Sampling and Analysis Plan (SAP) For Assessment Activities of Fuel Oil Leak In Underground Transfer Lines From AST At TA-21-357 Steam Plant

March 7, 2002

Project Numbers: 5399.12 and 5383.06

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
ES&H	Environmental Safety and Health
EPA	U.S. Environmental Protection Agency
FWO-UI	Facility Waste Operations
JCNNM	Johnson Controls Northern New Mexico
LANL	Los Alamos National Laboratory
OU	Operational Unit
QC	quality control
QCSP	quality control and sampling plan
SAP	Sampling and Analysis Plan
SCP	site characterization plan
TPH	total petroleum hydrocarbons
TCLP	toxicity characteristic leaching procedure
PetroFlag	Field instrument used for TPH analyses

1.0 PROJECT DESCRIPTION

Benchmark Environmental/JCNNM-HENV has prepared this site sampling and analysis plan (SAP) to describe sampling contaminated material handling activities associated with soil contamination from leaking underground fuel oil lines connecting the above ground storage tank AST (TA-21-57) with the Technical Area-21-357 Steam Plant at the at Los Alamos National Laboratory (LANL) (Figure 1-1). Up to 48,357 gallons of No. 2 Fuel Oil from the AST is unaccounted for. An assessment into the potential for fuel oil leaking into the surrounding soil and environment is being conducted. Soil removal and sampling is continuously being performed in accordance with LANL, DOE, NMED and EPA requirements to determine the presence and extent of the leak from underground fuel oil supply and return lines from the AST. This SAP will be implemented in conjunction with a detailed Quality Control Plan (QCP).

The TA-21-57 No. 2 Fuel Oil AST is a 50,000 gallon, 1 section, non-baffled tank which was installed in early 1945 to store No. 2 Fuel Oil to supply the Old Power Plant (TA-21-9). In 1987, the New Steam Plant was commissioned. No. 2 Fuel Oil reaches the Steam Plant boilers via an aboveground pumping system located inside the building and through an underground supply line and return line from the aboveground storage tank. The underground fuel lines leading to the Old Steam Plant (TA-21-9) have been decommissioned and capped. JCNNM managers at TA-21-357 responsible for the tank indicated that, to their knowledge, that all of the diesel fuel oil used in the system was non-PCB fuel oil.

A field assessment to determine the horizontal and vertical extent of soil contamination started February 26, 2002 and is planned to be completed by Benchmark Environmental/JCNNM-HENV by the end of March 2002. An initial site contamination characterization was conducted to determine Total Petroleum Hydrocarbons (TPH), Target Analytes (Table 1-1), and TCLP Metals. The analytical results are pending analysis. This initial assessment is summarized in section 1.4.1 Initial Site Analysis and Characterization. Initially, soil was removed to expose all underground fuel oil lines and mechanical devices to visually inspect the soil and fuel lines. Sampling and analysis will be used to confirm any contaminated soil areas associated with the buried piping. If the extent of the contamination is larger than expected, further actions will be taken to determine the extent of the leak. This will be presented in an amended SAP. Contaminated soil removed during this investigation will be managed accordingly under 20NMAC9.1. Confirmation sampling will be conducted through field-testing for TPH using PetroFLAG (calibrated for diesel range organics) and verification samples will be analyzed by a state certified laboratory for TPH, Target Analytes and TCLP Metals.

If the extent of the contaminated soil goes beyond the parameters of this SAP, further actions will be taken to determine the extent of the contamination and path forward action. This Contingency Plan information to follow will be presented in an amended SAP. Additional environmental assessment may include extensive probing (i.e. Geo Probe) and boring or core drilling (i.e. Geo Test) into surrounding soil areas and

geological matrices for sampling and analyses. Sampling and analyses may also be completed within building TA-21-357 to determine the extent of contamination under the building. Sampling and analysis locations will be contingent upon personnel safety requirements, utility locations and obstructions in the building.

Table 1-1. Target Analyte to be analyzed.

Target Analytes
Benzene
Toluene
Ethyl benzene
Xylene
Naphthalene
2-methyl naphthalene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Chrysene
Dibenz(a,h) anthracene
Indeno(1,2,3-c,d) pyrene

