HAFB 2003

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December 19, 2003

RECEIVED
DEC 2003
NMED Hazardous Waste Bureau

Ms. Sandra Martin
NMED/Hazardous Waste Bureau
2905 Rodeo Park Drive East
Santa Fe, New Mexico 87505-6303

Subject: Soil Disposal Work Plan, Drone Crash Site
Holloman AFB, New Mexico
USACE – Omaha District
Contract No. DACA45-03-D-0023, DO No. 1
Bhate Project No. 9030232.03

Dear Ms. Martin,

Please find enclosed the original and three copies of the final *Soil Disposal Work Plan – Drone Crash Site for Holloman AFB, New Mexico* for your review.

Bhate Environmental Associates, Inc., appreciates the opportunity to provide services to the U.S. Army Corps of Engineers, Holloman Air Force Base and the State of New Mexico. If you have any questions or need additional assistance, please feel free to contact us at (205) 918-4000.

Cordially,
BHATE ENVIRONMENTAL ASSOCIATES, Inc.

Frank Gardner, P.G.
Program Manager

cc w/ enclosures: Cornelius Amindyas (NMED/HWB)
Steve Jetter (NMED/HWB)
James Harris (USEPA/Region 6)

SOIL DISPOSAL

WORK PLAN

LIBRARY COPY

DRONE CRASH SITE

Holloman Air Force Base
New Mexico

December 2003

Contract No. DACA45-03-D-0023
Task Order No. 001, WAD 3
BHATE Project No. 9030232.03

Headquarters, Air Combat Command
Langley Air Force Base, Virginia

49 CES/CEV
Holloman Air Force Base, New Mexico

SOIL DISPOSAL WORK PLAN
DRONE CRASH SITE
WHITE SANDS NATIONAL MONUMENT
HOLLOMAN AFB, NEW MEXICO

Prepared For:

49 CES/CEV
Holloman Air Force Base
New Mexico

Under Contract To:

U.S. Army Corp of Engineers
Omaha District
Under Contract No. DACA45-03-D-0023
Task Order No. 1

Prepared By

Bhate Environmental Associates, Inc.
1608 13th Avenue South
Suite 300
Birmingham, Alabama 35205
Bhate Project Number: 9030232.03

December 2003

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SOIL DISPOSAL WORK PLAN
DRONE CRASH SITE
WHITE SANDS NATIONAL MONUMENT
HOLLOMAN AFB, NEW MEXICO

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ACRONYMS AND ABBREVIATIONS

AAF	Army Air Field
AOC	Area of Concern
AFB	Air Force Base
AF Fm	Air Force Form
amsl	Above Mean Sea Level
ANSI	American National Standards Institute
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
bgs	Below Ground Surface
Bhate	Bhate Environmental Associates, Inc.
BTEX	Benzene, toluene, ethylbenzene, xylenes
CES/CEV	Civil Engineering Squadron/Combat Engineer Vehicle
cm	Centimeter
cm/sec	Centimeter per second
COC	Chain-of-Custody
CRZ	Contaminant Reduction Zone
DCS	Drone Crash Site
DoD	Department of Defense
DQOs	Data Quality Objectives
DRMO	Defense Reuse and Maintenance Operations
DRO	Diesel-Range Organics
EOD	Explosive Ordnance Disposal
EZ	Exclusion Zone
FID	Flame Ionization Detector
gpm	Gallons per minute
GRO	Gasoline-Range Organics
HAFB	Holloman Air Force Base
HASP	Health and Safety Plan
hr	Hour
IDW	Investigation Derived Waste
IRA	Interim Remedial Action
IRP	Installation Restoration Program
kg	Kilogram
L	Liter
lbs	Pounds
LTM	Long Term Monitoring
mg	Milligram
mL	milliliter
NFA	No Further Action
NMED	New Mexico Environment Department
ORO	Oil-Range Organics

OSHA Occupational Safety and Health Administration

ACRONYMS AND ABBREVIATIONS (CONTINUED)

OWS	Oil/water Separator
PA/SI	Preliminary Assessment/Site Investigation
PCS	Petroleum-Contaminated Soils
PID	Photo Ionization Detector
POL	Petroleum, Oil and Lubricants
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAD	Radiological
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
sec	Second
SSL	Soil Screening Level
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USDOI	United States Department of Interior
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WSNM	White Sands National Monument
WWTP	Wastewater Treatment Plant

1 INTRODUCTION

Bhate Environmental Associates, Inc. (Bhate) has been retained by the U.S. Army Corps of Engineers (USACE), under contracts DACA45-03-D-0023, Task Order No. 1, to conduct a field investigation and soil excavation a the Drone Crash Site (DCS), located at the White Sands National Monument (WSNM), New Mexico. This document is to provide an investigation, and excavation work plan that will serve as the primary working document for the excavation activities at the DCS. This plan provides the relevant site information and requirements as outlined in the respective Scope of Work. The primary objective of this investigation is to delineate and remove, through excavation, and properly dispose of petroleum-contaminated soils (PCS) at the site. During this process, required data will be collected to support the closure of the site based on guidance from the New Mexico Environmental Department (NMED). The ultimate objective is to achieve approval for site closure from NMED.

1.1 Purpose

The Work Plan has been constructed to provide relevant information on the geologic, hydrologic and other environmental conditions for HAFB and at the site. Information is provided for the entire Base and its surrounding environment as well as the DCS, specifically. Likewise, the procedures encompassing the site investigation, excavation, sampling and waste management are presented.

1.2 Description

White Sands National Monument is located in the south central portion of New Mexico approximately five miles southwest of Holloman Air Force Base (Figure 1). The park covers 143,733 acres and is visited annually by over 500,000 people. The monument ranges in elevation from 3,890 ft to 4,116 ft above sea level, and occupies approximately 115 square miles of the 275 square mile physiographic region. The portion that is not occupied by the monument is military owned and is not open to the public.

The sand dune field is a very dynamic environment; dunes can migrate up to 30 feet per year. The sand is derived from pure gypsum that originates in the western portion of the monument from an ephemeral lake or playa with a very high mineral content. As the water evaporates from the lake, the mineral concentrations in solution increase until the water is saturated. Once the water is saturated mineral crystals begin to precipitate from the remaining brine and are left behind as evaporate deposits. The deposits are then transported by wind to form the dunes.

1.3 Project Background

The site is an area of the White Sands National Monument where an F-4 Drone crashed in the spring of 2003. The drone was carrying a full load of fuel at the time of the crash. Depending upon the configuration, a fully loaded F-4 could hold between 1000 and 1500 gallons of jet fuel. The scope of the project is to determine the vertical extent of contamination and to excavate all of the contaminated soil and debris left behind from the crash.

1.3.1 Site Description

The site is approximately 12 miles north of Highway 70, in the sand dune area of WSNM. The site is in an area that can be described as a desert environment, with large parabolic and transverse sand dunes. An access road is located approximately 300 feet south of the crash site. The road extends from Highway 70 to an abandoned missile observation platform located approximately 15 miles from the highway and three miles west of the site.

1.4 Physiography

The WSNM is located within the Sacramento Mountains Physiographic Province on the western edge of the Sacramento Mountains. The region is characterized by high tablelands with rolling summit plains; cuesta-formed mountains dipping eastward and of west-facing escarpments with the wide bracketed basin forming the basin and range complex. WSNM is located at a mean elevation of approximately 4,000 feet above sea level. The site is located in the Tularosa Sub-basin which is part of the Central Closed Basins. The San Andreas Mountains bound the basin to the west (about 30 miles) with the Sacramento Mountains approximately 10 miles to the east. At its widest, the basin is about 60 miles east to west and stretches approximately 150 miles north to south.

1.5 Surface Water

The Tularosa Basin contains all of the surface flow in its boundaries. One of the lowest points in the Tularosa Basin is a large playa called Lake Lucero. Once water enters Lake Lucero it either sinks into the ground or pools in low spots. Lake Lucero occasionally fills with water and as the water evaporates dissolved gypsum is deposited on the surface.

1.6 Groundwater

The predominance of the groundwater occurs as an unconfined aquifer in the unconsolidated deposits of the central basin, with the primary source of recharge as rainfall percolation and minor amounts of stream run-off along the western edge of the Sacramento Mountains. Surface water/rainfall migrates downward into the alluvial sediments at the edge of the shallow aquifer near the ranges, and flows downgradient through progressively finer-grained sediments towards the central basin. Because the Tularosa Basin is a closed system, water that enters the area only leaves either through evaporation or percolation. This elevated amount of percolation results in a

fairly high water table. Beneath WSNM, groundwater is expected to range in depth from 5 to 50 feet. Groundwater flow is generally expected to be towards the southwest with localized influences from the variations in the topography of the site.

1.7 Climate

As a whole, New Mexico has a mild, arid to semi-arid continental climate characterized by light precipitation totals, abundant sunshine, relatively low humidity and relatively large annual and diurnal temperature range. The climate of the Central Closed Basins varies with elevation. The Base is found in the low areas and is characterized by warm temperatures and dry air. Daytime temperatures often exceed 100°F in the summer months and middle 50s in the winter. A preponderance of clear skies and relatively low humidity permits rapid night time cooling resulting in average diurnal temperature ranges of 25 to 35°F. Potential evapotranspiration, at 67 inches per year, significantly exceeds annual precipitation, usually less than 10 inches (Foster Wheeler and Radian, 1997). The very low rainfall amounts resulting in the arid conditions, which with the topographically induced wind patterns combining with the sparse vegetation, tend to cause localized "dust devils". Much of the precipitation falls during the mid-summer monsoonal period (July and August) as brief, yet frequent, intense thunderstorms culminating to 30 – 40% of the annual total rainfall.

1.8 Geology

The sedimentary rocks which make up the adjacent mountain ranges are between 500 and 250 million years old. During the period when the area was submerged under the shallow intra-continental sea, the layers of limestone, shale, gypsum and sandstone were deposited. In time, these layers were pushed upward through various tectonic forces forming a large bulge on the surface. Approximately 10 million years ago the center began to subside resulting in a vertical drop of thousands of feet leaving the edges still standing (the present day Sacramento and San Andreas mountain ranges). In the millions of years following, rainfall, snowmelt and wind eroded the mountain sediments depositing them in the valley (i.e. Tularosa Basin). Water carrying eroded gypsum, gravel and other matter continues to flow into the basin.

The Tularosa Basin is characterized as a bolson, which is defined as a basin in an arid or semi-arid region with a playa at its lowest point. Bolsons are characterized as being the focus of local runoff. Therefore sediments that are carried by runoff into the bolson are termed bolson deposits. The overlying alluvium generally consists of unconsolidated gravels, sands and clays. Soils in the basin are derived from the adjacent ranges as erosional deposits of limestone, dolomite and gypsum. A fining sequence from the ranges towards the basin's center characterizes the area with the near surface soils as alluvial, eolian and lacustrine deposits. The alluvial fan deposits are laterally discontinuous units of interbedded sand, silt and clay while the eolian deposits consist primarily of gypsum sands. The eolian and alluvial deposits are usually indistinguishable due to the reworking of the alluvial sediment by eolian processes. The playa, or lacustrine

deposits, consist of clay containing gypsum and are contiguous with the alluvial fan and eolian deposits throughout the site.

2 SOIL INVESTIGATION

Prior to excavation of potentially impacted soils at the DCS, a subsurface investigation will be performed to determine the horizontal and vertical extent of the potential contamination. All work performed at the site will be in accordance with the Holloman Air Force Base Standard Operating Procedures (HAFB SOPs) 1 through 10. These SOPs outline methodologies for soil boring advancement, equipment decontamination, and sample handling/ chain of custody procedures. These SOPs are located as an attachment to the HAFB Basewide QAPP and will be referenced to accomplish specific tasks. All investigation and excavation activities will be performed under the Special Use Permit issued by the WSNM through the National Park Service of the United States Department of Interior (USDOI) , authorizing HAFB personnel and its sub-contractors to entered the restricted areas and disturb surface and sub-surface soils as required (Attachment A). Minimal disturbance is mandated to minimize the impact on the surrounding environs and habitat.

2.1 Soil Borings

Three to five Direct Push Technology (DPT) soil borings will be advanced around the perimeter of the point of impact to an anticipated depth of 12 ft bgs. Initial sample locations will be placed approximately 10 feet from the center of the point of impact. Step out/in from these locations, based upon screening results by FID/PID and PetroFLAG®, will be 10 feet. Based on historical data for HAFB and previous excavation experience, groundwater at the site is estimated to be greater than 20 ft bgs and not impacted by the crash event. It is not anticipated that soil cuttings will be generated during the investigation. Any residual soil from the sampling effort will be retained and incorporated into the excavation material for final disposal. Water from decontamination of sampling equipment will be generated and managed in accordance with HAFB SOP-9.

2.2 Soil Sampling

Continuous soil samples will be collected from each soil boring in accordance with HAFB SOP-4. A portion of each sample will be visually classified and screened in the field for the presence of petroleum contaminants using a flame ionization detector or photo ionization detector (FID/PID) in accordance with HAFB SOP-6 and SOP-7. Although the NMED clean-up level is 940 mg/kg TPH, soils resulting in a reading above 850 mg/kg with the FID/PID will be designated TPH contaminated, allowing for a 10% instrument error. The PID/FID readings will be used to delineate the approximate extent of contamination for subsequent excavation and disposal. Each screening sample will also be field tested using a PetroFLAG® TPH test kit Attachment B. There will be no samples collected, to identify any potential contamination, for analysis by a fixed-base laboratory.

2.3 Radiological Screening

2.3.1 Walkover Survey

To determine whether or not radioactive contamination exists in the surface or shallow subsurface soils, a gamma walkover survey will be completed prior to conducting the soil sampling at the DCS. The radiological survey will delineate any radiological contamination or materials (i.e. wreckage debris) on the ground surface. Identified debris will be removed and any surface contamination will be flagged.

