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Date: April 22, 2005
Refer To: ENV-WQH: 05-082

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SUBJECT: SAMPLING AND ANALYSIS PLAN (SAP) FOR ADDITIONAL CHARACTERIZATION OF PETROLEUM PRODUCT CONTAMINATION NEAR FORMER TA-16-7

Dear Mr. Vick and Mr. Young:

Enclosed for your review is the "*Sampling and Analysis Plan: Assessment of Petroleum Product Contamination Near Former TA-16-7*"which is being submitted as a follow-up to our letter of March 23, 2005. This characterization will support evaluation of this site under the New Mexico Water Quality Control Commission Regulations 20.6.2.1203 NMAC. The Sampling and Analysis Plan (SAP) has been prepared for additional characterization of petroleum product contaminated soil discovered during a waterline disconnection near former TA-16-7. Upon NMED's review and approval of the SAP, the Laboratory will begin the additional characterization of the area.

Please contact Mark Haagenstad at (505) 665-2014 or Mike Saladen (505) 665-6085 if additional information on the SAP would be helpful.

Sincerely,

Steven Rae
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Title: Sampling and Analysis Plan
Assessment of Petroleum Product Contamination
Near Former TA-16-7

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Submitted to: New Mexico Environment Department (NMED)
Ground Water Quality Bureau (GWQB)

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Form 836 (8/00)

Sampling and Analysis Plan
Assessment of Petroleum Product Contamination
Near Former TA-16-7

April 22, 2005

Prepared by:
Environmental Stewardship Division
Water Quality and Hydrology Group (ENV-WQH)

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Table of Contents

Table of Contents i
List of Tables i
List of Appendices i
List of Acronyms ii
1.0 INTRODUCTION 1
1.1 Scope of Work 1
1.2 Project Organization and Responsibilities 2
1.3 Site Characteristics 2
1.4 Data Review 5
2.0 WORK PLAN 8
2.1 Field Mobilization 8
2.2 Drilling Plan 8
2.3 Sample Collection and Analysis 9
2.4 Site Restoration 9
2.5 Project Report Preparation 9
2.6 Material Management 10
3.0 QUALITY CONTROL PROCEDURES 11
3.1 Soil Sampling Procedures 11
3.1.1 Field TPH Analysis 11
3.1.2 Confirmatory Analytical Samples 11
3.1.3 Quality Assurance/Quality Control (QA/QC) 12
3.1.4 Data Validation 12
3.2 Decontamination 12
3.3 Sample Handling Protocol 12
3.3.1 Custody and Shipping 13
3.3.2 Sample Preservation 13
3.3.3 Custody Seals 13
4.0 REFERENCES 14

List of Tables

Table 1.0-1 3
Table 1.0-2 4
Table 1.0-3 4

List of Appendices

Appendix A 15
Figure 1: TA-16-7 Site Diagram 16
Figure 2: TA-16-7 Proposed Sampling Diagram 17

List of Acronyms

AHA	Activity Hazard Analysis (did you use this one?)
AOC	Area of Concern
AST	Aboveground Storage Tank (did you use this one?)
bgs	below ground surface
BV	Background value
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
D&D	Decontamination and Demolition
DOE	Department of Energy
DRO	Diesel Range Organics
ENV-SWRC	Environmental Stewardship-Solid Waste Regulatory Compliance
ENV-WQH	Environmental Stewardship-Water Quality and Hydrology
EPA	Environmental Protection Agency
EQLs	Estimated Quantitation Limits (did you use this one?)
ER	Environmental Restoration
Ft	Feet
HE	High Explosives
IWP	
LANL	Los Alamos National Laboratory
MG/KG	milligram / kilogram
ND	Non Detectable
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NWIS-SWO	Nuclear Waste and Infrastructure Services-Solid Waste Operations
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
SAP	Sampling and Analysis Plan
SLLs	Soil Screening Levels
SWMUs	Solid Waste Management Units
SVOC	Semi Volatile Organic Compounds
TA	Technical Area
TAL	Target Analyte List
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

The Laboratory has prepared this site sampling and analysis plan (SAP) to describe additional sampling activities associated with petroleum hydrocarbon contamination discovered in soil near former Building 16-7 at Los Alamos National Laboratory (LANL). Sampling and analysis is required to further define the extent of contamination discovered during a waterline disconnection at the site in September 2003.