1.1 Scope of Work

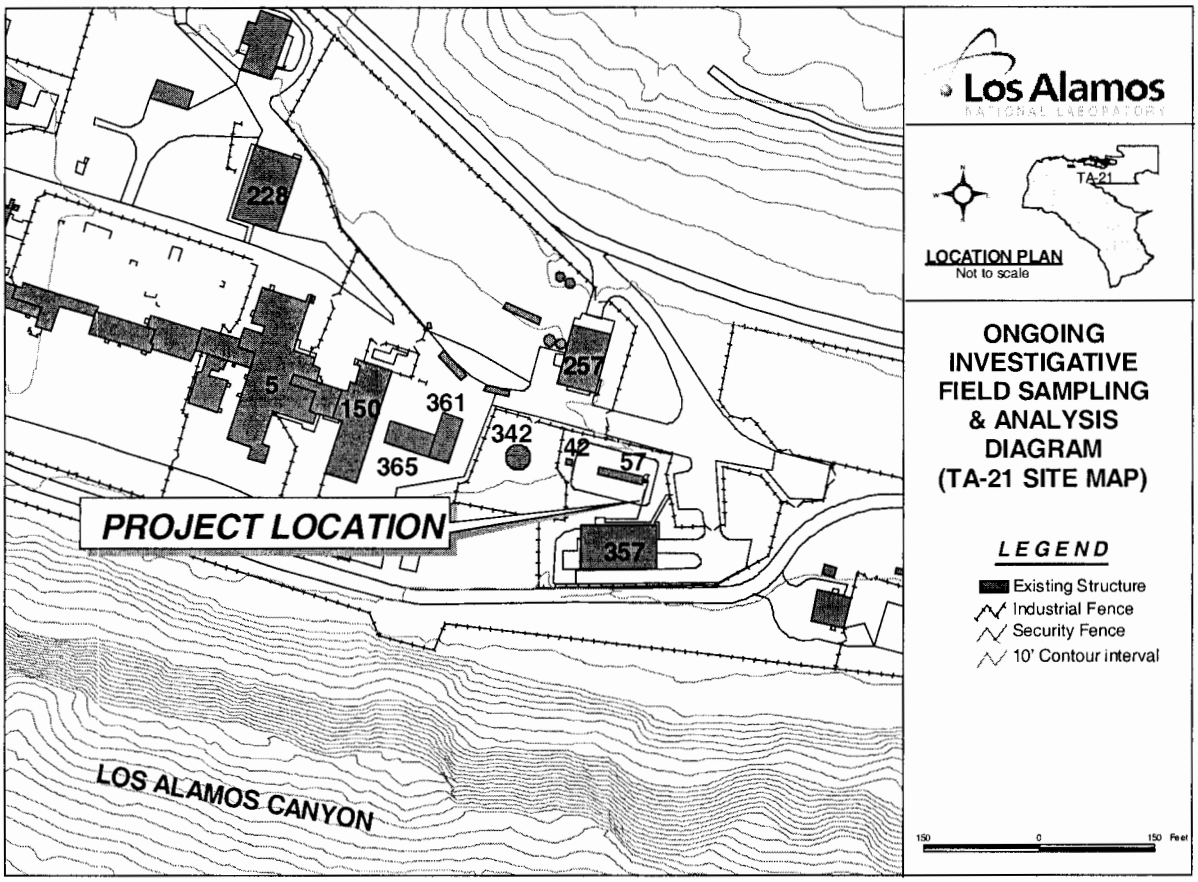
The purpose of this SAP is to document the objectives, rationale and procedures for collecting, analyzing and managing environmental samples taken from this site. Sampling methods for the investigation of the diesel lines are in accordance with the objectives and procedures described in the UST Soil/Water Sampling and Disposal Guidelines (NMED, April 1995, Underground Storage Tank Regulations). This plan outlines the methods and procedures proposed to collect samples and gather data of sufficient quality and quantity to adequately verify the presence and extent of the release that may have occurred from the lines. It will provide information necessary to identify the quantity of contaminated soil to be removed. The project will receive appropriate LANL reviews and will be performed in accordance with approved site health, safety, and emergency response plans. The project will be performed in accordance with applicable DOE, LANL, and State of New Mexico requirements.

1.2 Project Organization and Responsibilities

This SAP is organized into 3 main sections: project description, a work plan and a Quality Control and Sampling Procedures (QCSP). The work activities for this SAP are organized into **4** main areas:

Initial site analysis and investigation
Excavation and visual inspection
Confirmation sampling (field and analytical laboratory sampling and analysis)
Material Management

Figure 1-1. Site Location Map



LANL Facility Management (FMU-80) has overall responsibility for the project. Benchmark Environmental/JCNNM-HENV is responsible for planning and directing of site sampling, conducting field screening, arranging for shipping of samples and laboratory analysis of samples, and reporting on results. JCNNM construction is

responsible for removal of the soil and any mobilization/site preparation tasks required for obtaining necessary clearances and site access. The contract laboratory, Assaigai Analytical Laboratory, under subcontract to JCNNM, will provide analytical services.

1.3 Key Individuals

Key project participants for this effort include the Project Manager, Site Manager, Health and Safety Officer, Sampling Personnel, Construction Supervisor. The proposed project assignments and responsibilities are provided as follows:

- Facility Manager (FWO-UI) - Responsible for operations and management of the Facility.
- LANL Water Quality & Hydrology Personnel (ESH-18) - Responsibility for institutional interface with external regulatory agencies, report notification and project recommendation support
- Project Manager (FWO-UI) - Responsible for overall management of the investigation. Coordinates between internal and client organizations, manages administrative requirements, schedules, technical approach, implementation, and report preparation.
- Site Manager (JCNNM-UESB)- Supervises all field investigation activities and is responsible for implementation of appropriate site health, safety and emergency response plans and quality control and sampling plans during the fieldwork phase of this project.
- Health and Safety Officer (JCNNM-HSEO) - Oversees and ensures proper implementation of the appropriate site health, safety and emergency response requirements and coordinates with the Site Manager to enforce site safety.
- Sampling Personnel (JCNNM-HENV) - Responsible for collecting soil samples from excavated areas and the track hoe bucket for field test screening and laboratory analysis.
- Construction Supervisor (JCNNM-CDDO)- Responsible for coordinating all construction activities pertaining to the investigation activities.
- Soils Engineer (JCNNM-HENV) - Responsible for monitoring excavation activities with regard to maintaining the integrity of the footing of the adjacent building.
- Data validation personnel. Responsible for validation of all analytical data in accordance with DOE, LANL, and NMED requirements.
- Analyst (JCNNM-HENV)- Responsible for the analysis of samples using the field test kit.