The survey will be performed using a hand-held field radiation detector. This may be a 2 inch by 2 inch sodium-iodide detector, a FIDLER, or another detector approved by USACE. The detector operator will walk straight parallel lines over the effected area at a constant velocity while "swinging" the detector close to the ground surface. GPS, or another ground control method such as a survey grid, will be used to ensure the operator walks straight lines and achieves complete area coverage. The walkover survey will be performed at a rate of approximately 0.5 m/s, moving the probe in a serpentine pattern across the ground. As nearly as practicable, the walkover will consist of straight paths spaced no more than 1.25 meters apart.

If a detector reading exceeds the investigation level of 1.5 times the mean background reading for the location being surveyed, the operator will flag that spot for further investigation. The value of 1.5 times the mean background reading is a commonly used factor for radionuclide-impacted sites to designate a statistically valid result when compared with background conditions. The 1.5 times the background provides sufficient protection to off-site personnel while at the same time limiting the number of times that investigative actions are taken due to random fluctuations in background count rate. Once the survey is completed, the data will be checked for completeness and accuracy.

2.3.2 Soil Sampling Screening

During the soil sampling effort, the HAFB Explosive Ordnance Disposal (EOD) personnel will accompany the field crew to assist in determining if radioactive materials are present at the crash site. In general, soil samples will be screened for gross alpha and/or gross beta using a gamma meter(s). The field screening will be performed according to the following procedures:

1. Sample will be removed from the device.

2. Meters will be run along the length of the sample core (slowly) and the highest reading will recorded. Care will be taken so that direct sunlight does not interfere with the meter.

3. The results will be recorded on the boring log, screening forms, and project field book. Also, background levels at the time of the field screening will also be recorded.

4. If levels of radiation above background levels are detected, the project manager, health and safety officer, and customer contact will be notified immediately.

3 SOIL EXCAVATION

3.1 Excavation

Prior to commencing any excavation activities, site access routes for heavy equipment will have been approved by the WSNM personnel. Excavation activities at the drone crash site will utilize an excavator or trackhoe for the primary soil removal with either a front loader or rubber tired backhoe to assist with soil management. Overburden soil shall be removed, with appropriate screening, and stockpiled onsite in the designated location, as determined by WSNM personnel. Contaminated soils will be temporarily stockpiled for immediate transfer to the commercial landfarm facility in Newman, NM, for treatment/processing. The suspected area of contamination within the soil is projected to be the upper three to four feet. Every effort will be taken by the site supervisor and equipment operators to minimize impact to the surrounding dune environment.

3.2 Site Safety

Site security will focus on safety at the site of the excavation and access from Highway 70. Items of concern include the proper designation and demarcation of construction boundaries (i.e. exclusion zone (EZ), contamination reduction zone (CRZ) and construction zone (CZ), compliance with excavation requirements, posting of potential hazards, and control of un-authorized site personnel, as discussed in the Draft *Basewide Health and Safety Plan* (HASP) [Bhate, 2003]. Based upon the USACE classifications of the various excavations, this site will be a Class II excavation.

At a minimum, the site will be secured with caution tape surrounding the perimeter of the site delineating the outer boundary of the CZ. This is essential in the utility clearance process and it serves as the demarcation of the site for both project and non-project persons. Depth to bottom of the excavation is expected to reach no greater than of 10 feet below grade. This will be dependant upon the depth to unimpacted soil. At the immediate edge of the excavation, construction fencing will be erected, less the entrance ramp, completely around the excavation site. Postings will indicate the excavation hazard as well.

3.3 Soil Screening

During the excavation process, soils will be screened for potential and real contamination as outlined in HAFB SOP-6. Initial screening will be visual; (i.e., observance of discoloration.) Likewise, soils will be periodically screened utilizing soil-headspace screening techniques via the FID/PID. When discolored soils are observed and the FID/PID screening indicates an elevated reading excavation will continue. Although the NMED clean-up level is 940 mg/kg, soils resulting in a reading above 850 mg/kg with the FID/PID will be designated TPH contaminated, allowing for a 10% instrument error and variability between the screening method

and the NMED approved laboratory analysis. Final soils characterization will be completed via laboratory analysis (NMED specified GC Methods).

3.4 Confirmation Sampling

Once excavation has extended into potentially unimpacted soil, an estimated 12 confirmation soil samples will be collected for laboratory analysis. Soil samples will be obtained from the floor of the excavation a 1 per 100 square feet of exposed soil and from the lower one third of each excavation wall. If any wall of the excavation exceeds 25 ft in length additional soil samples will be collected from that wall. Confirmation samples will be collected in accordance with HAFB SOP-5. The samples will be analyzed by ELAB of Tennessee for VOCs (EPA Method 8260B), SVOCs (EPA Method 8270C), and TPH (EPA Method 8015). ELAB's USACE certification is valid through March 2004. Their NELAC certification is valid through June 2004. Copies of their certification letters are incorporated into the QAPP Addendum as attachments.

3.5 Excavation Backfilling and Compaction

At the request of Park personnel, no imported material will be used. The area of the excavation will be graded to match the natural area as much as practical without destroying more of the delicate vegetation. The area will be packed with tire wheels. No compaction will be performed. Further, no re-vegetation of the area will be performed.

3.6 Soil Disposal

Stockpiled contaminated soils shall be transferred to the commercial landfarm operating at Newman, NM, for disposal. The management of the waste will be in accordance with HAFB SOP-9.

3.7 Site Restoration

Upon completion of site excavation and backfill activities, the site will be restored with grading the clean backfill to the surrounding grade. Construction equipment and debris will be removed. The site will be canvassed for trash, debris, etc. Final grade for the site will allow for positive drainage in accordance with the surrounding area. WSNM personnel will provide final approval for adequacy and completeness of site restoration.

4 DEBRIS POLICING

Once the subsurface investigation and excavation activities have been completed and the site has been restored to its original appearance it will be policed manually for the presence and subsequent disposal of airframe fragments. It is anticipated that an area of approximately 300 square feet will need to be covered by foot to minimize the environmental impact to the area. Any airframe fragments found will be placed into a small roll off box or truck bed for disposal at an approved landfill. The management of the waste will be in accordance with HAFB SOP-9.

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5 HEALTH AND SAFETY REQUIREMENTS

Project Health and Safety practices will adhere to the Basewide HASP [Bhate, 2003]. A Site Specific Addendum to the Basewide HASP has been attached as Attachment C for the excavation activities at Site. It is anticipated that no greater than modified Level D personal protection equipment (PPE) will be required to complete the excavation and sampling activities. This includes: OSHA approved safety shoes, ANSI approved safety glasses (Z87.1) and hard hat (Z89.1-1997: Type I), sleeved shirt and long pants, and as required, hearing protection, leather work gloves and/or nitrile gloves during sampling.

Excavation depths are not expected to exceed 10 ft. If excavation depths do exceed 10 ft, side wall benching shall be conducted in accordance with OSHA regulations 29 CFR 1926 Subpart P.

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6 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigative-Derived Waste (IDW) will be managed and characterized according to the approach presented in Table 6-1. Whenever possible, waste minimization techniques will be used to reduce the amount of IDW. Wastes generated during this field program will be characterized using the analytical results available from samples collected. The management of IDW generated in the field will be specified for each waste stream category indicated in Table 1. A summary of IDW management for each waste stream is presented in the following sections.

Table 1. Proposed Waste Streams for the Interim Remedial Action

ACTIVITY	WASTE STREAM			
	Excavated Soil	Recycled Material	PPE	Decontamination Water
Excavation	X		X	X
Soil Sampling	X		X	X
Airframe Fragments		X	X	X
Equipment Decontamination			X	X

6.1 Excavated Soil

Excavated soil will be not segregated in the field based on visual observation and/or headspace readings. Due to the small amount of anticipated soil for excavation; the sensitive nature of the environment within the White Sands National Monument; and the limited amount of working space, excavated soil that is suspected of contamination will loaded directly into waiting trucks.

Excavated contaminated soils will be handled in accordance with HAFB SOP-9.

6.2 Decontamination Water

Small equipment, such as sampling tools, will be decontaminated in accordance with the Draft Basewide QAPP (Bhate, 2003). Heavy equipment, such as the backhoe, trackhoe, etc., will be decontaminated at a decontamination pad at HAFB rather than at the White Sands National Monument. The containers and decontamination pad will be managed in a secure area and the decontamination water will be either allowed to evaporate or combined with the treated groundwater and discharged to the Base wastewater treatment plant. Decontamination water is anticipated to be non-hazardous and as such, can be disposed of through the WWTP. Sediment remaining in the decontamination pad area after the water has either evaporated or been discharged to the WWTP, will be combined with the soil to be remediated in the onsite landfill.

6.3 Personal Protective Equipment, Disposable Sampling Equipment, and Decontamination Pad Materials

PPE and other site non-hazardous debris/waste shall be placed in plastic trash bags and disposed in a standard trash dumpster or receptacle as directed by HAFB personnel.

7 SAMPLE DOCUMENTATION

Sample documentation, identification and tracking will adhere to the prescribed methods found in the Basewide QAPP and in accordance with SOP HAFB-1. Sampling activities will include documentation of significant activities, significant occurrences and sample identification information. At a minimum, field log books will be utilized to record dates and times, sampling protocols, project numbers, and sampler's name. Other pertinent information will include COC numbers and air-bill tracking number. COC forms will be completed and included with each sample shipment. Daily Quality Control Reports (DQCR) will be maintained throughout the effort. They will be made available to the Base Environmental Manager daily and submitted weekly.

Each environmental sample collected will be identified on the sample label and COC records, regardless of type. The duplicate samples will appear in sequence with the regular samples. The sample identifier nomenclature will be as follows:

F4WSM-DP01-6

Site alpha-numeric identifier: F4WSM

Sample type identifier: SB = soil boring, DP = direct push boring
Sequential soil boring number: 01, 02, etc
Ending depth of sample interval: 6
Reserved for QA sample identifiers: FD = field duplicate, MS = matrix spike, MSD = matrix spike duplicate

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8 DATA REPORTING

Data obtained during the excavation, confirmation or field screening samples, will be reported according to the Basewide QAPP and the respective project specific QAPP addendum provided in Attachment D. Risk evaluation and sampling results will be tabulated and summarized in the closure report for the site. An Environmental Restoration Program Information Management System (ERPIMS) submittal is not required for this project

The closure report, which documents site activities and data, will include all daily notes from field activities, a description of each project task, any problems encountered along with corrective measures, project photographs, and pertinent analytical data. The report will use text, tables, and figures to present the findings of data collected during project. The report will also include appendices presenting maps, sample logs, laboratory data sheets, COCs, and a QA/QC report for the analytical data. The report will include the following components:

- Description of field methods employed
- Summary of the field results
- Analytical summary tables
- Discussion of the laboratory results
- Maps showing constituent concentrations in groundwater
- Quantity of soil excavated

The report's appendices will consist of:

- Maps showing the location of the test pits
- Maps showing lateral and vertical representation of analytical data
- Development and sampling log sheets
- Laboratory data reports
- COCs for the analytical samples

Bhate will submit the draft report to the USACE for review and comment. Upon receiving review comments, Bhate will address these comments and will submit the report as the final version.

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9 ORGANIZATION AND SCHEDULE

During the excavation operations at the Drone Crash site, *Mr. Jerry Pelfry* will serve as the Bhate Site Manager overseeing and directing investigation and excavation activities. Mr. Pelfry will also provide on-site management of sub-contractors for the project. *Mr. Frank Gardner* is the Bhate Program Manager and will ensure required project documents, permits, contractual agreements and other program tasks are completed.

Bhate personnel, or its sub-contractors, will complete tasks in regards to the soil sampling and excavation oversite. Likewise, qualified, licensed operators will provide excavation and transportation services.

The field effort is scheduled to commence in late 2003/early 2004.

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10 REFERENCES

Bhate Environmental Associates, Inc., *Draft Basewide Health and Safety Plan,* July 2003.

Bhate Environmental Associates, Inc., *Draft Basewide Quality Assurance Project Plan,* July 2003.

New Mexico Environment Department, Hazardous Waste Bureau and Ground water Quality Bureau Voluntary Remediation Program, *Technical Background Document for the Development of Soil Screening Levels*, December 2000, Revised January 2001.

New Mexico Environment Department, Hazardous Waste Bureau, *TPH Screening Guidelines*, June 24, 2003.