This SAP is organized into three main sections: project description, a work plan and quality control procedures. The work activities for this SAP include:

- Mobilization
- Drilling
- Core Sampling
- Sample Collection and Analysis
- Project Report Preparation
- Material Management

1.1 Scope of Work

The scope of work for this project is to drill investigative boreholes in and around the previously excavated region of a waterline disconnect directly south of former Building 16-7 in an attempt to define the horizontal and vertical extent of hydrocarbon contamination in this area. Specific activities to accomplish the drilling and core sampling are provided in the Work Plan Section of this document.

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 are in accordance with the objectives and procedures described in Chapter 1, Soil and Groundwater, Sampling and Disposal Guidelines For Corrective Action (New Mexico Environment Department [NMED] Petroleum Storage Tank Bureau, March 13, 2003). Reporting requirements will be pursuant to the New Mexico Water Quality Control Commission (NMWQCC) Regulations 20.6.2.1203 NMAC. This plan outlines the methods and procedures to collect samples and gather data of sufficient quality and quantity to adequately verify the extent of the contaminated soil, if any exists at the previous excavation near former Building 16-7. The project will be performed in accordance with approved site health, safety, and emergency response plans. The project will be performed in accordance with applicable Department of Energy (DOE), LANL, and NMED requirements.

If the contamination extends beyond the proposed sampling area, additional drilling, coring, or other method of determining the extent of contamination will be performed, considering any physical obstacles or contaminant conditions, and documented as an amendment to this plan

1.2 Project Organization and Responsibilities

The Laboratory will have overall responsibility of additional characterization as described in this proposed SAP. A Laboratory approved subcontractor will conduct additional characterization work and document findings in a characterization report.

1.3 Site Characteristics

A site diagram of the Building 16-7, surrounding area, and associated excavation is provided in Appendix A, Figure 1, including locations of nearby solid waste management units (SWMUs) and areas of concern (AOCs). Building 16-7 was operated as a steam plant and machine shop in the former administration area of TA-16 from 1944 until 1956. The building was subsequently used for storage. Decontamination and Demolition (D&D) or removal of Building 16-7 was completed the end of April 2004.

Workers excavating an area directly adjacent to the southeast corner of Building 16-7 to disconnect a waterline during preliminary D&D activities reportedly noticed the smell of diesel during excavation activities. Work was stopped so that industrial hygiene monitoring could be performed. This monitoring did not identify the presence of vapors above action levels and work was restarted. Excavation continued until the bottom of the excavation was approximately 6 ft below ground surface (bgs). Potable water was released into the excavation during the disconnection on September 26, 2003, and site workers indicated that hydrocarbon sheen was visible on the surface of this water. Final disconnection activities for the potable water line to Building 16-7 were completed on September 29, 2003, and approximately 600 gallons of water was pumped from the excavation into drums at the site pending characterization results for the excavated soil. The Laboratory reported the water release to NMED pursuant to NMWQCC regulations (20.6.2.1203 NMAC) on September 26, 2003. The site was field screened for gross alpha, beta and gamma radiation. Results showed no radiation levels above background.

Because of the presence of the hydrocarbon sheen on the water in the excavation, on September 30, 2003, Laboratory personnel proposed, informed NMED, and conducted the following initial characterization activities to determine whether the soil at the location of the excavation was contaminated:

- One grab sample was collected from the bottom/center of the excavation and submitted for analysis of VOCs, SVOCs plus a duplicate, BTEX, TPH-DRO, TAL metals and HE (Location ID#: 16-22561, see Figure 2, Appendix A).

- One grab sample was collected from the bottom/western end of the excavation and submitted for analysis of VOCs, SVOCs, BTEX, TPH-DRO, TAL metals and HE (Location ID#: 16-22562, see Figure 2, Appendix A).

- One grab sample was collected from the middle of the excavated soil pile with the most visible or obvious contamination and submitted for analysis of VOCs, SVOCs, and HE.

- One trip blank (deionized water) was collected outside the area of influence where the soil samples were collected and would be submitted for analysis of VOCs.

- One equipment blank (deionized water) was collected from the sample collection scoop prior to initiation of actual sample collection.

The samples described above were collected by Laboratory personnel on October 1, 2003 and were submitted to a state certified analytical laboratory for the analyses listed above. During sample collection, no obvious staining or odor was observed in the excavation or excavated soil pile with which to bias sampling locations. Immediately following sample collection, sample locations were surveyed.