1.4 Site Characteristics

The TA-21-57 Steam Plant AST is located at TA-21 on the north side of building 357 near the south edge of the site, which is located between Los Alamos Canyon and DP Canyon. TA-21 is sited on the relatively narrow DP Mesa, and is underlain by approximately 800 ft of volcanic ash deposits, the Bandelier Tuff, which is the bedrock throughout the region. The groundwater lies at a depth of approximately 1150 ft. Knowledge of the geology beneath TA-21 is very important because it is believed that this geologic setting provides substantial impedance to contaminant migration (TA-21 Operable Unit RFI Work Plan for Environmental Restoration, May 1991). There is approximately 1150 feet of volcanic and sedimentary material between the bearing units and the groundwater. Environmental Restoration (ER) designated Solid Waste Management Units (SWMUs) and Potential Release Site (PRS) that are reviewed and identified in any of the required Excavation Permits will be dealt with in accordance with LANL, DOE and NMED requirements.

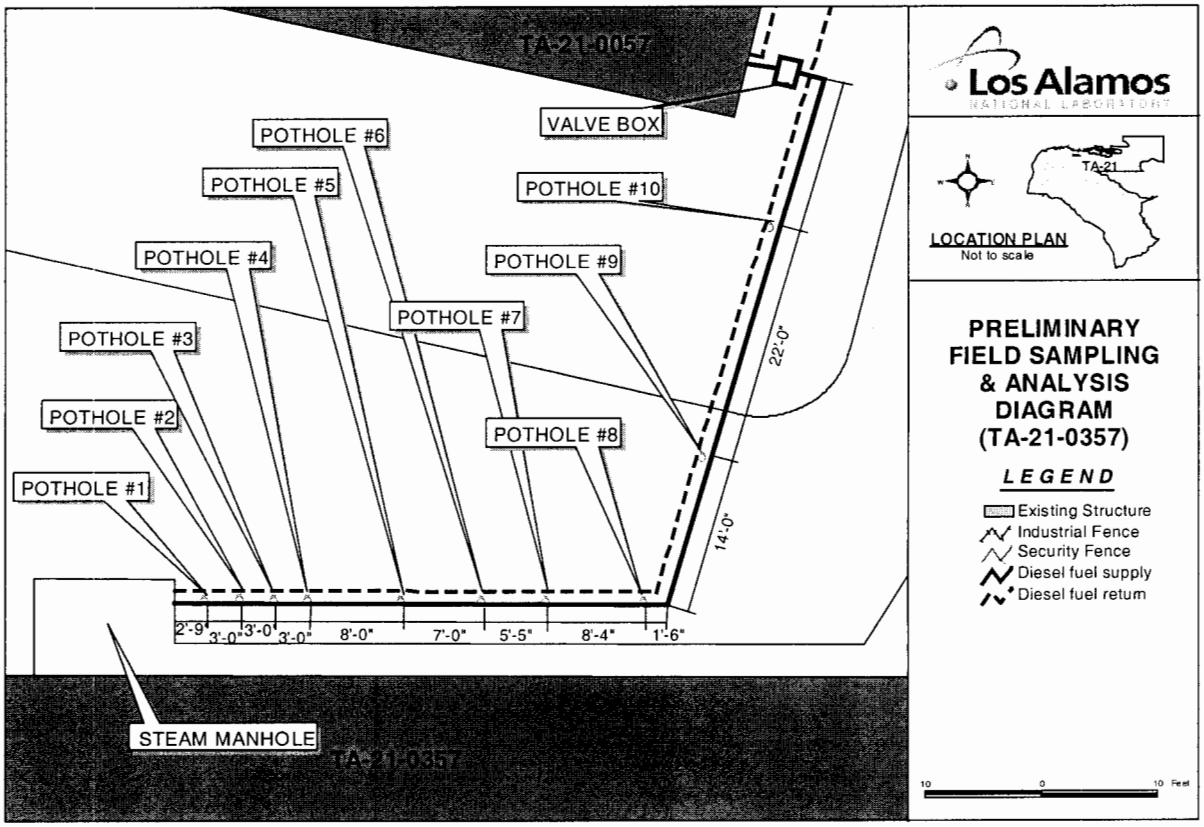
1.4.1 Initial Site Analysis and Charaterization

Ten areas were potholed to expose the diesel fuel lines for observation (Figure 1-2). Potholes were distributed along the line in varying intervals for initial assessment of the extent of contamination. Composite samples were taken at a depth of six inches below and between the oil fuel supply and return lines to determine the extent of contamination near and under the fuel lines in each pothole. Soil samples were analyzed using Petroflag to measure TPH (Diesel Range Organics) levels and verification samples were sent to a state certified laboratory (Assaigai Analytical Laboratory) for analysis. To date, this data has not been validated, but will be used internally to mitigate a path forward for further assessment. The results from this initial site analysis and assessment will also be used to help develop characterization for soil handling and storage.

1.4.2 Training Requirements for Conducting Sampling Activities

Training associated with this assessment will be followed in accordance to DOE, LANL, and JCNNM requirements. Work steps, ES&H hazards, hazard controls, required permits, required training is designated and strictly followed under the site-specific hazard analysis for all activities.

Figure 1-2. Sample locations taken from potholes during preliminary sampling and analysis.



2.0 WORK PLAN

The following sections describe all major activities necessary to complete the sampling and analysis assessment of the fuel oil lines from the AST (TA-21-57) at TA-21-357. They are presented in the sequence in which they will be performed. For this project, field and laboratory activities are focused on determining if a release of fuel oil has occurred from the underground piping associated with the tank and to determine if remediation of any contaminated soil is needed. As indicated in the introduction there is a significant amount of fuel oil unaccounted for. The objective of this work plan is to determine to what extent, if any, the fuel oil has leaked into the ground and environment.