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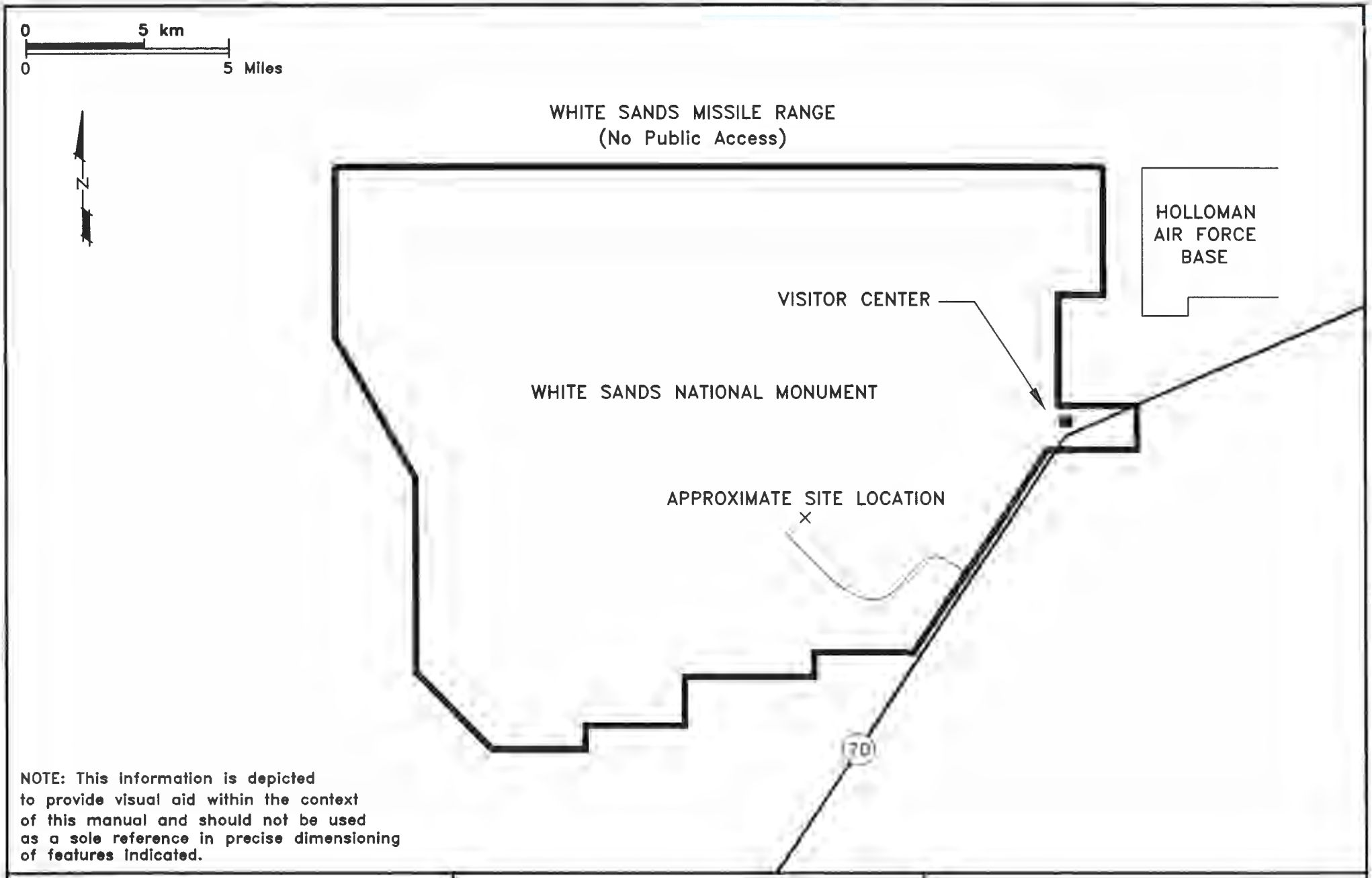

NOTE: This information is depicted to provide visual aid within the context of this manual and should not be used as a sole reference in precise dimensioning of features indicated.

BHATE
Environmental Engineers and Scientists

SITE LOCATION DIAGRAM

PROJECT NO.	SCALE	DATE	DRAWN BY:	
9030232	NTS	11/07/03		MRM
			DRAWING NO.	FIG1

DRONE CRASH SITE SOIL DISPOSAL

Figure 1

ATTACHMENT A

US DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE
SPECIAL USE PERMIT

Form 10-114
Rev. DEC. 99

UNITED STATES DEPARTMENT OF THE INTERIOR
National Park Service

Special Use Permit

Name of Use **Access; remove debris and contaminants**

Date Permit Reviewed _____
Expires **30 SEP 03**

Long Term ____

Short Term **X**

Permit # Region Park Type No. #

Name of Area **White Sands National Monument**

James P. Hunt, Brigadier General (Sel), U.S. Air Force, Commander, 49th Fighter Wing, Holloman AFB 505-572-5571
Name or Permittee Address Phone

is hereby authorized during the period from **(10 FEB 03)**, through **(30 SEP 03)**, to use the following described land or facilities in the above named area:

National Park Service lands immediately surrounding the QF4 drone impact site of 11 FEB 03 at location coordinates N 32 42.418 latitude, W 106 19.080 longitude.

For the purpose(s) of:

Access to investigate mishap site, remove aircraft debris, take soil samples, remove contaminated soil.

Authorizing legislation or other authority (RE - DO-53): **16 U.S.C. 1 et seq.; 42 U.S.C. 9601 et seq.**

NEPA Compliance: CATEGORICALLY EXCLUDED **X** EA/FONSI ___ EIS ___ OTHER APPROVED PLANS ___

PERFORMANCE BOND: Required _____ Not Required **X** Amount $_____

LIABILITY INSURANCE: Required _____ Not Required **X** Amount $_____

ISSUANCE of this permit is subject to the conditions on the reverse hereof and appended pages and when appropriate to the payment to the U.S. Dept. of the Interior, National Park Service of the sum of $

The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied herein.

PERMITTEE _____ **JAMES P. HUNT** 20 FEB 03
Signature Brigadier General (sel), USAF Commander, 49th Fighter Wing Date

Authorizing Official _____ for James A. Mack 2/20/03
Signature Superintendent Date

Additional Authorizing Official _____ _____ _____
(if Required) Signature Title Date

CONDITIONS OF THIS PERMIT

1. The permittee shall exercise this privilege subject to the supervision of the Superintendent, and shall comply with all applicable laws and regulations of the area.

2. The issuance of this permit will grant U.S. Air Force access to National Park Service (NPS) property to conduct those activities necessary to perform the work set forth in the attached statement of work entitled "Work Plan".

3. Motor vehicles including trucks and tractors may drive off maintained road using marked route to impact site. Any vehicles brought to the site will be limited to traveling within the established work zone. The zone will be clearly delineated by an NPS representative prior to the commencement of work.

4. The NPS reserves the right to stop work being performed on NPS property should the NPS determine that such work has or will negatively impact any NPS resources.

5. Air Force personnel and contractors must be apprised of, and be familiar with, the contents of this permit. A copy of this permit will be available on-site during all phases of the associated work.

7. This permit does not authorize any use, activity, or purpose other than those expressly herein described.

8. Assignment - This permit may not be transferred or assigned without the consent of the Superintendent, in writing.

9. This permit does not grant any property rights, easements, rights-of-ways, etc.

10. PREVENTION OF DAMAGE AND RESTORATION OF SITE: Air Force shall take adequate measures as directed and approved by NPS to prevent or minimize damage to all Park resources during all activities including, but not limited to debris removal and soil sampling/removal. This may include but not be limited to restoration, soil conservation and erosion protection measures, landscaping, and repairing roads, trails, signs, etc. All work on Park lands shall be completed to the satisfaction of NPS.

11. QUALITY CONTROL: An NPS representative will observe all activities on NPS property, or those activities that are or may be impacting NPS property and resources.

12. REIMBURSEMENT FOR NPS PERSONNEL: Air Force will compensate the NPS for all hours worked by NPS personnel under this Special Use Permit. NPS will provide Air Force a Bill for Collection for all associated costs.

13. REGULATORY REQUIREMENTS: All site work will be conducted and implemented in accordance with all Federal, state, and local regulations and requirements, including the Comprehensive Environmental Response, Compensation and Liability Act, CERCLA, 42 U.S.C sections 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R Part 300 et seq., and shall be consistent with the NPS mission (see e.g., 16 USC Sections 1 et. seq.).

14. Air Force shall make available to the NPS, all information in its possession that is relevant to Site Work and all other related environmental work, in a timely fashion.

15. SAFETY: All applicable Federal, state, and local health and safety regulations and standards, including those cited in 29 Code of Federal Regulations (CFR) 1910.120, will be adhered to while performing any work on NPS property.

Military will provide a safety UXO safety briefing and hazmat safety briefing prior to all personnel entering the impact site. The general locale is known to be contaminated with cluster bomb sub-munitions.

16. Future access to NPS property or any modifications to this permit will require a written amendment issued by the NPS.

17. All work and investigations on NPS property requires a minimum 48-hour notice to the NPS point of contact.

18. The NPS point of contact for all aspects of this permit will be James A. Mack, Superintendent, White Sands National Monument. His alternate will be Bill Conrod, Chief of Resources Management, White Sands National Monument. Either can be contacted at (505) 679-2599, or by mail at P.O. Box 1086, Holloman AFB, NM 88330-1086.

19. Damages - The permittee shall pay the United States for any damage resulting from this use which would not reasonably be inherent in the use which the permittee is authorized to make of the land described in this permit.

20. Benefit - Neither Members of, nor Delegates to Congress, or Resident Commissioners shall be admitted to any share or part of this permit or derive, either directly or indirectly, any pecuniary benefits to arise therefrom: Provided, however, that nothing herein contained shall be construed to extend to any incorporated company, if the permit be for the benefit of such corporation.

21. Revocation - This permit may be terminated upon breach of any of the conditions herein or at the discretion of the Superintendent.

22. The permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation [Re: 36 CFR 2.32(a)(4)].

23. Permittee will comply with applicable public health and sanitation standards and codes.

24. This agreement is made upon the express condition that the United States, its agents and employees shall be free from all liabilities and claims for damages and/or suits for or by reason of any injury, or death to any person or property of the Permittee, its agents or employees, or third parties, from any cause or causes whatsoever while in or upon said premises or any part thereof during the term of this agreement or occasioned by any occupancy or use of said premises or any activity carried on by the Permittee in connection herewith, and the Permittee hereby covenants and agrees to indemnify, defend, save and hold harmless the United States, its agents and employees from all liabilities, charges, expenses and costs on account of or by reason of any such injuries, deaths, liabilities, claims, suits or losses however occurring or damages growing out of the same.

25. **Permittee shall present to the National Park Service for review and approval any reports, studies, analyses or other deliverables pertaining to mishap site remediation derived in whole or in part from information or data gathered under this permit.**

26. **EMERGENCY ACCESS: The use of any wheeled vehicle, outside of the identified area of disturbance, is not permitted unless specifically authorized by the Superintendent in advance. Such authorized use will then be restricted to the surveyed route.**

27. **In the event of an emergency, the park will be notified at once, at telephone 505.679.2599.**

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WORK PLAN, QF-4 IMPACT

Motor vehicles including heavy equipment may leave maintained road via marked route to impact site and must remain within boundary established by National Park Service (NPS).

Air Force will test soil for radioactive contaminant and petroleum hydrocarbon and other relevant contaminants. Soil contaminated with radioactive material and soil containing greater than 1000 parts per million (ppm) petroleum contaminant will be removed from site, or upon agreement with NPS.

An inner perimeter line will be established marking an area within which solid debris material larger than 0.25 inch will be removed, to the satisfaction of NPS inspection. An outer perimeter line will be established marking the extent of the debris field. Within the outer line, material larger than 1 inch will be removed to satisfaction of NPS inspection.

Restoration:

- If contaminated soil is removed, site will be re-contoured to generally resemble original contours.
- No soil backfill is recommended at this time.
- No replanting is expected at this time.
- Access route from maintained road and debris field impact site will be raked out to obliterate all vehicle tire tracks.

ATTACHMENT B

PETROFLAG® TEST KIT MANUAL

PetroFLAG®

HYDROCARBON ANALYZER

User's Manual

DEXSIL®
ONE HAMDEN PARK DRIVE
HAMDEN, CT. 06517
TEL: 203-288-3509 FAX: 203-248-6523
http://WWW.DEXSIL.COM

Cover Rev. 2/1/95

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PetroFLAG is a trademark of Dexsil Corporation, Patent Pending

Rev 13 7/11/97

Introduction to the PetroFLAG Hydrocarbon Analysis System

NOTE: PLEASE READ THE ENTIRE MANUAL BEFORE ATTEMPTING TO RUN THIS TEST

The PetroFLAG hydrocarbon analysis system is a broad spectrum field analytical tool suitable for any type of hydrocarbon contamination regardless of the source or state of degradation[1]. Unlike other field screening methods, the PetroFLAG system does not target specific compounds such as BTEX (Benzene, Toluene, Ethylbenzene and Xylene) or PNAs (Polynuclear Aromatics) that may be part of some hydrocarbon mixture. This makes the PetroFLAG system a very versatile analytical method that can be used on most hydrocarbon spills without prior knowledge of the BTEX or PNA content of the contaminant. The PetroFLAG system uses patent pending chemistry to respond to the broadest range of hydrocarbons possible. As a result, the PetroFLAG system is most sensitive to heavier hydrocarbons such as oils and greases and less sensitive to the lighter more volatile hydrocarbon fuels. The specially designed PetroFLAG analyzer allows the user to select, in the field, the response factor that is appropriate for the suspected contaminant at each site. The response factors for a number of contaminants are listed in table 1. Using the selected response factor, the analyzer compensates for the relative response of each analyte and displays the correct concentration in ppm. The response curves for some typical hydrocarbon contaminants are plotted in Appendix A.

All chemical methods for hydrocarbon analysis in soil that are currently in use, whether field screening methods or laboratory methods, depend on a solvent extraction to remove the hydrocarbons from the soil sample. The extraction efficiency for each method is a function of the solvent used and the extraction procedure, and is, therefore, dependent on many other factors such as the soil type, water content, pH, etc. Many EPA SW-846 methods use chlorinated solvents or Freon as extraction solvents. These solvents were originally chosen for their extraction efficiency for polar organic compounds and may not be appropriate for hydrocarbons. In addition, special measures have to be taken for these lab methods when the soil is wet.[2] The extraction efficiencies may be as low as 1%[3] in some cases.

The extraction solvent used in the PetroFLAG system has been carefully developed to give consistent extraction efficiencies over the range of soil types and conditions most commonly encountered in the field. The PetroFLAG solvent contains no chlorofluorocarbons or chlorinated solvents, and the extraction efficiency is unaffected by soil moisture, in most cases up to saturation.

Because the PetroFLAG system has such a broad response spectrum, there are situations where it will indicate a higher hydrocarbon concentration than other methods might. This can be due to the higher extraction efficiency of the PetroFLAG extraction solution or the broader response range of the detection system. SW-846 method 8015B, for example, targets only a very narrow range of

[1]Brake fluid and phosphate ester based hydraulic oil will not be detected by the PetroFLAG system.