Table 1.0-1
Inorganic Chemicals Detected Above Background Values in Soil Samples Collected from Excavation Adjacent to Building 16-7

Analyte	Sample ID	Location ID	Depth (bottom of excavation)	Media	Sample Value (mg/kg)	BV[a] (mg/kg)	SSL[b] (mg/kg)
Cadmium	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.422	0.4	74.1
Cobalt	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	13.4	8.64	1520
Copper	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	18.5	14.7	3130
Copper	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	20.9	14.7	3130
Lead	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	31.9	22.3	400
Zinc	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	50.6	48.8	23,500

[a]BV = Background Value. Background values used in this table are from the 1998 paper: "Inorganic and Radionuclide Background Data for soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory." (LANL 1998, 59730)
[b]SSL = Soils screening level. The soil SSLs used in this table are NMED residential screening levels (NMED 2004)

Table 1.0-2
Volatile Organic Chemicals Detected in Soil Samples Collected from Excavation Adjacent to Building 16-7

Analyte	Sample ID	Location ID	Depth (bottom of excavation)	Media	Sample Value (mg/kg)	SSL[a] (mg/kg)
n-Butylbenzene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.33	62.0
Sec-Butylbenzene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.12	60.5
n-Butylbenzene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.18	62.0
Sec-Butylbenzene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.078	60.5

Note: VOCs were not detected in the sample collected from the excavated soil pile or in the QA samples.
[a]SSL – Soil screening level. The SSLs used in this table are NMED residential screening levels (NMED 2004)

Table 1.0-3
Semivolatile Organic Chemicals Detected in Soil Samples Collected from Excavation Adjacent to Building 16-7

Analyte	Sample ID	Location ID	Depth (bottom of excavation)	Media	Sample Value (mg/kg)	SSL[a] (mg/kg)
2-Methylnaphthalene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	2.2	NA[b]
Bis(2-Ethylhexyl)phthalate	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.69	347
Dibenzofuran	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.60	313
Fluorene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.46	3130
Naphthalene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.48	71.9
Phenanthrene	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	0.74	1800
TPH-DRO	RE16-03-52666	16-22561	6.0-6.5 ft	Soil	740	880[c]
2-Methylnaphthalene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	1.2	NA
Bis(2-Ethylhexyl)phthalate	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.64	347
Dibenzofuran	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.36	313
di-n-Butylphthalate	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.72	6000
Fluorene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.26	3130
Naphthalene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.21	71.9
Phenanthrene	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	0.41	1800
TPH-DRO	RE16-03-52667	16-22562	6.0-6.5 ft	Soil	220	880
Bis(2-Ethylhexyl)phthalate	RE16-03-52668	16-22563	Soil Pile	Soil	0.39	347
2-Methylnaphthalene	RE16-03-52671[d]	16-22561	6.0-6.5 ft	Soil	1.5	NA
Bis(2-Ethylhexyl)phthalate	RE16-03-52671[d]	16-22561	6.0-6.5 ft	Soil	0.58	347
Dibenzofuran	RE16-03-52671[e]	16-22561	6.0-6.5 ft	Soil	0.41	313
Fluorene	RE16-03-52671[e]	16-22561	6.0-6.5 ft	Soil	0.31	3130
Naphthalene	RE16-03-52671[e]	16-22561	6.0-6.5 ft	Soil	0.22	71.9

Analyte	Sample ID	Location ID	Depth (bottom of excavation)	Media	Sample Value (mg/kg)	SSL[a] (mg/kg)
Phenanthrene	RE16-03-52671[c]	16-22561	6.0-6.5 ft	Soil	0.50	1800

[a]SSL = Soil screening level. The SSLs used in this table are NMED residential screening levels (NMED 2004)

[b]NA = Not available

[c] Screening level for TPH-DRO is NMED residential screening guideline for diesel (NMED 2003)

[d] = duplicate of sample RE16-03-52666

1.4 Data Review

Analytical results indicated that five inorganic chemicals were detected in the two excavation samples at concentrations at or slightly above background values and well below NMED soil screening levels (SSLs) based on residential land use. All inorganic chemicals were less than two times background values, and the maximum concentrations of cadmium and zinc, although above background values, were less than the maximum LANL background concentrations (LANL 1998). If the inorganic compounds were representative of a release, the most likely source appears to be metal chips generated from the waterline disconnection activities. These activities involved cutting and subsequent repair of the waterline within the excavation. Only two volatile organic compounds (VOCs) were detected in the two samples collected from the excavation, at concentrations similar to estimated quantitation limits (EQLs) and well below SSLs. No VOCs were detected in the soil pile sample or in any of the QA samples. A total of eight semivolatile organic compounds (SVOCs) were detected in the soil samples collected from the excavation (including the duplicate) and one SVOC was detected in the soil pile sample. The SVOCs other than TPH-DRO were all detected at concentrations close to the EQLs and well below SSLs, and are typically associated with asphalt. TPH-DRO was detected at 740 mg/kg and 220 mg/kg in the two samples collected from the bottom of the excavation, respectively. These concentrations are below the 880 mg/kg NMED residential screening guideline for diesel (NMED 2003). HE was not detected in any of the samples