2.1 Field Mobilization

Field mobilization involves all tasks required to prepare for and support fieldwork at the site. These activities include contract laboratory notification, coordination within JCNNM, obtaining utility clearances and excavation permits, ordering and calibrating field equipment and instrumentation, procuring decontamination equipment, preparing the site for work (i.e., setting up decontamination station), development of a health and safety plan, and preparing this SAP. All field mobilization tasks must be complete prior to the initiation of any fieldwork or sampling activities. Tasks relative to the excavation and sampling activities are discussed within this plan. Tasks such as the removal of the canopy and above ground piping network for the tank are not discussed in this plan.

2.2 Excavation and Visual Inspection

A trench will be excavated to expose the pipes from the concrete pit where the pipes enter Building TA-21-357 to the sump at the east end of the tank. At the east end of the tank the old piping to the Old Steam Plant will be exposed to verify they were disconnected and capped when they were decommissioned. If the old lines to the steam plant were not disconnected and capped, the old lines will also be excavated to expose the piping to the steam plant. Soil from the excavation will be stockpiled in a lined containment area east of Building TA-21-357 or placed in covered roll-off bins. During the excavation a visual inspection of the excavated soil and soil around the pipes will be performed to identify any areas of visible contamination including color variations in the soil or heavy hydrocarbon odors. PetroFLAG will be used to measure TPH to verify visual inspections. Confirmation sampling will be conducted in areas where there is no visible contamination with PetroFLAG and state certified laboratory analyses (Assaigai Analytical Laboratories).

2.3 Confirmation Sampling

Two samples will be collected to determine if contamination exists in the sump just outside of Building TA-21-357 and in soil between the sump at the west end of the tank and the tank itself. The samples will be collected at a depth of two feet using a hand auger.

If no visible contamination is found along the pipe runs, confirmation sampling will be performed in the trench. Samples will be collected below all joints in each pipe. Additional samples will be collected along the pipe to ensure that a sample is collected at least every ten feet along the pipes. The samples will be collected between the supply and the return line pipes from just below the pipe to a depth of six inches. The samples will be collected using a hand auger or metal/poly scoop depending on the depth of the trench.

2.4 Sample Analysis

Field analyses will be performed using a PetroFLAG hydrocarbon test kit. Results greater than 100 ppm indicate contaminated soil. Laboratory samples will be sent to Assaigai Analytical Laboratory for analysis of TPH, Target Analytes and TCLP Metals. All analyses data will be validated in accordance with DOE, LANL and NMED requirements.

2.5 Site Restoration

During the assessment, any soil removed that is determined contaminated will be profiled and removed from the site for disposal at a properly permitted and licensed facility. Uncontaminated soils will be left stockpiled at the site until the trenches are ready to be backfilled. The trenches will be left open to facilitate anticipated renovation of the piping. Best Management Practices (BMPs) will be installed as necessary.

2.6 Report on Sample Results

Benchmark Environmental/JCNNM-HENV will prepare a brief report summarizing the analytical results, compliance with QC requirements (data validation), and estimating the nature and extent of soil contamination based on the analytical results. LANL's ESH-18 will provide this information to the regulators.

2.7 Material Management

During the assessment process, all soil will be segregated (contaminated versus non-contaminated) during soil removal and placed in covered roll-off bins. Non-contaminated soil will be managed as reusable fill material. All excavated soil will be sampled and analyzed for TPH, Target Analytes and TCLP Metals for characterization. Contaminated soil with TPH levels higher than 1000 mg/Kg will be managed as New Mexico Special Waste. Contaminated soil with TCLP Metals levels greater than regulatory limits will be managed and disposed of as Hazardous Waste. All soil removed during this assessment will be properly characterized (waste profiles) and disposed of in accordance to LANL, NMED, and DOE requirements through FWO-SWO.

3.0 QUALITY CONTROL AND SAMPLING PROCEDURES

The objective of the sampling is to obtain data of sufficient quantity and quality to determine the extent of the leak that may have occurred from the tank piping and the severity of the leak. These data must be obtained in a manner that is acceptable to the New Mexico Environment Department and DOE order requirements for assessment of off-normal occurrences. The data must also be of sufficient quantity and spatially distributed such that conclusions may be drawn with respect to the extent and quantity of contamination in the subsurface. The following sections detail the equipment, personnel, and procedures that will be used to conduct the field sampling and analysis for this project. Any deviations from this plan that are deemed necessary during conduct of fieldwork will be discussed with the Project Manager (Health and Safety Plan will be amended as needed) and clearly documented in the field logbook. All sampling and analyses will be verified in accordance to DOE, EPA and NMED requirements.

3.1 Soil Sampling Procedures

Soil samples will be collected using a stainless steel hand auger or with stainless steel or disposable poly scoops. Samples from trenches or excavations less than 3 feet in depth will be collected using scoops. Samplers will not enter an excavation or trench that is more than 4 feet in depth to collect a sample. Samples from trenches deeper than 4 feet will be collected using the auger. Samples from an excavation deeper then 4 feet will be collected from soil collected by the excavator using scoops to collect the sample from the bucket. The samples will be placed in a labeled 4 oz. or 8 oz. glass jar. If a stainless steel spoon or auger is used it will be decontaminated prior to collecting another sample. Decontamination techniques are discussed in Section 3.4.

Sampling and analysis of soil will be performed using two different techniques: initial screening using a field test kit, and sampling for laboratory analysis. Screening of soil samples will be used to rapidly define the presence or absence of residual contamination and estimate contamination boundaries. Off-site laboratory analysis of samples by a NMED and DOE qualified laboratory will be performed in order to confirm hydrocarbon levels are below regulatory concern.