[2]USEPA SW846 Method 3550A Ultrasonic Extraction Rev 1, November 1992

[3]Lee, W.E. III, Houchin, C.A. and Albergo, N., "TRPH Discrimination of Petroleum and Nonpetroleum Organic Materials", *American Environmental Lab*, December 1993.

hydrocarbons typically in the "Diesel" or "Gasoline" range. This method does not detect oils or greases unless the analyst changes the method and specifically looks for heavier compounds. Requesting 8015B for diesel range hydrocarbons may result in under reporting of the total hydrocarbon contamination if oils or greases are present. Method 418.1 is a more general method and detects any Freon extractable compounds that contain a C-H bond. This method has relatively poor extraction efficiencies in many soil types. For a more complete discussion of the comparability of hydrocarbon methods see Appendix B.

The PetroFLAG system responds to the full range of hydrocarbons; therefore, it will also detect some naturally occurring hydrocarbon-like compounds. (Method 418.1 uses a silica column to remove some of these compounds, but will still pick up naturally occurring terpenes and creosotes, etc.) Therefore, in situations where high organic content is suspected, background levels outside the spill site should be determined. This will help to identify any naturally occurring sources of hydrocarbons that may cause a positive interference with the test. In cases where there exists a high natural organic background, a "Soil Calibration" can be used to correct readings for the positive interference. Note: Because of the broad spectrum screening nature of the test, naturally occurring waxes and oils can cause high readings; however, false negatives or under-reported levels are very unlikely.

The PetroFLAG system is a valuable field analytical tool when used as part of a systematic sampling plan. As part of any site work, always have the hydrocarbon contamination characterized at some point during the project, and always send confirmation samples for closure to a certified laboratory. Because each laboratory method for petroleum hydrocarbons has a different target analyte and different response characteristics, use only appropriate methods for comparison. In addition, the realized performance of laboratory methods for petroleum hydrocarbons varies from one laboratory to another; therefore, verify that the lab you use is proficient with the method you request. Always ask for QA/QC deliverables and verify that the blanks, duplicates and spikes are within specification for the method. If the lab is new to you, send them proficiency samples of known concentrations and varying water content.

Lab results often contain one or more samples that are designated "ND" (none detected) without a qualifier. This type of reporting is misleading because information on the limit of quantification is not included. The designation "ND" never means zero ppm and should be followed by an indication of the detection limits of the method used to obtain the result, e.g., ND<40 ppm. In many cases the detection limits for a method will vary with sample size, dilution factors or extraction procedures and may not be the same for all samples in the sample batch. The detection limits for some of the common lab TPH methods are on the order of 40-50 ppm. Therefore, when comparing lab data it is important to know the realized detection limits implied in any "ND" results.

Using the PetroFLAG Hydrocarbon Analysis System

Sample Preparation

Each 10-pack of soil reagents contains supplies for 10 tests, one blank and one calibration standard. Samples can be run individually or batched. For optimum performance and throughput, samples should be run in groups of 10 samples along with a blank and a standard. If more than 10 samples are to be run at one time or sequentially, the meter need not be recalibrated, provided that the operating conditions and reaction times are maintained. Total time to analyze 10-15 samples is approximately 20-25 minutes.

Calibration

To ensure accurate quantification and repeatable results, it is recommended that the PetroFLAG meter be recalibrated with each batch of 10 samples or, at least, daily. The meter is easily calibrated using an extra extraction solvent vial as a blank and the calibration standard supplied with each ten-pack of reagents. The blank and calibration standard can be used without soil as a "reagent calibration" or with clean soil as a site-specific "soil calibration" spike. If there is no verifiably clean soil to use as a blank, do not use a soil calibration; use a reagent calibration. Once clean soil has been identified, it can then be used to prepare site specific standards to calibrate the PetroFLAG meter.

After exiting the calibration mode, all further readings made by the PetroFLAG analyzer will automatically incorporate the selected response factor. Therefore, rereading the calibration standard will result in an incorrect reading, i.e. an over estimation of the concentration, on any response setting other than 10.

NOTE: Once the *blank* and *cal standard* have been read discard them. They will fade with time and cannot be reused; DO NOT USE THEM TO RECALIBRATE THE METER OR TO CHECK THE EXISTING CALIBRATION.

Preparing Blanks and Standards

The following description summarizes the procedure for preparing the calibration blank and standard. Read the step-by-step instructions below completely before beginning the calibration process.

To prepare a reagent calibration *blank* and a *standard*, first label two soil tubes, one as the "blank" and the other as the "standard". Add to the *blank* tube the contents of a break-top vial containing extraction solvent. Add the contents of the break-top vial labeled "calibration standard" to the *standard* soil tube. Process the blank and standard exactly as soil samples along with the unknown soils as described below.

A soil calibration is prepared in the same way, with the additional step of adding 10 grams of uncontaminated native soil to each of the labeled calibration tubes (blank and standard). After the soil has been added proceed as above and process the standards along with the unknown samples.

The PetroFLAG Test Procedure

1) Prepare soil extraction tubes (plastic tubes with yellow caps) and developer vials (small glass vials filled approximately half way with liquid) by clearly labeling each with the appropriate sample ID. Do not write in the center 1/3 of the developer vial, as this may obscure the optical path when the readings are taken. Label the bottom of the vial and/or label the cap using the self-adhesive labels supplied with the reagents.

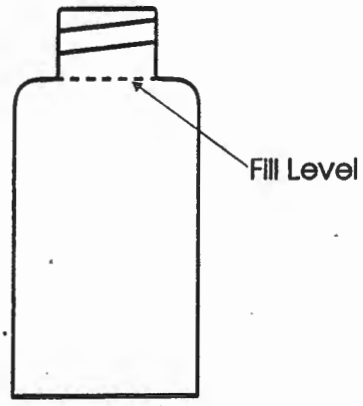
2) Weigh 10 grams (± 0.1 gram) of all unknown soils into labeled yellow capped polypropylene tubes.

3) Set timer for 5 minutes. Add one break-top vial of extraction solvent (blue polypropylene top) to the first tube. Start 5 minute timer and shake tube for 15 seconds. Add extraction solvent to each of the remaining tubes, shaking each for 15 seconds (all soil should be fully wet). Shake tubes intermittently for a total of 4 minutes, then let stand for remaining 1 minute.

4) Remove the plunger from a filter-syringe assembly (verify that the filter disk is firmly attached to the syringe barrel) and remove the cap from the first labeled 6 mL glass vial containing developer. Pour free liquid from polypropylene soil tube into syringe barrel (do not add excess soil to syringe as this may plug the filter). Discard the first few drops from filter to waste container, then filter extraction solvent into 6 mL vial. Add extraction solvent drop-wise to developer solution until meniscus just enters the neck (see figure at right), shake for 10 seconds, start 10 minute timer and proceed to next sample. After 10 minutes from the start of the first sample, begin reading the developer vials. (Do not let developer vials stand longer than 20 minutes before reading, as this may result in under-reported values.)

5) If meter is off, turn it on by pressing "READ/ON" and calibrate (optional).

6) To read, place sample vial into reader and press "READ/ON". Be sure that the outside of the vial is clean before reading. Record result on work sheet. Read vials in the same order as they were prepared in.



6 mL Developer Vial

Using the PetroFLAG Analyzer

The PetroFLAG analyzer has been specifically designed to be used with the unique patent pending chemistry of the PetroFLAG system. The meter is shipped fully calibrated, preset with response factor 5. This calibration is sufficient to begin screening measurements; however, in order to achieve optimum performance the analyzer should be calibrated with each batch of samples, or at least daily. The PetroFLAG analyzer is easy to calibrate and calibration solutions are included with every refill pack.

The PetroFLAG analyzer stores two independent calibration equations in separate memory locations. This allows the user to store both an absolute "reagent calibration" and a site specific "soil calibration". Each calibration has a unique designation, "rC" or "SC". One way to effectively use this feature is to use the SC calibration for site-specific "soil" calibrations, and use the rC calibration for "reagent" calibrations (see below under "Using the PetroFLAG Analysis System"). This system will help to remind the user that a soil background is being subtracted from the readings and a correction is made for the extraction efficiency on a particular soil in the SC calibration and that these corrections are not made when using a reagent calibration stored in the rC location. The user may, however, store an additional site specific calibration in the rC location if two different soil curves are desired.

Table 1: Response Factors and Method Detection Limits for Common Hydrocarbons

Hydrocarbon Type	Method Detection Limit (ppm)	Response Setting
Transformer Oil	15	10
Grease	15	9
Hydraulic Fluid	10	8
Transmission Fluid	19	8
Motor Oil	19	7
#2 Fuel Oil	25	7
#6 Fuel Oil	18	6
Diesel Fuel	13	5
Gear Oil	22	5
Low Aromatic Diesel	27	4
Pennsylvania Crude Oil	20	4
Kerosene	28	4
Jet A	27	4
Weathered Gasoline	1000*	2

Choosing the Correct Response Factor

The microprocessor in the PetroFLAG analyzer uses the calibration data to convert the optical reading into a preliminary concentration. It then uses the selected response factor to calculate the correct concentration for the analyte of interest. It is, therefore, important to choose the response factor that is appropriate for the particular hydrocarbon or class of hydrocarbons present at the site. The response factor can be changed at any time without affecting the stored calibrations.

If the contaminant is known or suspected, choose the appropriate response factor from Table 1 and set that response factor on the analyzer. (See Analyzer Operation below.) If there is a mixture of hydrocarbons, use the most conservative response factor (i.e. the lowest) for the contaminants known to be present. If the contaminants are unknown, choose a conservative

response factor based on those hydrocarbons that are likely to be on the site. By examining Table 1, it will be seen that the majority of typical contaminants are in response category 5 or above.

Analyzing High Concentration Samples

The PetroFLAG Hydrocarbon Analyzer is pre-programmed to warn the user of an over-range condition. If the over-range reading is outside of the linear range (±10 precision), but sill within the quantifiable range (±20% precision), the reading will be displayed blinking. This reading can be used as an indication that the concentration in the sample is not less than the displayed value (Because the response curve for most analytes in non-linear at high concentrations, the concentration in the sample may be higher than the displayed value.) If the over-range condition is outside of the quantifiable range the display will show a blinking "EEEE". Either error indication can be cleared by simply inserting the next vial and pressing READ.

Often it is necessary to obtain accurate results for soil samples with high contaminant concentrations that would cause an over-range condition on the PetroFLAG analyzer when using a 10 gram sample. To quantify these high samples simply re-extract the soil using a 1 gram sample and re-analyze. Then multiply the result by 10 to obtain the concentration in the sample. Using this procedure, soils containing up to 50,000 ppm of light hydrocarbon contamination can be analyzed or 10,000 ppm of a heaver hydrocarbon.

Converting Response Factors for Data Already Collected

If data has been collected using a response factor that is later determined to be the wrong one, the data can easily be converted to the correct reading. To make the conversion simply multiply the measured value by the response factor used to make the measurement and divide by the new response factor.

Temperature Effects on Measurements

The PetroFLAG analyzer is equipped with an onboard temperature sensor to measure the ambient temperature while measurements are being made. The software uses this temperature reading to correct the optical readings for drift caused by temperature fluctuations. The corrections have been determined for effects on the color development and the temperature drift of the electronics.

The PetroFLAG analyzer can be used at temperatures from 4°C to 45°C. The temperature corrections are valid for temperatures within 10°C of the calibration temperature. If a calibration is run with each batch of samples the temperature correction is not significant and measurements can be made at any temperature in the usable range. If, however, no calibration is run and the ambient temperature deviates from the calibration temperature by more than 10°C, an error condition will result. The analyzer will display "Err4" which can only be cleared by pressing "NEXT". Pressing "NEXT" will clear the error and cause the current reading to be displayed. This reading can be recorded, but it should be noted that the ambient temperature was outside of the acceptable 10°C window. Any samples remaining in the series can also be read, however, the same error condition will most likely occur. The meter must then be recalibrated to eliminate the error condition.

To avoid a temperature error when a calibration is not run with the samples, check the ambient temperature before starting. This can be done by taking a reading without inserting a vial. If a reading is displayed, the temperature is within range and readings can proceed. If an error is displayed the meter must be recalibrated before proceeding.

Analyzer Operation

The PetroFLAG analyzer is controlled by a low power consumption micro-computer with the preloaded operating program stored in EEPROM memory so it cannot be lost regardless of battery condition. For convenience, the meter stores two calibration curves in separate memory locations. The calibration curves can be independently updated and the response factor can be changed without losing the calibrations.

The PetroFLAG meter is configured to allow easy access to the program modes. The currently active mode is indicated on the LCD display while a reading is in progress. The response factor and the active calibration can be changed from the MAIN MENU using the four buttons on the keypad. The four buttons are:

SCROLL	Scrolls through menu choices.
NEXT	Exits the read mode or skips a menu option without changing or executing. (Also used to clear error conditions.)
READ ON	Turns the meter on and starts a reading.
SELECT OFF	Selects a menu choice. Manually turns meter off (only in the *read* mode).

When the PetroFLAG analyzer is turned on it will return to the last mode it was left in. Under normal operation the analyzer will power up in the *read* mode. If the analyzer powers up in the *read* mode, the screen will display the last measured value for two seconds, then display the currently selected calibration curve (rC or SC) and response factor (1-15). The meter is ready to resume measurement.[4] Simply insert a new sample vial and push READ. The display will indicate the calibration curve (either rC or SC) and the response factor (1-15) that is currently selected and, after 5 seconds, will display the measured concentration in ppm.

If you wish to exit the *read* mode, push NEXT and operation is returned to the MAIN MENU. The NEXT button is also used to skip a step where a menu selection is required. To change a flashing menu option, for instance to change the response factor, push SCROLL while the option is flashing. To store the currently flashing menu choice, push SELECT. This stores the current choice and moves the flashing cursor to the next program mode.

Selecting a Calibration Curve

Either of the two calibration curves, identified as "rC" and "SC", can be selected from the MAIN MENU. Using either calibration curve, any response factor can be selected. To change the response factor or to recalibrate the unit, use the

[4]If the battery is disconnected and reconnected, the meter will return automatically to the MAIN MENU. If the calibration curve and response factor displayed are the desired ones, the MAIN MENU can be exited, retaining the calibration data, by pushing NEXT. To return to the *read* mode, continue pressing NEXT until the display shows the calibration curve and the response factor continuously without blinking.