Based on these results, the contamination observed in the excavation is believed to be consistent with a release of diesel fuel. The only known sites of historical diesel fuel usage in the vicinity of the excavation are AOCs C-16-030 and C-16-031. AOC C-16-030 is the former location of an aboveground concrete diesel tank housing (former structure TA-16-181) and AOC C-16-031 is the former location of a diesel unit (i.e., generator) building (former structure TA-16-182). The diesel unit building was constructed in 1944 and the tank housing (consisting of a concrete stand) was added in 1948; both structures were removed in 1956. The fuel for the diesel unit was stored in a tank located on the concrete housing. These structures were located approximately 40 ft northeast of the northeast corner of Building TA-16-7 and approximately 100 ft north of the waterline excavation. There was never a utility corridor connecting the AOCs to Building 16-7 or to the location of the waterline excavation. Therefore, these AOCs are not likely the source of the contamination detected in soil samples from the excavation

based on the dates of operation and removal of AOCs C-16-030 and C-16-031, their distance from the excavation, and the absence of a utility corridor to serve as a preferential pathway for contaminant transport. Based on a review of historical structures and operations in this area, no discernible unit could be identified as a source of the contamination.

Another historical use of petroleum products in the vicinity of the site was operation of the Building 16-7 steam plant from 1945 to 1956. Fuel oil for the steam plant was stored in a 56,000-gallon aboveground storage tank (TA-16-29, AOC 16-033[c]) located to the northwest of Building 16-7, approximately 200 ft from the waterline excavation. Fuel oil was pumped from the tank to Building 16-7 by overhead lines through a pump house (TA-16-19, AOC C-16-019). The tank and pump house were both installed in 1945 and removed in 1956. Based on historical information presented in Addendum 2 to the Operable Unit 1082 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan (LANL 1995), there was no record of fuel spills when the steam plant was operational. No soil staining was observed during inspections of the sites performed during preparation of the RFI Work Plan. Based on the information presented in the RFI Work Plan, historic fuel oil releases do not appear to be a likely source of the observed diesel contamination.

A potential source of the diesel contamination could have been the construction and paving activities that were underway directly adjacent to and south of the waterline excavation. The parking lot for new Building 16-969 was being installed when the hydrocarbon contamination was detected adjacent to Building 16-7. Numerous dump trucks, backhoes, and paving machines, aggregate piles and temporary asphalt emulsion tanks were staged directly south and east of the water line excavation. Also present were the subcontractor construction trailers for the new building and parking lot, numerous vehicles and temporary aboveground fuel storage tanks. The close proximity of these activities required that the waterline disconnect excavation be backfilled as soon as the samples were collected to avoid injury to contractor personnel. The bottom of the excavation was lined with plastic to denote the depth and location of the waterline break and residual petroleum hydrocarbon contamination, and the excavation was subsequently backfilled to minimize hazards to site workers. Water collected from the pit was managed and disposed of in accordance with applicable regulations.

Based on the analytical results, operational history of Building 16-7, and the location of the two AOCs northeast of Building 16-7, the Laboratory has determined that the petroleum hydrocarbon contamination detected in the waterline excavation southeast of Building 16-7 is not associated with either of the AOCs located northeast of Building 16-7. There is no obvious source of the residual diesel contamination detected (at a depth of 6 ft bgs) in the excavation and the lack of any visible staining and relatively low TPH concentrations is not indicative of a systematic and/or routine release. The detected concentrations of residual petroleum hydrocarbon contamination and SVOCs do not pose an unacceptable risk to human health or the environment. The Laboratory proposed no further investigation or remediation at this location. On April 7, 2004, the Laboratory requested closure of the release pursuant to NMWQCC Regulations 20.6.2.1203. NMED

responded by requesting additional characterization of the site in a February 16, 2005 letter, "*RE: RESIDUAL DIESEL CONTAMINATION AT TA-16-7, REQUEST FOR CLOSURE UNDER NMWQCC REGULATIONS, LOS ALAMOS NATIONAL LABORATORY, EPA ID #0890010515*". The Laboratory has agreed to conduct additional characterization of the site pursuant to this SAP.

2.0 WORK PLAN

The following sections describe all major activities necessary to complete the sampling and analysis for determining the extent of soil contamination, the potential source of the release, and preparing a report to document project activities.