3.1.1 Field Test Kit Screening

Soil screening analyses will be conducted using a field calibrated screening test kit capable of measuring TPH from 100 to 10,000 ppm. Test results will be used to semi-quantitatively identify any residual contamination. Results will be used to determine the boundaries of any contamination excavated. The Analyst/technician performing soil analyses will be trained and familiar with use of the selected field test kit prior to the start of fieldwork. As each soil sample is collected, the Analyst will complete a Sample Collection Log and an entry will be made in the field logbook. The Analyst will perform

sample analyses using the test kit as soon as is practicable after sample collection. All results will be recorded on the Sample Collection Log as they are obtained.

3.1.2 Confirmatory Analytical Samples

The sampling will consist of obtaining samples from soil beneath the pipes and from excavation floors if necessary to confirm the presence/absence of contamination from a leak or to determine that the excavation is sufficient to remove contaminants below levels of regulatory concern. Samples will be submitted to the contract analytical laboratory for analysis. The soil samples collected during this phase will be analyzed for diesel range organics using method 8015A TPH, TCLP Metals, and Target Analytes.

3.1.3 QA/QC

In addition to field samples, QC samples will be taken in accordance with EPA SW-846 requirements. QC samples include duplicates, and equipment rinsate blanks (if necessary). A field duplicate sample will be collected for every 10 samples collected. If stainless steel augers or scoops are used, an equipment rinsate sample will be collected each day to assess the effectiveness of the decontamination procedure. The rinsate sample will be collected and placed in two 40 ml vials for analysis. Results obtained will be subjected to a data validation to ensure that both the project and analytical laboratory QC requirements have been satisfactorily fulfilled.

After each sample has been collected, all of the sampling equipment, mixing bowl, sampling spoon, etc., will be decontaminated according to the procedure in Section 3.4.

3.2 Decontamination

All sampling equipment, if not disposable, must be cleaned/decontaminated before being reused according to the following procedure:

1. Brush or scrape off any large particles of soil.
2. Wash with a brush in a solution of Alconox, or equivalent.
3. Rinse in a second bucket filled with of tap water.
4. Rinse with deionized water.
5. Air dry.

Residues generated by decontamination procedures should be collected and disposed of in accordance with LANL and NMED requirements.

3.3 Sample Handling Protocol

When a sample is collected for off-site analysis, it will be promptly placed into a labeled 4 oz. or 8 oz. glass jar and fitted with a Teflon lined lid. The sample will be placed in a reclosable poly bag then placed on ice to cool to 4°C until delivery to the lab. The

sample must be extracted by the laboratory within 14 days of collection and analyzed within 40 days of collection.

Each sample container will be labeled with the following information:

- Unique sample identification number (including locations)
- Project number
- Date
- Time sampled
- Name of Sampler
- Requested analysis
- Preservation method

The labels will be covered with transparent plastic tape and the sample containers will be sealed with custody tape. Pertinent information will be recorded in the field logbook and all chain-of-custody forms will be fully completed for all samples.

3.3.1 Custody and Shipping

The properly labeled and sealed containers will be placed in reclosable poly bags and sealed. These will be placed into the sample cooler, which will have sufficient ice or blue ice to maintain a temperature of approximately 4°C. Samples will be packed to prevent breakage, using additional, inert packing material as necessary. Samples will be picked up by a representative from the contract laboratory for delivery to the laboratory. All chain-of-custody forms will be placed into a plastic bag and attached to the cooler lid, or otherwise included with the samples, prior to pickup.

3.3.2 Sample Preservation

All samples will be preserved by cooling on ice to approximately 4°C. Samples will be maintained on-site in a cooler filled with ice or blue ice. No samples will be held for more than 24 hours on site.

3.3.3 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if disturbed or tampered with. Except for VOA vials, individual sample bottles are to be sealed over the cap by the person obtaining samples. Sample shipping containers (coolers, shipping boxes, etc.) are to be sealed in as many places as necessary to ensure that tampering will be obvious. Seals are signed and dated before application. On receipt at the contract laboratory, the receiving individual will check and certify that the seals on shipping containers and sample bottles are intact. Discrepancies shall be noted and communicated immediately to the Project Manager.

3.4 Field Logbook

The field logbook will be permanently bound with pre-numbered pages and all entries will be made in indelible ink. The field logbook will be kept and maintained at TA-21-357. Corrections will be made by drawing a single line through any errors, and the person correcting the entry will initial the change. The person recording in the field logbook will sign and date their entries at the end of the day at the bottom of the last page on which entries are made. Any blank pages or blank space left at the end of a page will be crossed out and "BLANK" will be written across the blank space and initialed.

Sampling and Analysis Plan (SAP) For Assessment Activities of Fuel Oil Leak In Underground Transfer Lines From AST At TA-21-357 Steam Plant Amendment 1

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1.0 Purpose

The purpose of this amendment is to provide guidance in conducting additional subsurface investigation in support of the TA-21-57 fuel oil leak.

2.0 Objective

The objective of the Geo Probe investigation at TA-21-357 is to determine if any No. 2 Fuel Oil is present at the interface between the Bandelier Tuff and the topsoil beneath the site.

3.0 Sample Collection

A Geo Probe unit will be used to collect subsurface samples at the tuff/top soil interface. The Geo Probe will be advanced until rejection is reached at which point a sample will be collected. The sample will then be retrieved, packaged and shipped to an independent laboratory for analysis.