NEXT button to enter the MAIN MENU screen. Immediately upon entering this menu three decimal points and the response factor will be displayed; next, the first two characters will display the calibration curve that is currently selected (SC or rC). They will blink, indicating that a new curve may be selected. Use the SCROLL button to scroll to the next calibration curve. Push SELECT to select the curve.

The response factor will then blink. Use the SCROLL button to scroll to the desired response factor for the target analyte and SELECT it.

Reading the Blank and Standard

After the response factor has been selected the screen will read CALC for five seconds and then display the calibration temperature. This temperature will remain on the screen until NEXT or READ is pressed. The screen will then prompt you for the "blank" vial by displaying "-bL-". Insert the blank vial and press READ. (See "Preparing Blanks and standards" under "Using the PetroFLAG Hydrocarbon Analysis System.) After 5 seconds the display should read "0" for 2 seconds. The screen will then prompt for the calibration standard "-CSd". Insert the calibration standard and press READ. After 5 seconds the calibration is complete. The meter will then re-read the calibration standard to verify a valid calibration and display "1000". If the concentration is not correct using the newly calculated equation, an error message will flash until NEXT is pushed. If an error condition exists, the previously stored calibration constants will be retained until a valid calibration is completed. (See Appendix C, Table 1: Error Conditions.)

Taking a Reading

After calibration, the meter will then display the calibration curve and response factor currently selected. The meter is ready to read the first sample. After reading a sample (inserting the sample vial and pressing read), the meter will display the concentration in parts per million (ppm) until the READ or NEXT button is pushed. If no button is pushed for a period of five minutes, the meter will automatically turn off. (If the meter turns off automatically, pressing "ON" will turn the meter on and return to the operation mode last used) The meter can be manually turned off, using the OFF button, while in the *read* mode only.

The optical system on the PetroFLAG analyzer is covered with a screw cap to keep out stray light. To remove the cap, simply unscrew it 1/4 of a turn counter-clockwise. After inserting a vial to be read, push the cap over the vial, depressing the spring, and rotate the cap clockwise while holding it down. Turn the cap until it is snug, but do not over tighten.

Power Requirement

The PetroFLAG analyzer is powered by one 9V alkaline battery (included). This battery should last for up to 18,000 readings. If a low battery condition exists "LP" will appear on the display.

Analyzer Operation Examples

Outlined below are step-by-step examples of how to use the PetroFLAG analyzer. Under normal operating conditions the meter will power up in the read mode. The examples given here categorized as "standard operation" assume that the meter was last operated in the read mode. If the meter was left in another mode longer than five minutes or the batteries were removed, see below under special cases.

Standard Operation:

Where the last operation mode was *read,* the calibration data is current and the response factor last used is valid.

1) Turn meter on by pressing:

The last reading will be displayed for 2 seconds. Then the display will show the calibration curve and response factor currently selected. The meter is in the *read* mode.

2) Remove cap, insert vial to be read and tighten cap.

3) To begin reading press:

The display will show the calibration curve and response factor currently selected (blinking), then the display will read CALC for 3 seconds, and finally the result will be displayed.

4) The result will be displayed until the next reading is taken. To make the next reading: remove the vial and repeat steps 2 and 3 above.

Standard Operation-Changing Response Factor Without Recalibrating:

Where the last operation mode was *read* and a different response factor is desired.

1) Turn meter on by pressing:

The last reading will be displayed for 2 seconds. Then the display will show the calibration curve and response factor currently selected. The meter is in the *read* mode.

2) Return operation to the MAIN MENU by pressing:

Three decimal points will be displayed along with the current response factor. The calibration curve designation will then begin blinking, indicating that it may be changed.

3) Skip to the response factor entry mode by pressing:

The response factor will begin to blink indicating that it may be changed.

4) Scroll to the desired response factor by pressing:

The next response factor will be displayed. Continue pressing SCROLL until the desired response factor is displayed. (Response factors scroll in descending order, i.e., 15-1)

5) After the desired response factor is reached, select it by pressing:

The new response factor has been selected. The meter will now calculate and display the current temperature.

6) Move to the next screen by pressing:

The meter will then prompt for the blank to be entered and the calibration procedure to begin by displaying -bL-.

7) Skip over the calibration and move directly to the *read* mode, saving the new response factor but not recalibrating, by pressing (This exits the calibration mode without affecting the current calibration data):

The meter will display the current calibration curve and the selected response factor and is ready to read a sample using the new response factor.

8) Proceed with reading a sample by following the procedure for "standard operation" above, beginning at step 2.

Standard Operation With Recalibraton:

Where the last operational mode was the *read* mode and the meter is to be recalibrated. Before proceeding with the calibration procedure, prepare the blank and standard as described in "Using the PetroFLAG Hydrocarbon Analysis System -- Preparing Blanks and Standards" below. The calibration solutions can be prepared using clean soil for a "soil calibration" or with reagents alone for a "reagent calibration". They may also be prepared along with the unknown samples to save time.

1) Turn the meter on by pressing:

The last reading will be displayed for 2 seconds. Then the display will show the calibration curve and response factor currently selected. The meter is in the *read* mode.

2) Return operation to the MAIN MENU by pressing:

Three decimal points will be displayed along with the current response factor. The calibration curve designation will then begin blinking, indicating that it may be changed.

3) Scroll to the calibration curve that is to be redetermined by pressing:

The display will show the next calibration curve designation.

or, if the displayed calibration curve is the one to be redetermined, skip directly to the response factor input by pressing NEXT.

4) After the desired calibration is reached select it by pressing:

The calibration curve is now selected and the meter will now prompt for input on the response factor.

5) If the response factor that is displayed is not the desired one, change it by using the SCROLL button as described above under "Standard Operation-Changing the response factor". If the response factor is correct, skip this step by pressing:

The meter will now calculate and display the current temperature.

6) Move to the next screen by pressing:

The meter will then prompt for the blank to be entered and the calibration procedure to begin by displaying -bL-.

7) Remove cap and insert previously prepared blank, replace cap and begin calibration by pressing:

The display will blink showing the selected cal curve and response factor. The meter will display "0" for three seconds and then prompt for the calibration standard by displaying -CSd.

8) Remove cap and blank vial and insert the calibration standard vial. Read the standard by pressing:

The display will blink showing the selected cal curve and response factor. The display will read "1000" for three seconds and then display the currently selected calibration curve and response factor continuously. The meter is in the read mode.

9) Proceed with reading the unknown samples by following the procedure for standard operation above, beginning at step 2.

Special Operating Conditions:

Operation of the Meter After the Batteries have Been Disconnected:

If the batteries have been disconnected the microprocessor will automatically return to the MAIN MENU. The steps to follow are described above. The operations to be preformed will determine the exact steps followed.

Meter Left to Turn Off in Other Mode:

If the meter is left in any "screen" for five minutes then the meter will automatically shut off. The meter will then return to that screen when the ON button is pressed.

Helpful Suggestions and Safety Precautions

If PetroFLAG test results indicate no hydrocarbons are present, the sample can be sent in for certified laboratory confirmatory analysis. All environmental soil sampling used for final closure should be performed using methods that are approved by the local regulating agency.

Personal protection should be worn during soil sampling and testing. At a minimum latex gloves and goggles should be worn.

Decontamination stations should be set up using appropriate cleaners and rinsing solutions. Soil sampling equipment not supplied with the reagent pack should be decontaminated between sampling locations to prevent the possibility of cross contamination.

All reagents and sampling scoops supplied with the kit are single-use disposable items. Do not reuse spoons, tubes, filters, or vials. (The electronic balance is NOT disposable)

Check ambient temperature BEFORE extracting soils, if a calibration is not planned for the current batch of samples.

Before adding the soil extract to a filter syringe check to be sure that the filter disk is screwed on tightly.

Do not leave the PetroFLAG analyzer in direct sunlight when not in use. Keep it in the protective carrying case with the lid closed.

Make sure that the contamination at the site is characterized at some time during the investigation.

Avoid sampling organic matter. Scrape away organic material (leaves, sticks, etc.) before sampling.

Avoid sampling directly under pine, cedar, and fir trees unless the sample is collected below the organic layer. Do not collect a sample from an area where tree roots have been encountered.

Avoid sampling directly beneath creosote bushes, sage brush and other oil bearing plants.

Caution

When opening the break-top ampules DO NOT remove the plastic sleeve from the top. It is there for your protection. Removing it may result in personal injury.

The Extraction Solvent and Calibration Standards contain methanol and are Flammable and Poisonous.

Wear rubber gloves and safety glasses while performing tests.

Dispose of all used reagents and soil properly.

Read the Material Safety Data Sheet before performing test.

Manufacturer's Warranty

The reagents and supplies used in the PetroFLAG test are warranted to be free of defects in material and workmanship until the expiration date stamped on the box. Manufacturer's sole and exclusive liability under this warranty shall be limited to replacement of any materials that are proved to be defective. Manufacturer shall not be liable for any incidental or consequential damages.

Reliable test results are highly dependent upon the care with which the directions are followed and, consequently, cannot be guaranteed.

Appendix A: PetroFLAG Response Curves

Most fuels, lubes and greases are complex mixtures of various hydrocarbons having a broad range of physical and chemical properties. The PetroFLAG system will detect a majority of the ecologically important hydrocarbon mixtures. The PetroFLAG responses to some typical hydrocarbon contaminants are plotted in figure 1[5].

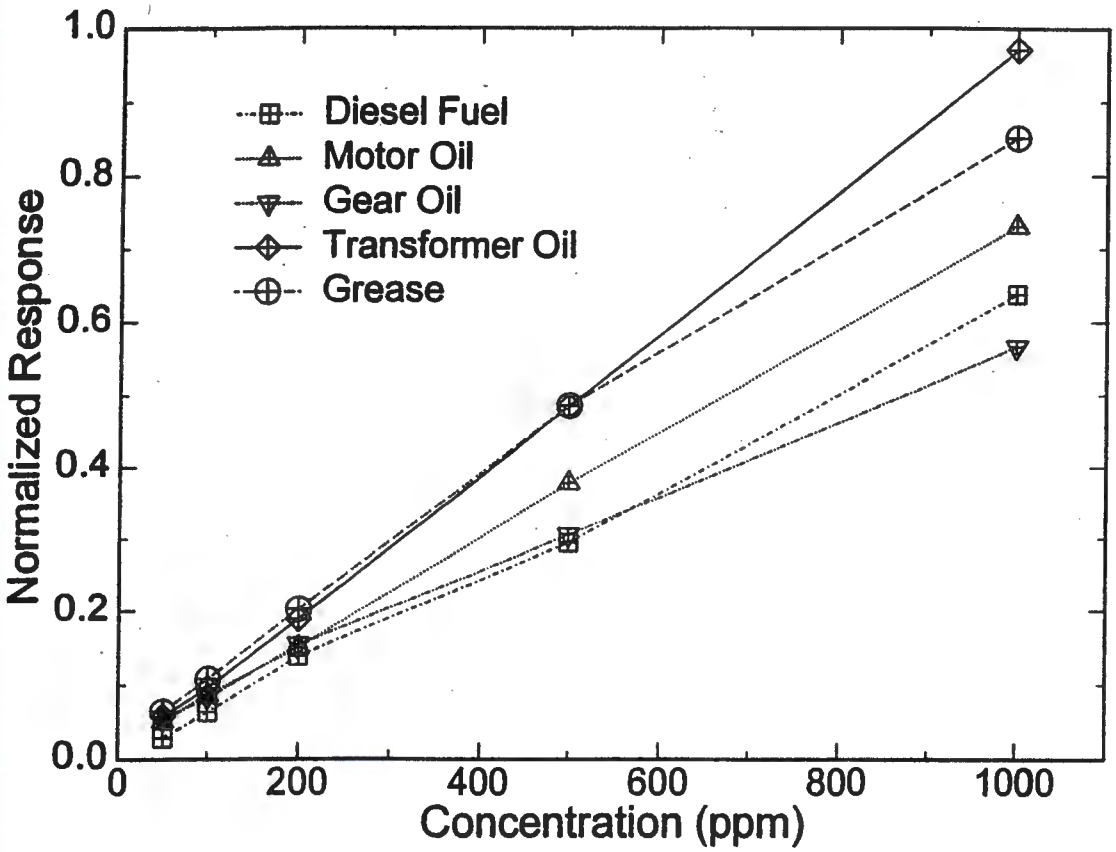


Figure 1: Normalized Response of PetroFLAG System

[5]The lower limit of quantification, using a 10 gram sample size, is 400 ppm for gasoline. Brake fluid and phosphate ester based hydraulic oil will not be detected by the PetroFLAG system.

Appendix B: Comparison with Laboratory Methods

In field trials, the PetroFLAG system was used at sites contaminated with diesel fuel or with oil and grease. In both cases the PetroFLAG results correlated very well with EPA laboratory methods. Both EPA methods 8015B and 418.1 were used to analyze the samples from the diesel site. The data are presented in figures 2 and 3 below. The resulting correlations were 89% and 92% respectively[6]. The samples from the oil and grease site were analyzed using EPA method 418.1 for soil. The lab results confirmed the PetroFLAG results with no false negatives and only 2 false positives (10%). The comparison of the field results and the lab results for the field split samples is plotted in figure 4. The correlation between the PetroFLAG data and EPA method 418.1 for the laboratory split samples was 90%[7] as shown in figure 5.

When comparing the PetroFLAG field results with laboratory results using EPA methods it is important to keep in mind that EPA laboratory methods for TPH are known to have variable extraction efficiency. The extraction efficiency achieved using EPA laboratory methods varies with soil type and moisture content. In addition, the degree to which moisture affects the extraction is dependent on how the individual laboratory is implementing the method. It is, therefore, important to verify that the lab used for comparison is performing the method properly and that the recovery is known.