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 with the characterization subcontractor, 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 an activity hazard analysis, and preparing this SAP. All field mobilization tasks must be complete prior to the initiation of any fieldwork or sampling activities.

2.2 Drilling Plan

An auger drilling rig will be brought in to advance continuous core boreholes with split spoon sampling to define the vertical and horizontal extent of contamination. The horizontal extent of contamination will be determined using a step-out approach. A continuous borehole will be advanced in the previously excavated area near sample locations 16-22561 and 16-22562 where residual hydrocarbon contamination was detected at 740 mg/kg and 220 mg/kg respectively (see Appendix A, Figure 2). Continuous borehole sampling will be conducted 10 feet directly North, South, East, and West of the initial borehole (see Appendix A, Figure 2). Horizontal extent will continue in 10 feet intervals outward from each previous location until contamination is non detectable (ND) with field and laboratory analysis [Note: ND for field analysis takes into account minor artifacts common to the field screening methodology utilized]. The initial sample location and step-out sampling points are depicted in Figure 2 of Appendix A and include locations of the initial characterization sampling conducted on October 1, 2003. If contamination is visible or confirmed by field analysis in any of the initial step-out sampling points, an analytical sample will be collected and a secondary step-out will be performed. If secondary sampling points contain visible signs of contamination or contamination is confirmed by field tests additional step-out sampling will be conducted.

Continuous core boreholes will be advanced at the initial location to determine the vertical extent of contamination. Initial borehole sampling will be conducted at a depth interval of 6.0-6.5 feet. Continuous borehole sampling will then be advanced in 5 feet intervals until field analysis is ND. When field analysis is ND, the borehole will be

advanced an additional 20 feet and verification samples will be taken for submittal to a certified analytical laboratory.

If the horizontal-extent borehole field analysis results indicate a higher concentration of contamination in the step-out samples, a vertical-extent borehole will be advanced at the location of the highest concentration. This borehole will be advanced to 10-feet below the first sample depth with a field screening result of ND. A geologist will log each vertical-extent borehole. This process will continue until nature and extent of contamination has been determined and verified by laboratory analysis.

2.3 Sample Collection and Analysis

Field analysis will be used in conjunction with visual and olfactory evidence to guide the drilling. Samples that exhibit obvious contamination using visual and olfactory means will not be subjected to field analysis. Field analysis will be used when visual or olfactory evidence is less obvious or non-existent. Field analyses will be performed using a PetroFLAG field TPH analysis kit or similar field TPH analysis kit in accordance with the detailed instructions for the kit. Typically, a sample is collected and mixed with reagents, filtered, allowed to develop, then read with a turbidimeter.

Analytical samples will be collected and placed in 8oz amber-glass jars with no headspace. Laboratory samples will be sent to a contract laboratory for analysis. All analytical samples will be analyzed for diesel range total petroleum hydrocarbons (TPH-DRO) by method 8015M and Target Analyte Metals (TAL) by method 3050A.

2.4 Site Restoration

As each borehole is completed it will be covered and barricaded to prevent personnel from accidentally stepping in the hole and to prevent soil and debris from falling in the hole. Once the determination that the boreholes are no longer needed, they will be abandoned in accordance with the Chapter 3 of the NMED Guidelines For Corrective Action. All sampling equipment and materials and drilling equipment will be removed from the site upon completion of the investigation. Drill cuttings and decontamination water will be handled in accordance with Section 2.7 of this document.

2.5 Project Report Preparation

The Laboratory will have the subcontractor will prepare a characterization report summarizing the field work, analytical results, compliance with QC requirements (data validation), and estimating the extent of soil contamination based on the analytical results. The characterization report will contain sample collection and control documentation, analytical data reports, and borehole logs. ENV-WQH will formally submit this information to the regulators.

2.6 Material Management

Drill cuttings and spent field analytical samples will be placed in drums and stored pending receipt of the analytical results. Contaminated soil with TPH levels higher than 1000 mg/kg will be managed as New Mexico Special Waste. All decontamination solutions generated during this assessment will be properly characterized (waste profiles) and disposed of through Nuclear Waste and Infrastructure Services Solid Waste Operations (NWIS-SWO) in accordance with LANL, NMED, and DOE requirements.

3.0 QUALITY CONTROL PROCEDURES

The objective of the sampling is to obtain data of sufficient quantity and quality to determine the extent of the contamination and to provide contaminant data for comparison with the NMED soil screening levels. The data must 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 with DOE, EPA and NMED requirements.