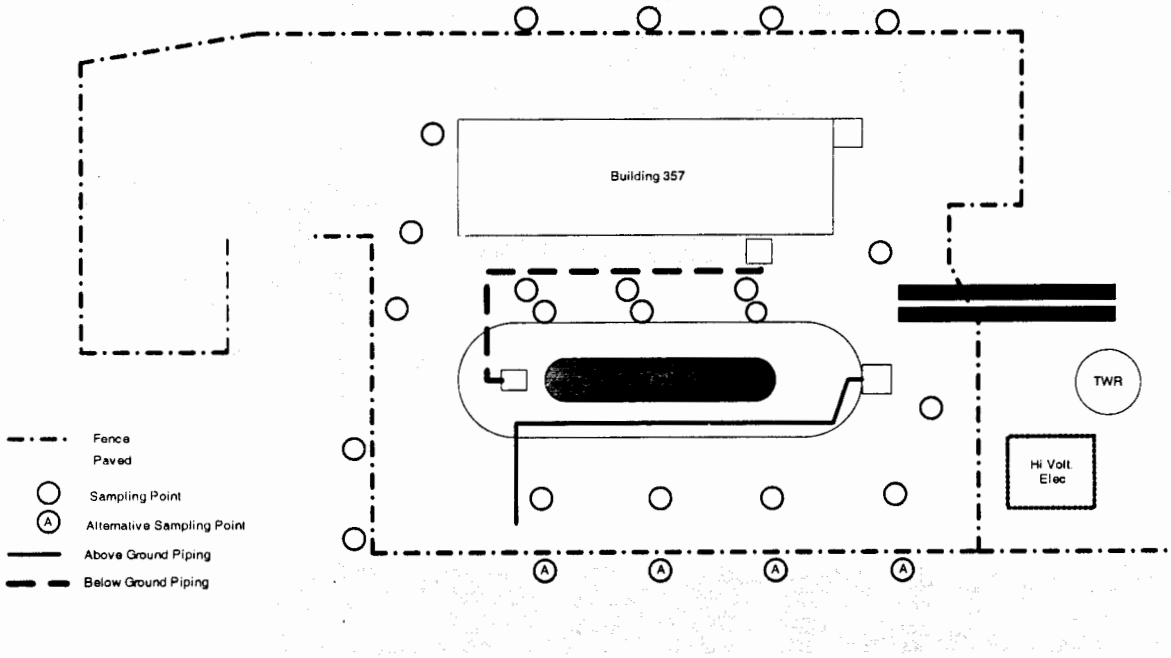
Proposed sampling locations are provided on the attached site diagram (Figure 3-1). This sampling scheme provides for data that would encircle the tank and all associated piping, containing the fuel oil leak concern. Alternative sampling points have also been shown on the site diagram because of access concerns. Sampling points within the fenced area to the north and west of the tank are located to the north of the tank. Access to these sampling points would have to be granted by removing a portion of the fence or removing the delivery line only. Alternatively the samples could be taken outside of the fence line through the asphalt. An alternative sampling point to the west of the fence would be difficult due to the presence of the water tower and multiple high-voltage electrical panels and associated underground cable to the west of the TA-21-357 fence line.

4.0 Analysis and Quality Control

Sampling collected using the Geo Probe and Geo Test will be labeled, handled, and analyzed in accordance with the procedures outlined in the Sampling and Analysis (SAP). The chain of custody, decontamination, and collection of duplicate samples required in the SAP will also apply to the Geo Probe and Geo Test sampling activities.

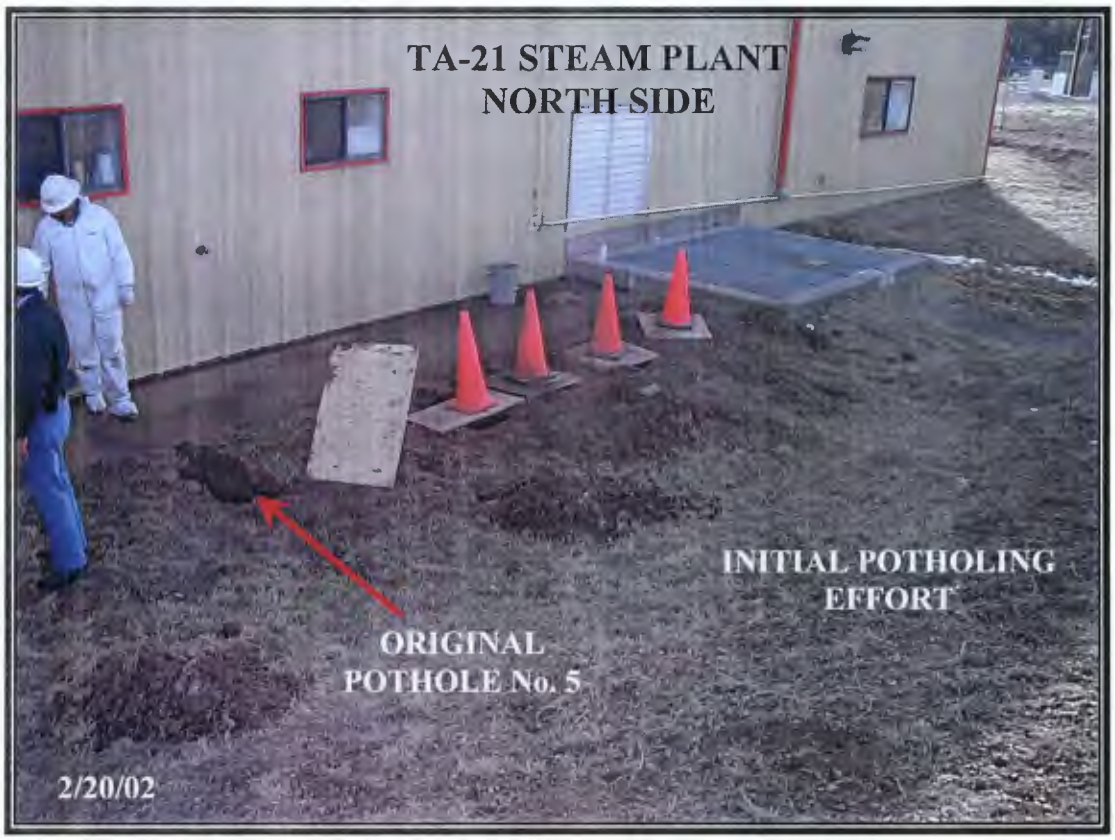
MORE DETAIL TO BE PROVIDED BY CONTRACTOR UPON SELECTION OF GEO PROBE AND GEO TEST.