Another important factor affecting laboratory confirmation analysis is the inhomogeneous nature of soil samples. Whenever possible, homogenize samples using standard methods[8] before taking "splits" to send to the lab for confirmation.

---

[6]Wright, Keith A., "Evaluation of a New Field Test Kit for Determining Total Petroleum Hydrocarbon Concentrations in Soil at a Site Contaminated by Diesel Fuel", Presented at the AEHS Conference on "Hydrocarbon Contaminated Soils", January 11-13, 1995, New Orleans, LA.

[7]Wright, Keith A. and Jermstad, David B., "Evaluation of a Rapid Field Analytical Test Kit for Assessing Hydrocarbon Soil Contamination", Presented at the "Third International Conference On-Site Analysis", January 22-25, 1995 Houston, TX.

[8]See for example: Pitard, Francis F. , Pierre Gy's Sampling Theory and Sampling Practice, Volumes 1 and 2, CRC Press, Inc., Boca Raton, FL, 1992).

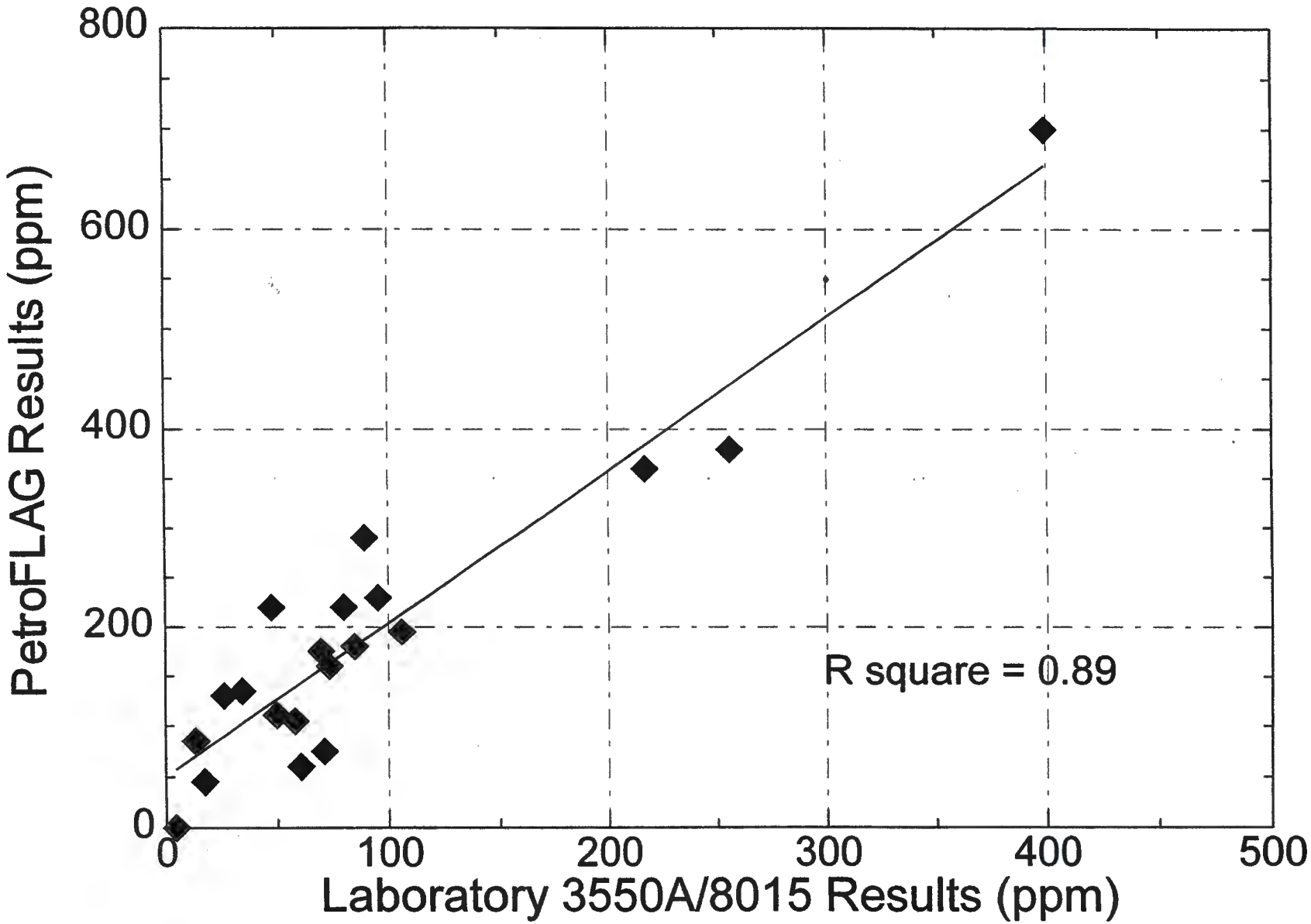


Figure 2: Comparison of PetroFLAG with EPA method 8015B

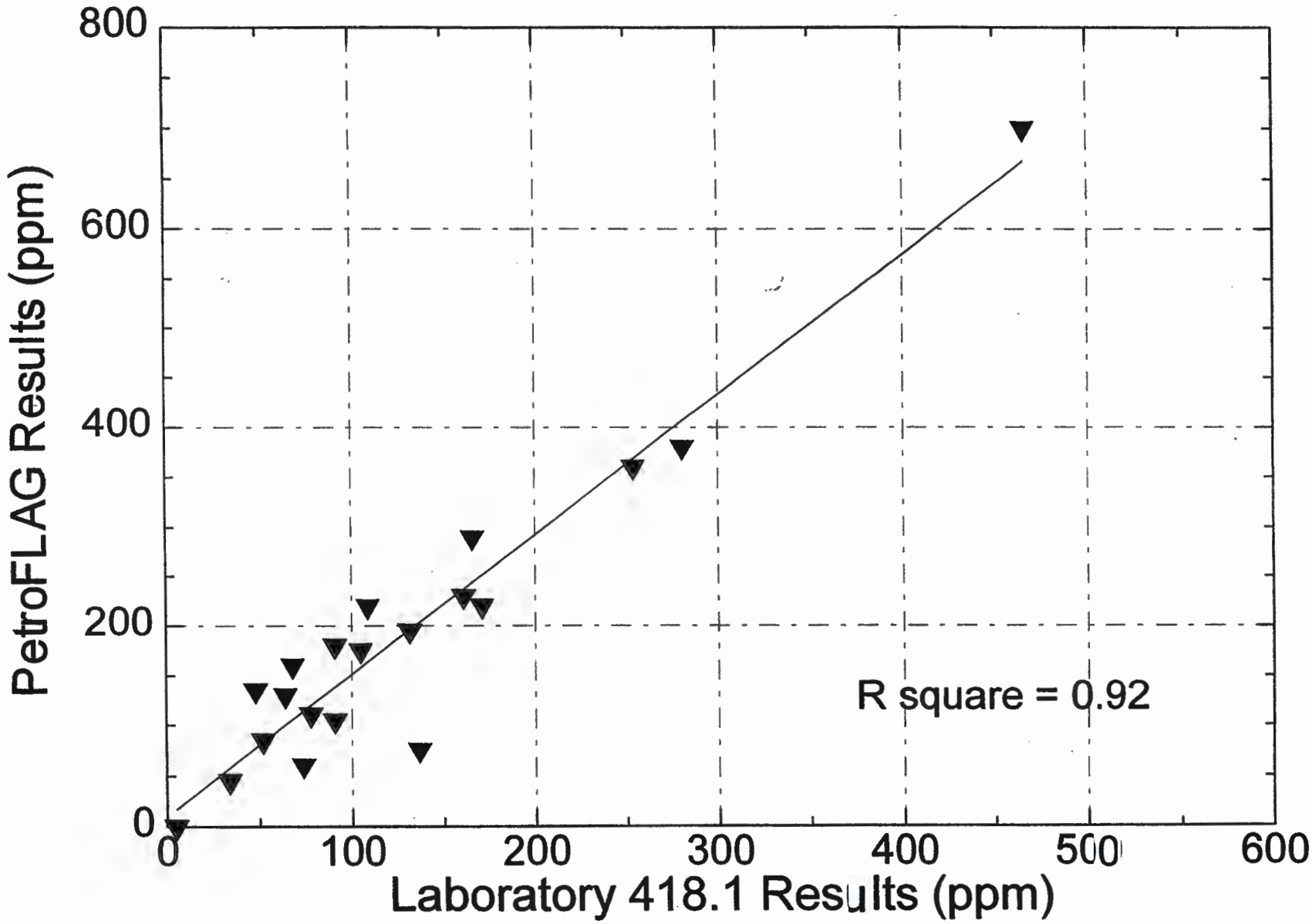


Figure 3: Comparison of PetroFLAG with EPA method 418.1

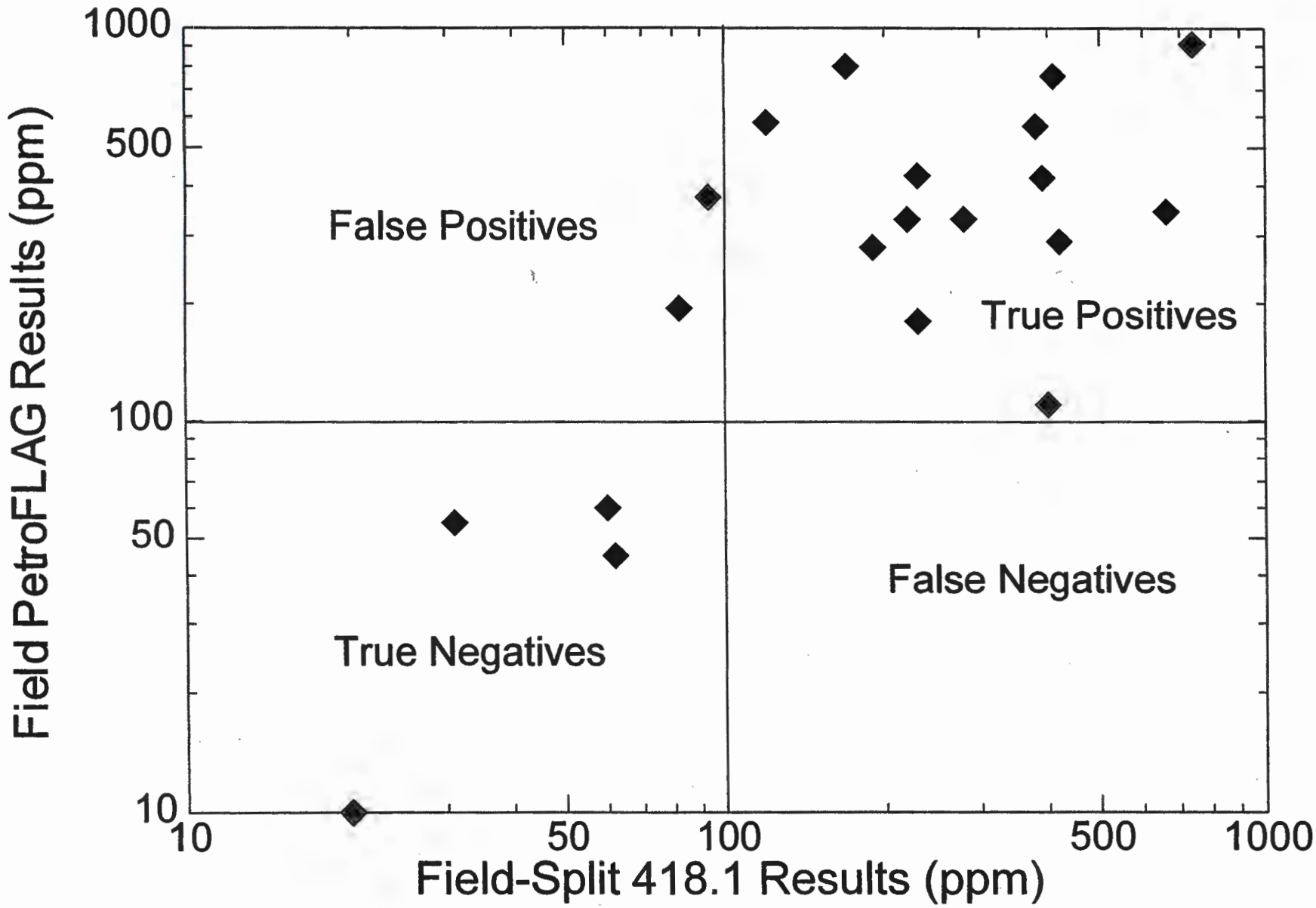


Figure 4: Comparison of PetroFLAG with EPA method 418.1

ATTACHMENT C

SITE SPECIFIC HASP ADDENDUM

SITE-SPECIFIC ADDENDUM TO THE BASEWIDE HEALTH AND SAFETY PLAN

DRONE CRASH SITE SOIL DISPOSAL HOLLOMAN AIR FORCE BASE ALAMOGORDO, NEW MEXICO

Prepared For:

49 CES/CEV
Holloman Air Force Base, New Mexico

Under Contract To:

U.S. Army Corp of Engineers
Omaha District
Under Contract No. DACA45-03-D-0023

Task Order No. 1

Prepared By

Bhate Environmental Associates, Inc.
1608 13th Avenue South Suite 300
Birmingham, Alabama 35205
Bhate Project Number: 9030232.03

December 2003

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Figure 12-1 - Hospital Route Map

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A - Activity Hazard Analyses

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ACRONYMS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
Bhate	Bhate Environmental Associates, Inc.
CIH	Certified Industrial Hygienist
EPA	U.S. Environmental Protection Agency
HAFB	Holloman Air Force Base
HASP	Health and Safety Plan
HSM	Health and Safety Manager
MSDS	Material Safety Data Sheet
mg/M^3	milligrams per cubic meter of air
NIOSH	National Institute for Occupational Safety and Health
PPE	personal protective equipment
SPF	sun protection factor
SPM	Senior Project Manager
SSA	Site-Specific Addendum
SSHO	Site Safety and Health Officer
USACE	U.S. Army Corps of Engineers
WSNM	White Sands National Monument

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1 PROJECT SAFETY COORDINATION

The Bhate Environmental Associates, Inc. (Bhate) personnel who are responsible for safety and health issues for the field investigation, and soil excavation, at the Drone Crash Site located at White Sands National Monument (WSNM), New Mexico are identified in Table 1-1. A signature below indicates that the respective personnel have reviewed and approved this Site-Specific Addendum (SSA) to the Basewide Health and Safety Plan (HASP) (November, 2003) for implementation on this scope of work. Unless otherwise specified in this SSA, titled positions (i.e. Site Manager, Site Safety and Health Officer (SSHO), Health and Safety Manager, etc.) will be positions held by Bhate employees. The requirements of this SSA and the HASP are applicable to Bhate employees, their subcontractors, and site visitors. Copies of both the SSA and the HASP shall be maintained at the project site during field operations. Bhate employees, their subcontractors, and site visitors are required to understand and comply with the requirements of both the SSA and the HASP.