3.1 Soil Sampling Procedures

Whenever possible, disposable sampling equipment will be used to minimize the chance of cross-contamination of samples. Soil samples will be removed from the split spoon sampler and soil probe using disposable poly scoops. All non-disposable equipment will be decontaminated in accordance with Section 3.2 prior to use. Borehole samples will be collected in stainless steel split spoon samplers. Core samples will be collected using a stainless-steel soil probe.

3.1.1 Field TPH Analysis

Field TPH analysis will be conducted using PetroFLAG field analysis kit or similar TPH field analysis kit with a calibrated turbidimeter. The sensitivity and detection levels of the kit will be dependent upon the age of the material present and any interference present in the soils at the site. Test results will be used to semi-quantitatively identify any residual contamination. The analyst/technician performing soil analyses will be trained and familiar with use of the method and instrumentation 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 on the field activity log. 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 confirmatory samples will consist of obtaining samples from the split spoon sampler and the soil probe. Samples will be placed into the sample containers and submitted to the contract analytical laboratory for analysis after collection in accordance with required holding times.

3.1.3 Quality Assurance/Quality Control (QA/QC)

In addition to field samples, field QC samples will be collected to assess the sample collection and handling techniques and the decontamination effectiveness. Field duplicate samples will be collected at a frequency of 10 percent (10%) and will be collected, handled and analyzed exactly as the original sample for which it is a duplicate. A trip blank will be included in any cooler containing samples to be analyzed for volatile organics to identify any contamination that may occur during handling or transportation of the samples.

Batch laboratory QC samples, including lab blanks, will be analyzed to assess the laboratory's performance during analysis of the samples. Any laboratory QC sample results falling outside of the acceptable limits will be explained on the analytical report and its effect on the validity of the sample results will be evaluated.

3.1.4 Data Validation

Laboratory data will be checked for the following parameters to ensure validity of the data.

- Completeness – all samples and analysis have been processed.
- Detection and Quantitation Limits – Detection and quantitation limits are below the regulatory and/or action levels.
- Control Limits – Ensure that laboratory quality control sample analytical results are within acceptable control limits.
- Holding Times – Ensure that sample preparation and analysis were performed within the acceptable holding times.

3.2 Decontamination

The auger flights will be decontaminated between holes. The split spoon sampler and soil probe will be decontaminated before the collection of each sample. Field analysis jars will also be decontaminated prior to each use. Decontamination will consist of physically removing all gross contamination, followed by a wash with a laboratory detergent solution followed by two water rinses. Residues generated by decontamination procedures should be collected and disposed of in accordance with LANL and NMED requirements as specified in Section 2.7.

3.3 Sample Handling Protocol

When a sample is collected for off-site analysis, it will be promptly placed into a labeled 8 oz. amber-glass jar and fitted with a Teflon lined lid. The sample will be handled under chain of custody procedures and labeled with the following information,

- Unique sample identification number (including locations)
- Project number
- Date
- Time sampled
- Name of Sampler
- Requested analysis
- Preservation method,
- Sealed with custody tape, then placed in a re-closable poly bag and placed on ice to cool to 4°C for delivery to the analytical laboratory. Pertinent information will be recorded on the sample collection log and the chain-of-custody form.

3.3.1 Custody and Shipping

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 analytical laboratory for delivery to the analytical laboratory. If overnight storage of the samples is required, the samples will be placed, under custody, in a laboratory sample refrigerator. 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. Samples will be relinquished to the laboratory representative by one of the sample team members and the transaction will be recorded on the chain-of-custody form.

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.

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 VOC 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.

4.0 REFERENCES

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LANL 1995. *RFI Work Plan for Operable Unit 1082, Addendum 2, LA-UR-95-1038, Los Alamos National Laboratory*, Los Alamos, New Mexico, July 1995.

NMED 2004. *Technical Background Document for Development of Soil Screening* Levels, Revision 2.0, New Mexico Environment Department, Santa Fe, New Mexico, February 2004.

NMED 2003. *Guidelines For Corrective Action, New Mexico Environment Department, Petroleum Storage Tank Bureau*, Santa Fe, New Mexico, March 13, 2003.

NMED 2002. *Ground and Surface Water Quality Protection Regulations, 20.6.2.1203 NMAC,* Santa Fe, New Mexico, September 15, 2002.