Figure 3-1. Locations for investigation of contaminated region using Geo Probe and Geo Test.



TA-21-357 Proposed Geo Probe Sampling Site Diagram

TA-21-57 FUEL OIL CONTAMINATION ASSESSMENT



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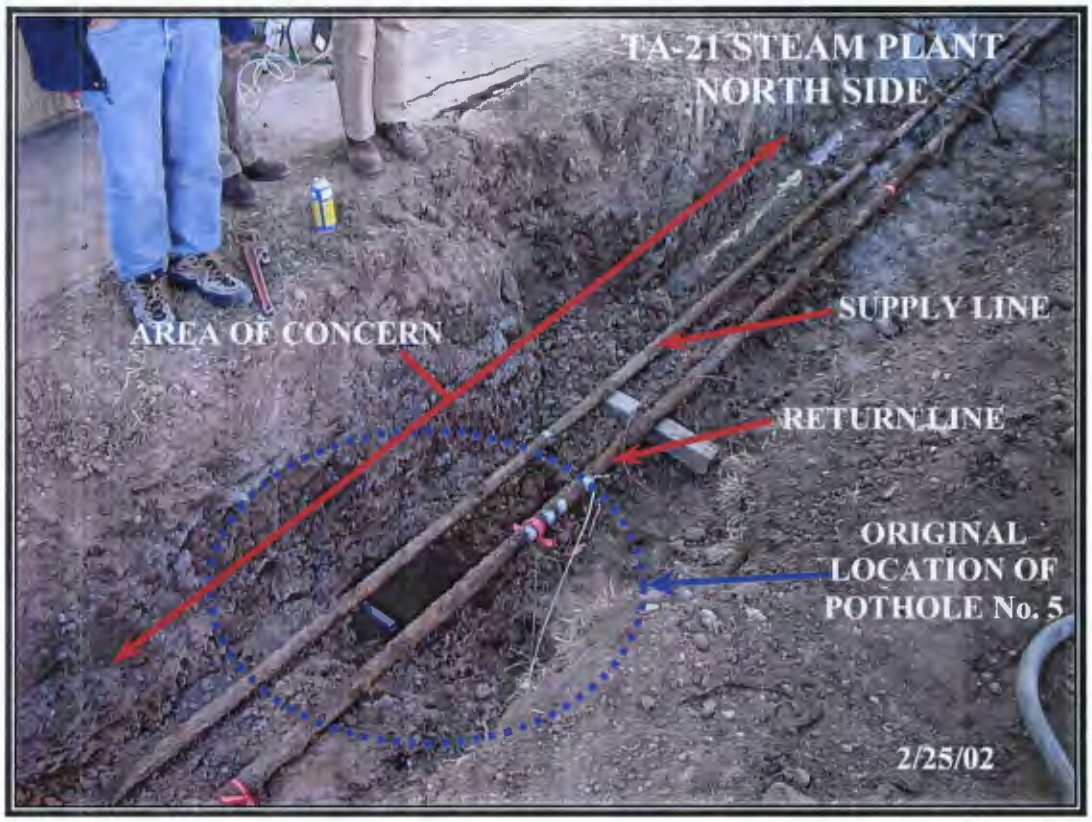

