEL	DATE:	TIME:
GEOLOGIST:	DRILLING CONTRACTOR:		DRILLING EQUIPMENT	DRILLER		
WATER USED DURING DRILLING: GAL	WATER RECOVERED DURING DRILLING: GAL		WATER LOST DURING DRILLING GAL			

DEPTH (FEET)	SAMPLE TIME, DATE, AND NUMBER	BLOWS (per 6 inch)	RECOVERY (Inches)	DESCRIPTION (Colors identified per Munsell Color Chart)	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS

METER	BKGD	DATE	TIME
PID			
ALPHA			
BETA / GAMMA			

SAMPLING EQUIPMENT:
TYPE OF SAMPLER
DIAMETER OF SAMPLER
WEIGHTS OF HAMMER

NOTES:

* SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST.

FS-F-3681

G: / WPSC / 96-0037.DRW (07-10-96)

FEMP
BOREHOLE ABANDONMENT RECORD

CONTROL NO.:	PAGE ___ OF ___
PREPARED BY (NAME):	BADGE NO.: DATE:
REVIEWED BY (NAME):	BADGE NO.: DATE:

PROJECT NAME:	PROJECT NO.:	CHARGE NO.:
BOREHOLE NO.:	DATE OF ABANDONMENT:	FIELD PERSONNEL:
MANUFACTURER/ SERIAL NO. OF WATER LEVEL INDICATOR:	WATER LEVEL (FT.): DATE:	
VOLUME OF WATER USED FOR GROUT HYDRATION: GAL	BOREHOLE DIAMETER: IN.	DRILLING METHOD:

MATERIAL SYMBOL LEGEND:
BENTONITE PELLETS | GROUT | SAND | CONCRETE

BOREHOLE DIAGRAM

	MATERIAL SYMBOL	
		GROUND SURFACE
MATERIAL TYPE _____ AMOUNT USED _____ DENSITY OF MATERIAL _____		TOP OF _____: _____ FT.
MATERIAL TYPE _____ AMOUNT USED _____ DENSITY OF MATERIAL _____		TOP OF _____: _____ FT.
MATERIAL TYPE _____ AMOUNT USED _____ DENSITY OF MATERIAL _____		TOP OF _____: _____ FT.
MATERIAL TYPE _____ AMOUNT USED _____ DENSITY OF MATERIAL _____		TOP OF _____: _____ FT. BOTTOM OF BOREHOLE: ___ FT.

COMMENTS:

VARIANCE / FIELD CHANGE NOTICE

V/F No. _____

WBS NO.: [ ] VARIANCE

PROJECT TITLE: [ ] FIELD CHANGE

Page ___ of ___

Date: _____

SCOPE CHANGE

JUSTIFICATION

REQUESTED BY: _____ Date: _____

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
	QUALITY ASSURANCE			PROJECT MANAGER	
	DATA QUALITY MANAGEMENT			ENGINEERING MANAGER	
	SAFETY/HEALTH REPRESENTATIVE			TASK MANAGER	
	OTHER			PERMCO GEOLOGIST	
	OTHER			PARSONS GEOLOGIST	
	OTHER			SUB BAR. TASK MANAGER	

VARIANCE/FCN APPROVED [ ]YES [ ]NO

REVISION REQUIRED: [ ]YES [ ]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL:	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

CLARIFICATION REQUEST FORM	C.R. No. ____
WBS NO.:	Page ___ of __
PROJECT TITLE:	Date: _____

(CONTINUATION)

10-96

FEMPO

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS CHANGE REQUEST RECORD

(Attach to the corrected original COC / RFA Record, if possible.)

COC / RFA REFERENCE DOCUMENT NO.:	RELEASE NO.:
PROJECT NO.:	
ASSOCIATED NON-CONFORMANCE MEMO NO.:	

CRR PREPARATION

PRINTED NAME:	SIGNATURE:	BADGE NO.:	AFFILIATION:	DATE:

PROJECT CONTACT APPROVAL

PRINTED NAME:	SIGNATURE:	BADGE NO.:	AFFILIATION:	DATE:

LABORATORY RECEIPT APPROVAL

PRINTED NAME:	SIGNATURE:	BADGE NO.:	AFFILIATION:	DATE:

COC / RFA RECORD SECTION REQUIRING MODIFICATION (CHECK ALL APPLICABLE)

☐ FACTS ID ☐ RELEASE NO. ☐ CHARGE NO. ☐ CONTRACT PURCHASE ORDER / TASK ORDER NO. ☐ ANALYSES REQUESTED

☐ CUSTOMER ID ☐ SAMPLE POINT ☐ ASL ☐ MEF NO. ☐ OTHER (EXPLAIN) _____

FACTS ID	CUSTOMER ID / SAMPLE POINT	REQUIRED CORRECTIONS TO THE COC / RFA RECORD	SCL CORRECTED (CHECK) *

* The noted corrections must also be transcribed to the corresponding Sample Collection Log (SCL) and other documents (i.e., boring logs, daily activity logs, etc.) with a copy of this CRR attached. If applicable, the person maintaining custody of the samples must make the necessary corrections to the sample container labels.

WHITE - RELEASE FILE / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP | YELLOW [illegible] | BUTE AS NEEDED / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP | BLUE SAMPLING TF [illegible] JECT FILE