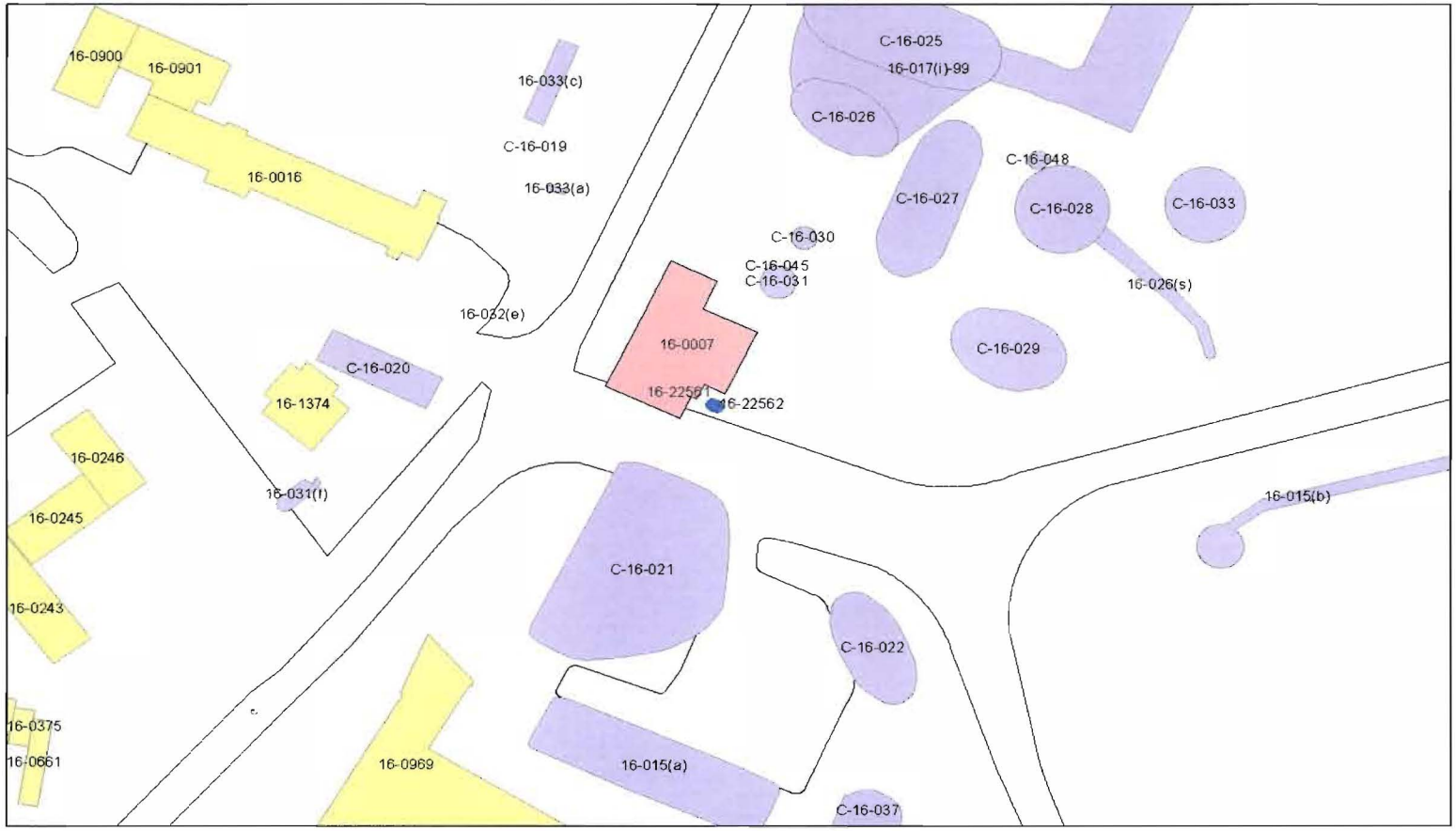
NMED 2003. *New Mexico Environment Department TPH Screening Guidelines, New Mexico Environment Department*, Santa Fe, New Mexico, February 28, 2003.

NMED 2005. *RE: RESIDUAL DIESEL CONTAMINATION AT TA-16, REQUEST FOR CLOSURE UNDER NMWQCC REGULATIONS, LOS ALAMOS NATIONAL LABORATORY, EPA ID #0890010515,* Santa Fe, New Mexico, February 16, 2005.

APPENDIX A

Figures

Figure 1: TA-16-7 Site Diagram



Sampled Locations
Roads
PRS
Removed Buildings
Buildings

1:1,000

N

0 25 50 100 150 200 Feet

Data Sources

Removed Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 08 May 2003.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, Development Edition of 06 January 2005.

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, ENV Remediation Services Project, ER2005-0200, 05 April 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project, ER2004-0714, 1:2,500 Scale Data, 07 January 2005.