Table 1-1 Project Team Members with Project Health and Safety Responsibilities

Title	Printed name	Office Telephone
Site Manager/SSHO	Jerry Pelfrey	(505) 679-2100
Senior Project Manager	Frank Gardner	(970) 216-7819
Health and Safety Manager	Eric Lehnertz, CIH	(205) 918-4000

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2 PROJECT BACKGROUND AND SCOPE

The scope of this project involves a subsurface soil investigation to determine the horizontal and vertical extent of the potential contamination followed by excavation and disposal of petroleum contaminated soils and crash debris. Additional details regarding the scope of work are located in the work plan.

The anticipated activities for the project include:

- Mobilization and demobilization of equipment
- Delineation of work area
- Soil Borings
- Soil Excavation and Loading

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3 HAZARD ASSESSMENT AND CONTROLS

3.1 TASK HAZARD(S) SUMMARY

The potential health and safety hazards of this task are summarized below in Table 3-1. The potential for encountering these hazards is ranked (high, moderate, or low) based on the work to be performed and the hazard control measures to be used.

Table 3-1 Task Hazards Summary

Summary	Hazard potential (High, Moderate, or Low)	Description of potential hazards
_v_ **Safety** (i.e. Walking and working surfaces, heavy equipment, traffic, falls, excavations, power and hand tools, materials handling, cranes, hoisting and rigging, hot work, confined spaces, demolition, electrical safety, etc.)	• Moderate All tasks and their control measures are addressed in Task Specific Activity Hazard Analyses (AHAs)	• Walking and working surfaces • Heavy equipment and equipment traffic • Slips, trips, and falls
_v_ **Utilities**	• Low	Due to the site location, these hazards should not be expected with this particular scope of work, however it is necessary to verify that the hazards can be controlled.
_v_ **Chemical**	• Low	The chemicals of concern should be limited to equipment fluids (fuel, lubricants, coolant, etc.) • Petroleum Hydrocarbons
_v_ **Physical** (i.e. Heat, cold, noise, radiological)	• Moderate	• Thermal stressors • Equipment noise • Potential radiological exposures
_v_ **Biological** (i.e. Plants, animals, insects, spiders)	• Low	• Insect stings and bites • Poisonous snakes/reptiles Potential for contact should be minimal.

3.2 HAZARD CONTROL MEASURES

General safe work practices and control measures for routine tasks are identified and summarized in the Basewide HASP. Additional task-specific hazards and control measures are

identified in Table 3-2 for non-routine tasks as part of the Activity Hazard Analysis (AHA) process. AHAs have been developed for the following activities associated with this project and are included as Attachment A.

Table 3-2 Task-Specific Hazard Control Measures by AHA

Activities with an AHA:	
Mobilization and Demobilization	Soil Boring
Soil Excavation and Loading	

3.3 WRITTEN SAFETY PROCEDURES AND PROGRAMS

The following sections of existing safety procedures and programs listed in Table 3-3 will be used for this task.

Table 3-3 Written Safety Procedures and Programs

Reference Procedure or Program	Applicable Section(s)
Bhate Hazard Communication Program	All (Refer to Basewide HASP)
Bhate Respiratory Protection Program	All (Refer to Basewide HASP)
Bhate Hearing Conservation Program	All (Refer to Basewide HASP)

4 PERSONAL PROTECTIVE EQUIPMENT

Table 4-1 lists the personal protective equipment (PPE) that will be used for the various activities within the scope of the project.

Table 4-1 Personal Protective Equipment by Activity

Activity	Head/Face	Foot	Hands	Respiratory	Clothing
Mobilization / Demobilization	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	None[3, 4]	Minimum of long pants and shirts with a minimum 4-inch sleeve
General Site Labor	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	None[3, 4]	Minimum of long pants and shirts with a minimum 4-inch sleeve
Equipment Operation	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots. Boot covers for entering and exiting equipment.	Leather gloves as needed	None[3, 4] N95 Air Purifying Respirator with Organic vapor cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve
Equipment Decontamination	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots. Boot covers.	Chemical resistant gloves	None[3, 4] N95 Air Purifying Respirator with Organic vapor cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve Tyvek coveralls may be worn as recommended by the SSHO.
Soil Sampling	Hard Hat[2] (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Chemical resistant gloves	None[3, 4] N95 Air Purifying Respirator with Organic vapor cartridges based on monitoring	Minimum of long pants and shirts with a minimum 4-inch sleeve Tyvek coveralls may be worn as recommended by the SSHO.
Supervision of work	Hard Hat (for overhead hazards), Safety Glasses[1] with rigid side shields.	Steel toed boots	Leather gloves as needed	None[3, 4]	Minimum of long pants and shirts with a minimum 4-inch sleeve

Note:

[1] Safety Glasses with rigid side shields approved by American National Standards Institute (ANSI) Z-87 required at all times.

[2] Hard hats are not required inside fully enclosed equipment cabs.

[3] Voluntary use of respirators is authorized for comfort from nuisance dusts and odors, provided they are issued and used in accordance with established respiratory protection program procedures.

[4] Cartridge change out will occur at the following conditions:

- Damage to cartridge
- Cartridge is wet, restriction in breathing, unusual odors
- Cartridge is visibly clogged with dust, restriction in breathing
- After 40 hours of use with no continuous exposures over the established Permissible Exposure Limits (PELs)
- Changes that may be otherwise identified in 29 CFR 1910.120.

The following qualified person certifies that the selection of PPE is based on best available information about the work requirements and anticipated hazards.

Printed name:	Signature:	Date:
Eric Lehnertz, CIH Bhate Health and Safety Manager		12-19-03

5 SITE MONITORING

Site monitoring will be conducted using direct-reading instruments primarily in the workers' breathing zone. To the extent feasible, site operations will be conducted and modified as needed to ensure that personnel are situated upwind of the excavation activities. Initial upwind background and work-zone readings will be obtained before the initiation of activities. Readings of breathing zones (unless location is otherwise specified) will be taken periodically during all activities. The Site Safety and Health Officer (SSHO) has the authority to modify the level of protection required for work at this site as well as halt operations as deemed necessary to control personal exposures. Monitoring results will be recorded on an Atmospheric Monitoring Log Field Health and Safety form maintained by the SSHO. Monitoring, calibrating, and maintaining instruments are the responsibility of the SSHO. Table 5-1 summarizes the site monitoring parameters and action levels applicable for direct reading exposure monitoring.

Table 5-1 Direct Reading Exposure Monitoring

Activity(s)	Instrument	Action Level(s) and Frequency	Actions
Applicable to all phases of project	Volatile Organic Compounds (VOCs) (Total by Photoionization Detector {PID})	0 - 9 ppm Every 15 minutes during intrusive activities	Continue work in required PPE and continue monitoring.
		10 - 49 ppm (Sustained for more than 5 minutes)	**Monitor for benzene.** Ensure personnel are upwind, notify the Site Manager. SSHO may upgrade PPE to Level C respiratory protection with organic vapor cartridge, as necessary. If benzene is detected follow response actions outlined for benzene.
	Benzene (By colorimetric tube or similar) Where indicted by PID readings	No detection up to 0.2 ppm	Continue work activities in required protective equipment.
		> 0.2 ppm	Cease work, exit the area to upwind location and notify the Site Manager.
	Personal DataRam or similar particulate monitor.	=1.5 mg/M^3 particulates (average) not to exceed 5.0 mg/M^3 5 minutes monitoring periods on a 15 minute interval as necessary if visible dust is not controlled	Stop work, increase dust suppression
Radiation Screening As part of Site investigation, Site will be monitored for potential radiological materials prior to the start of intrusive activities. Screening will be conducted with soil sampling.	Radiation Survey Meter (alpha, beta, gamma capable)	Detections above background	Cease work and evacuate the work area (where background radiation levels exist)

6 SITE CONTROL

Site-specific site control measures will be used to control access to the work area. Tables 6-1 and 6-2 summarizes the site control requirements applicable for both general work areas and work areas with potentially contaminated soils, respectively.

Table 6-1 Site Control for General Work Area(s)

Location	Site Control Procedure
General Work Area	Due to the location of the project site, access will coordinated with the Site Manager and HAFB Operations and representatives from WSNM. Access will be made via a specified route.

Table 6-2 Site Control for Potentially Contaminated Area(s)

Location	Site Control Procedure
Support Zone	Located outside of contaminated areas, access will be from clean areas or from the Exclusion Zone through the Contamination Reduction Zone.
Contamination Reduction Zone	The Contamination Reduction Zone will be demarcated with caution tape or temporary construction fencing. Decontamination stations will be located here.
Exclusion Zone	Exclusion Zone work areas will be clearly demarcated with caution tape or temporary construction fencing. All access to this area will require the use of a sign-in/out log.

6.1 DECONTAMINATION

Required decontamination procedures are described below in Table 6-3.

Table 6-3 Decontamination Procedures by Location

Type of decontamination	Decontamination Methods
Personnel decontamination	Personnel will be required to thoroughly wash hands and face prior to eating drinking or smoking. Disposable PPE (from potential sampling events) will be collected for proper disposal. Additional decontamination procedures will be developed by the SSHO as needed.
Equipment decontamination	Work efforts will be made to minimize equipment contact with contaminated materials. Prior to leaving the work area and land-farm following placement of contaminated soils, equipment (tires, excavator/loader buckets, hand tools) will be dry decontaminated. Soils from the dry decontamination process will be disposed with the excavated materials. Decontamination tools may include brooms and shovels.

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7 COMMUNICATIONS

Cellular telephones will be available to summon emergency services as required. Refer to Sections 11, 12 and 13 of this SSA for site specific guidance on emergency situations and appropriate actions. Site communication amongst worker shall be a combination of verbal and line of sight hand communications. **Cellular telephone use is not permitted while operating equipment.**

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8 MEDICAL SURVEILLANCE AND TRAINING

The medical surveillance and training requirements for Bhate's on-site personnel working on the debris recycling project will follow the requirements outlined in the Basewide HASP Sections 7.4 and 5, respectively.

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9 HAZARDOUS CHEMICALS

Hazardous chemicals (as defined in 29 CFR 1910.1200) to be brought or used on-site are identified below in Table 9-1. This chemical inventory and Material Safety Data Sheet (MSDSs) will be maintained by the SSHO at the project site.

Table 9-1 Sample Chemical Identification

Chemical Name	Amount	Location	Purpose
Assorted fuels, lubricants, coolants, etc. necessary for equipment operation	No storage planned. Quantities limited to immediate use requirements of on-site equipment.	No storage planned. Materials to be brought on-site by vendor's maintenance vehicle.	Equipment Servicing and Operation

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10 EMERGENCY ACTION AND RESPONSE

Personnel responsible for coordinating emergency response actions during the debris recycling activities are identified below in Table 10-1. The project site is located at WSNM approximately 12 miles north of Highway 70 and 5 miles southwest of Holloman Air Force Base. See Figure 1 in the work plan for location detail. A map showing directions to the authorized medical facility from Holloman Air Force Base is attached in Figure 12-1.

Table 10-1 Emergency Coordinator and Alternate

Responsibility	Name	Phone Number(s)
Bhate Task Emergency Coordinator	Jerry Pelfrey	Office (505) 679-2100 Cell (505) 491-8261

If an emergency situation develops which requires evacuation of the work area, the evacuation procedures in Table 10-2 shall be followed

Table 10-2 Evacuation Procedures

Evacuation Step	Methods and comments:
Notify affected workers	Use of site communication methods as applicable
Evacuate to safe location	Assemble at the primary evacuation site (outside of the work area)
Assemble and account for workers	Emergency Coordinator shall account for personnel using site Sign in/Sign out sheet.
Notify Fire and Emergency Services	Notification as needed.
Complete incident report	Follow the Incident Reporting and Investigation Procedure.

Table 10-3 summarizes potential emergency situations and response actions that are applicable for the debris recycling.

Table 10-3 Potential Emergency Situations

In case of:	Response actions:
Injury or illness	Treat injury with applicable First Aid. All work related injuries beyond first aid will result in notification of Emergency Services and notification of the employee supervisor. Any employee requiring advanced medical treatment will be accompanied by a knowledgeable company employee that can answer potential questions on job duties and hazards. Make notifications in accordance with the Incident Reporting and Investigation Procedure.
Chemical exposure	First Aid shall be provided such as but not limited to: move victim to fresh air, remove contaminated clothing, flush affected skin with water, and seek medical attention.
Fire or explosion	Notify emergency services immediately. All personnel shall evacuate the immediate area of the fire and move to an upwind location. Personnel shall not engage in fire fighting activities use of fire extinguisher) unless trained to do so and only in the incipient stages of fire.
Adverse weather	Tornados, lightning or other threatening weather conditions will result in an immediate shut down of operations and evacuation of personnel. Lightning proximity will be determined by measuring the time interval between the visually lightning flash and the subsequent sound of thunder. An interval less than 30 seconds will prompt the shut down. Operations will be shut down for the period of the storm passing plus an additional 20 minutes.
Material spill or release	Vehicles and equipment will be maintained and inspected so as to prevent fluid leaks. Should any vehicle fluid leaks occur the equipment will be taken out of service to make necessary repairs and any contaminated material will be clean-up and disposed of properly. Spill kits will be available to facilitate prompt containment and clean-up of spills. Notification will be made in accordance with the Incident Reporting and Investigation Procedure.