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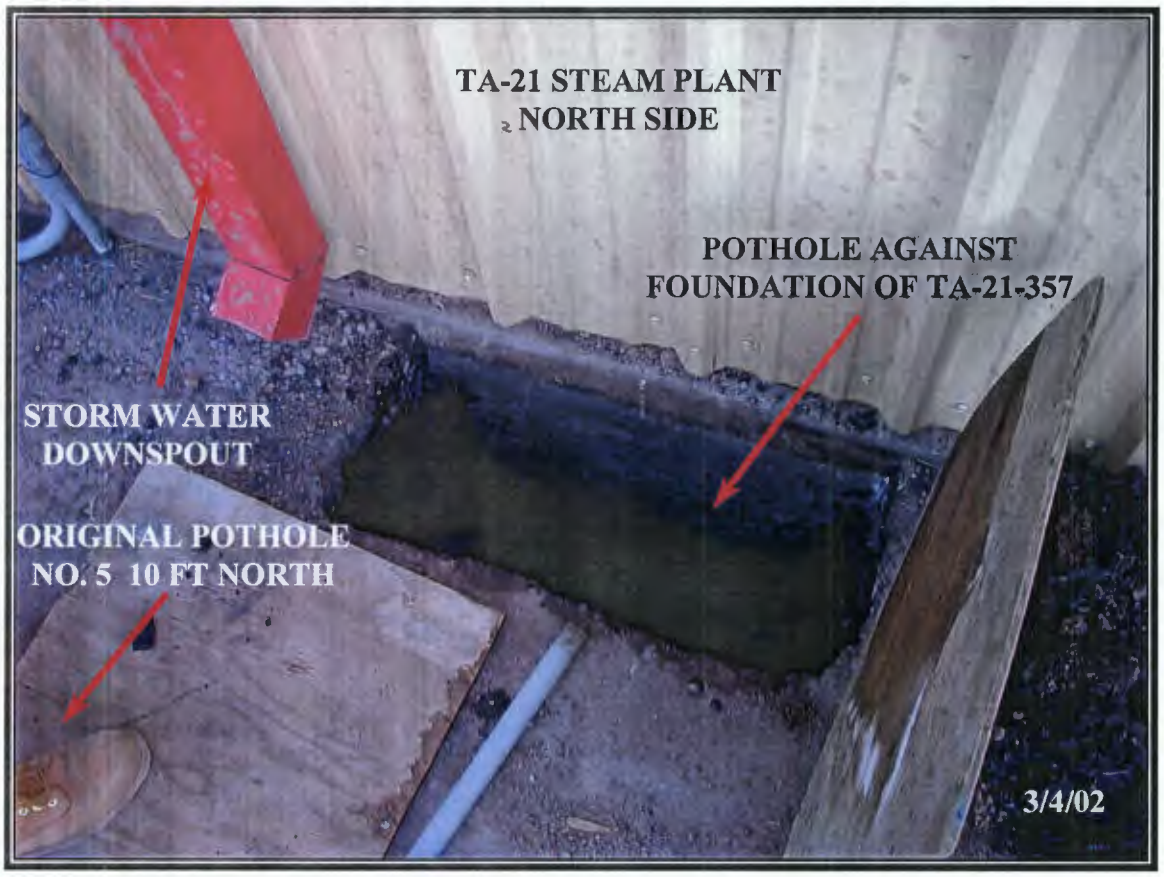

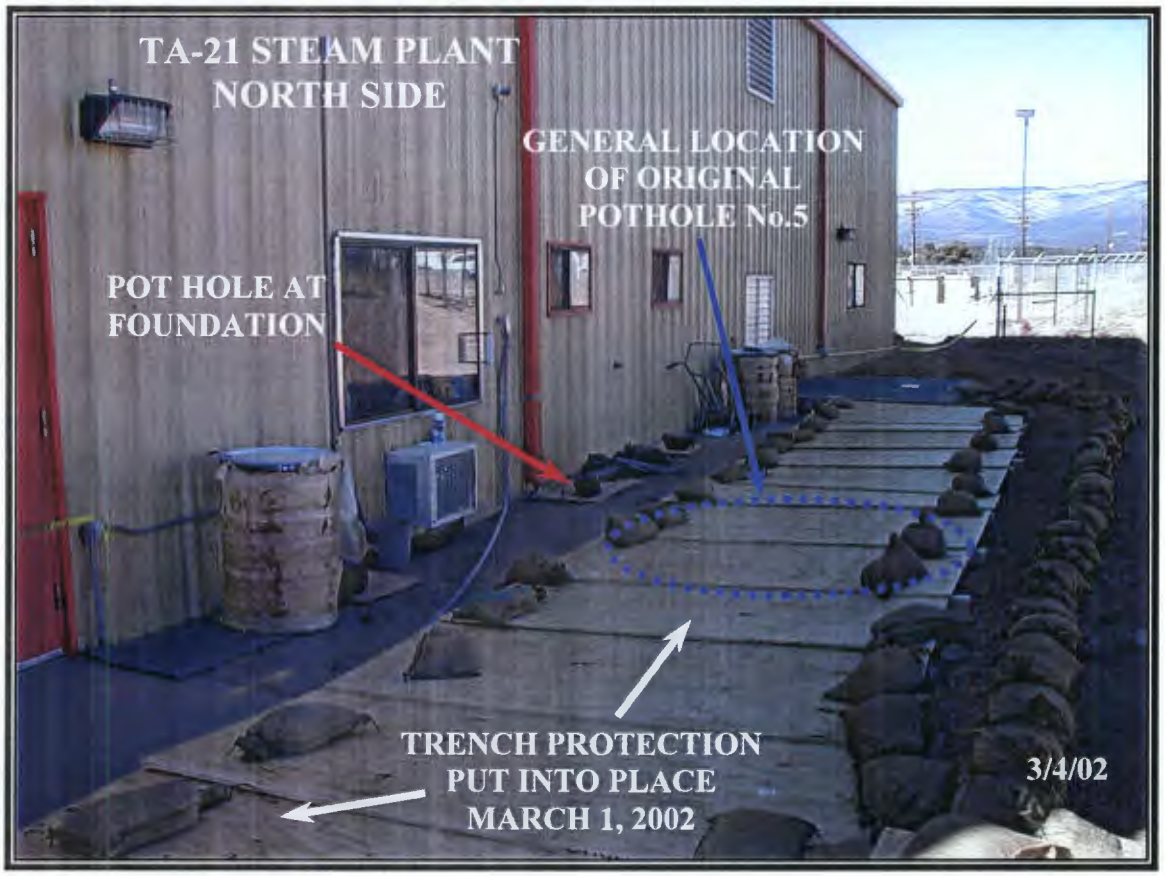

TA-21-57 FUEL OIL CONTAMINATION ASSESSMENT