New Mexico State Plane Projection
Central Zone
North American Datum 1983

Cartography by Chris McLean
ENV-ECR 4/11/05
05-0035-1

Users are solely responsible to confirm data accuracy.

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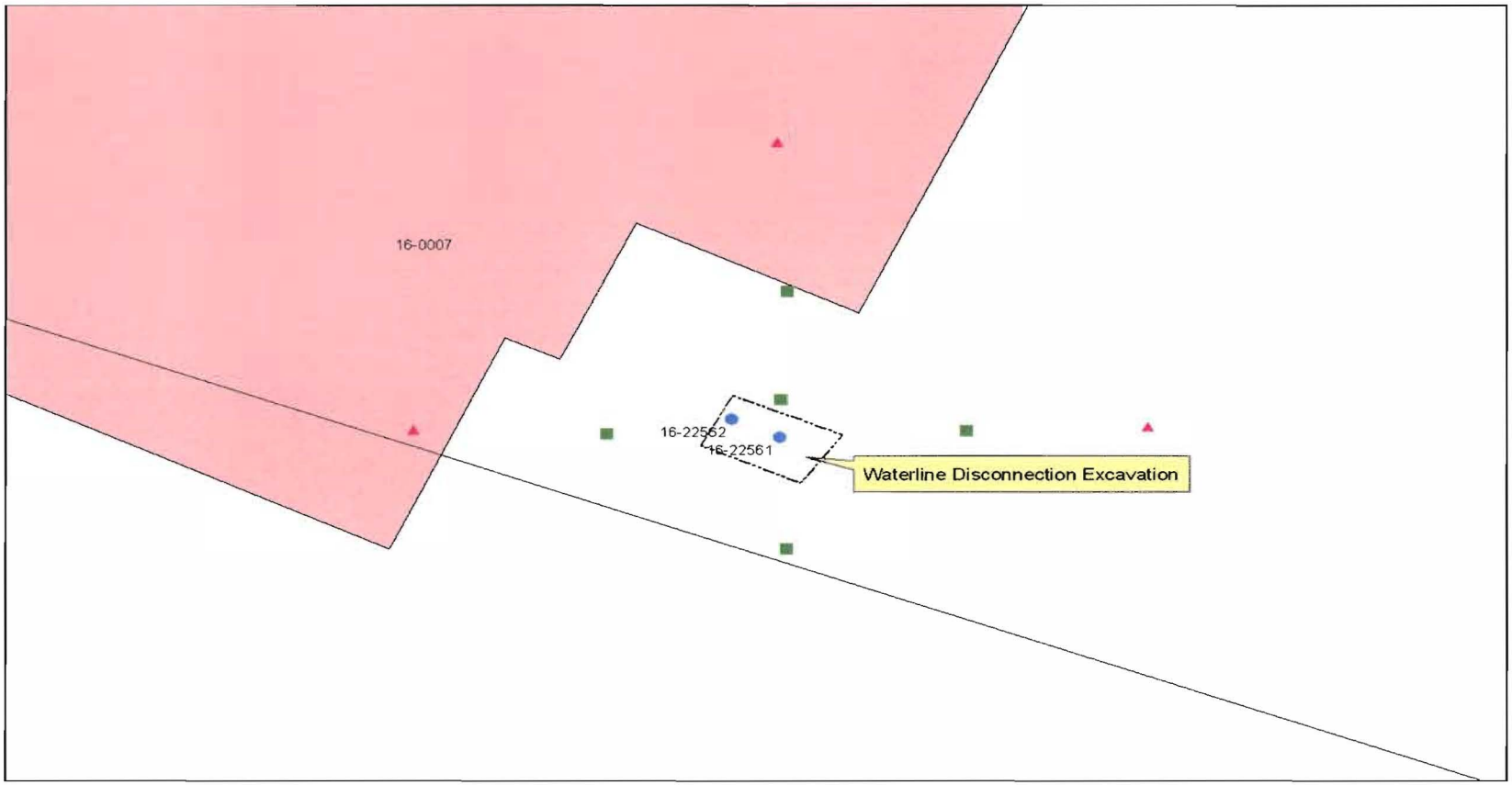
Figure 2: Proposed Sampling Diagram



2nd Proposed Sample Points

1st Proposed Sample Points

Initial Sample Locations (October 2003)

Removed Buildings

Roads

1:100

N

0 2 4 8 12 16 Feet

Data Sources

Removed Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 08 May 2003.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, ENV Remediation Services Project, ER2005-0200, 05 April 2005.

New Mexico State Plane Projection
Central Zone
North American Datum 1983

Cartography by Chris McLean
ENV-ECR 4/11/05
05-0035-2

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