11 EMERGENCY CONTACTS

In the event of an emergency, the following contacts should be made, as appropriate:

HAFB Emergency Number (using HAFB phone system).....9-911
Operators will assist with Medical, Fire, and Police emergencies

HAFB Security Force.....(505) 572-5037

HAFB Fire Protection.....(505) 572-1117

HAFB Hospital – 49th Medical Group (Main switchboard).....(505) 572-2778

Civilian Hospital (Alamogordo) Gerald Champion Regional Medical Center.....(505) 439-6100

White Sands National Monument Visitor Center.....(505) 679-2599

After initial contacts have been made and the situation has stabilized, notify the Site Manager/SSHO, Senior Project Manager, and/or HSM, as appropriate.

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12 HOSPITAL DIRECTIONS

In the event of a true medical emergency ("life or limb"), notify the WSNM Visitor Center for summoning emergency medical care.

Injuries should be treated as necessary at Gerald Champion Regional Medical Center at 2669 Scenic Drive, Alamogordo, NM 88310. From White Sands National Monument, exit the Main Gate and proceed east on US-70 onto US-54, continue north on US-54 to Indian Wells Road, turn right heading east to Scenic Drive, and turn left on Scenic proceed to the medical center. A map to this hospital from Holloman Air Force Base is presented in Figure 12-1.

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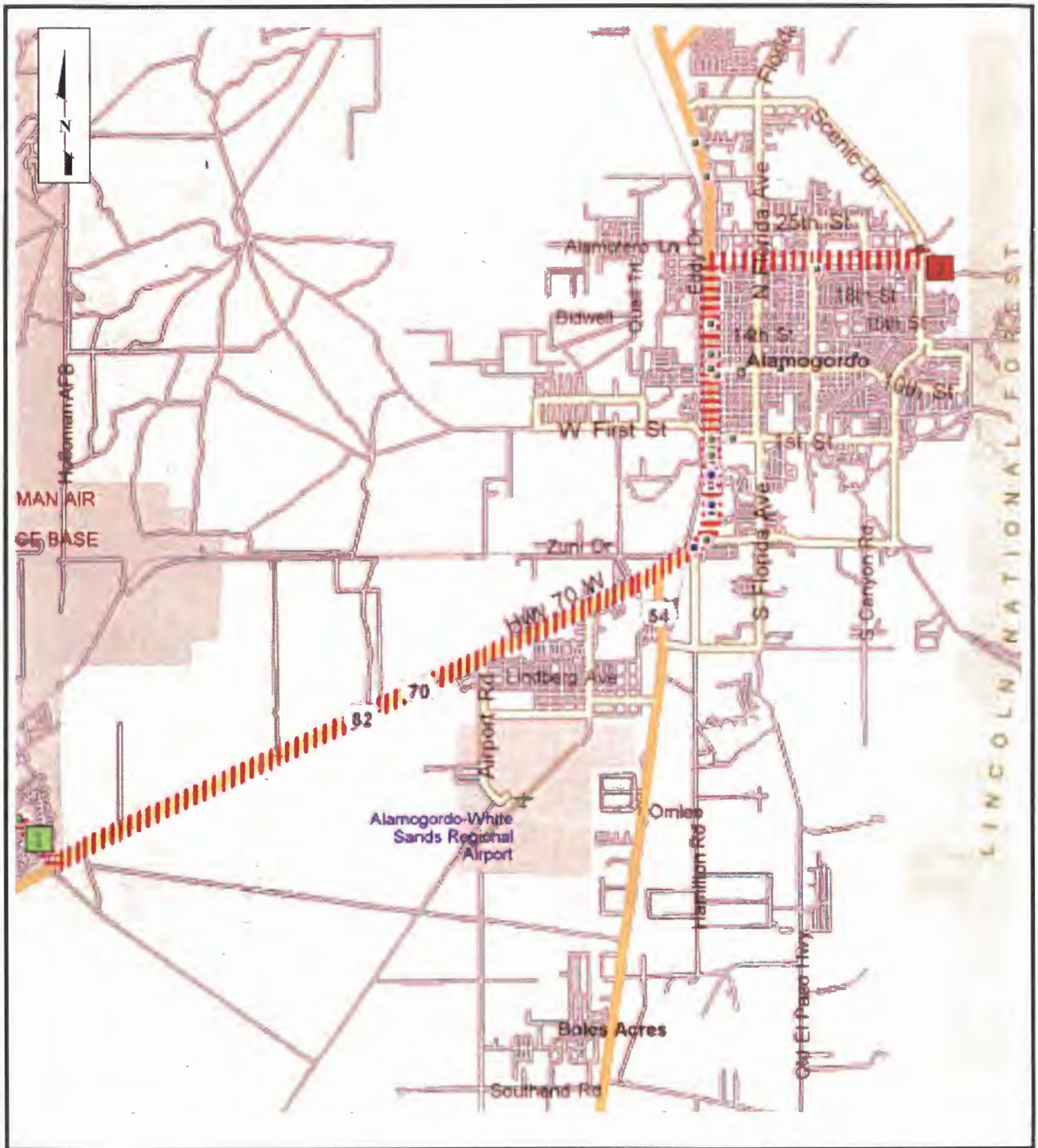
Figure 12-1 Hospital Route Map



BHATE

Bhate Environmental Associates, Inc.
Environmental Engineers & Scientists

Source: Microsoft Expedia Street Maps

HOSPITAL ROUTE MAP
Gerald Champion Regional Hospital

Not to Scale

Date
11/04/03

Holloman Air Force Base
Health and Safety Plan

Figure 12-1

13 REFERENCES

ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2003.

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ATTACHMENTS

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ATTACHMENT A
ACTIVITY HAZARD ANALYSES (AHAs)

AHA No.	AHA Title
AHA – 1	General Site Activities, Mobilization and Demobilization
AHA – 2	Soil Boring
AHA – 3	Soil Excavation and Loading

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Activity Hazard Analysis (AHA) – 1

Task: General Site Activities, Site Mobilization and Demobilization		Project: Drone Crash Site
Minimum Personal Protective Equipment (PPE): Level D PPE		Location: White Sand National Monument, New Mexico
Activity	**Potential Hazard(s)**	**Control Measures**
General site activities Mobilization and Demobilization	Slips, trips, or falls on walking and working surfaces	• Maintain clean work areas by following good housekeeping procedures • Be alert for uneven terrain and steep slopes • Wear slip resistant footwear when walking/working on slippery surface • Keep work area free of dirt, grease, slippery materials, debris and tools. • Provide adequate lighting in all work areas • Flag or cover work areas to protect against falls.
	Exposure to high noise from heavy equipment and power tools	• Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs); SSHO will determine the need for hearing protection; all equipment will be equipped with manufacturer's required mufflers
	Eye injury	• Use approved safety glasses with rigid side shields.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1 in all construction areas, and areas with overhead hazards
	Dropped objects	• Steel toe boots meeting ANSI Standard Z41 will be worn in all construction areas
	Back injury from lifting heavy loads	• Site personnel will be instructed on proper lifting techniques • Mechanical devices should be used to reduce manual handling of materials • Team lifting should be utilized if mechanical devices are not available
	Thermal Stressors (i.e. heat stress, cold stress)	• Employees will have appropriate clothing for variable weather. • Wear long sleeves and long pants, sunscreen with a high SPF on exposed skin. • Employees will take breaks and drink plenty of fluids, as necessary, to prevent heat stress. • Refer to the Basewide HASP for detailed information on heat and cold stress.

AHA – 1 (continued)

Activity	Potential Hazard(s)	Control Measures
General site activities Mobilization and Demobilization (continued)	Spills/Fire	• Fuel cans will be NFPA approved • Equipment shall be conducted in approved locations • Fuel cans will be equipped with pouring spout or a funnel will be used • Spill and absorbent materials will be readily available • Smoking and open flames are not permitted in fueling/greasing areas • All heavy equipment will be equipped with a ABC type fire extinguishers which will be inspected monthly and documented
	Vehicular traffic in work area and heavy equipment operation	• Maintain awareness of vehicle movement in work area • Exercise caution when approaching heavy equipment. • Equipment will be equipped with functioning back-up alarms, signal lamps and alerting horns. Operators are required to use seat belts.
	Inclement weather (Thunderstorms and tornadoes)	• Halt activities immediately and take cover during thunderstorm or tornado warnings, shelter in a building if possible, stay away from windows. • If outdoors, crouch close to ground and limit body surface in contact with ground by staying on feet. • Listen to radio or TV announcements for pending weather information. • Do not try to outrun a tornado on foot or in a vehicle.
	Extension cords	• Extension cords shall be inspected daily. • Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projection, pinch points (doorways) and vehicular traffic. • Cords shall be designed for heavy duty use.
	Radiological exposures	• Work area shall be surveyed for alpha, beta, gamma emissions. Detections above background shall result in evacuation of the work area (to a location where background emissions are present) and contact Project manage.

AHA – 1 (continued)

Equipment Used	Inspection Requirements	Training Requirements
Level D PPE First Aid Kits Portable Eyewash Fire Extinguishers Mobilization Equipment	Weekly inspections will be performed on fire extinguishers. Weekly inspections will be performed on first aid kits. Portable eye wash will be inspected weekly.	Personnel have read and understand the work plan and AHA Site specific briefing At least two individuals on-site will have current CPR and First aid training

Activity Hazard Analysis (AHA) – 2

Task: Soil Boring		Project: Drone Crash Site
Minimum Personal Protective Equipment (PPE): Level D PPE		Location: White Sand National Monument, New Mexico
Activity	Potential Hazard(s)	Control Measures
Soil Boring and Sampling Hazards and recommended controls from AHA – 1 apply	Drill Rig Hazards Including but not limited to: Flying debris, falling objects, noise, hydraulic failures, unguarded machinery, equipment rollover, movement of large, heavy drilling tools, etc.	• Drill rig is to be operated and maintained by qualified operators • A Drill Rig Inspection Checklist (following) should be completed daily to ensure that the rig is operating properly. The inspection will include fittings, cables, pins, connections, lubrication points, operating controls, emergency stop switches, etc. • To the extent possible, the terrain should be level and the condition of the ground such that unexpected movement of the rig is unlikely • Stabilize the rig prior to boring in accordance with manufacturer's recommendations • Wear required PPE (hard hat, safety glasses, work gloves, ear muffs or plugs, steel toe work boots), ensure loose clothing is secured • Maintain good housekeeping on and around drill rig
	Overhead/buried utilities	• Completion of a HAFB Excavation Permit or equivalent permit is required prior to the start of intrusive activities • Overhead utilities should be considered live until determined otherwise. Maintain a minimum distance of 15 feet from overhead utilities • All underground utilities must be clearly marked before beginning work • No borings shall be made within a 4 foot "Buffer Zone" of any utility marking

AHA – 2 (continued)

Equipment Used	Inspection Requirements	Training Requirements
Soil Boring (continued)	Exposure to soil contaminants	• To the extent feasible, conduct work in a manner that minimizes potential contact with subsurface materials • Wear chemical resistant gloves when handling soil samples • SSHO shall conduct breathing zone monitoring for VOCs with a PID/FID if any odors or visible soil staining are encountered. If there are any detections above background sustained for more than 5 minutes, cease work, exit the area to upwind location. SSHO may require an upgrade in PPE or modification to work methods based on monitoring results • Wash hands and face prior to eating or drinking after handling potentially contaminated materials • Conduct radiation survey on soil samples. Stop work and evacuate if detections above background
Equipment Used	**Inspection Requirements**	**Training Requirements**
Level D PPE First Aid Kits Portable Eyewash Fire Extinguishers Direct Push Rig Soil Sampling Equipment PID/FID	Weekly inspections will be performed on fire extinguishers. Weekly inspections will be performed on first aid kits. Portable eye wash will be inspected weekly.	Personnel have read and understand the work plan and AHA. Site specific briefing At least two individuals on-site will have current CPR and First aid training

Activity Hazard Analysis (AHA) – 3

Task: Soil Excavation and Loading		Project: Drone Crash Site
Minimum Personal Protective Equipment (PPE): Level D PPE		Location: White Sand National Monument, New Mexico
Activity	Potential Hazard(s)	Control Measures
Excavation Hazards and recommended controls from AHA – 1 apply	Overhead/buried utilities	• Completion of a HAFB Excavation Permit is required prior to the start of construction activities. • Overhead utilities should be considered live until determined otherwise. Maintain a minimum distance of 15 feet from overhead utilities. • All underground utilities must be clearly marked before beginning work.
	Heavy equipment operation	• Access to the work area shall be coordinated with the Site Manager. • Equipment (including trucks) shall be inspected and documented at the beginning of each shift. • Maintain awareness of vehicle movement in work area. • Exercise caution when approaching heavy equipment. • Equipment will be equipped with functioning back-up alarms, signal lamps and alerting horns. Operators are required to use seat belts. • Signs, barricades, flagmen, and/or other traffic control devices will be used to control traffic in the work area. • Buckets and attachments shall be placed on the ground if operator not at controls or if ground personnel approach.
	Excavation Safety	• Ensure equipment is placed so as to not contribute to a cave-in situation. • No personnel will be allowed to enter the excavation unless the excavation has been properly inspected, shoring and means of egress installed as necessary, all heavy equipment has been moved away from the affected edges, and any spoils have been removed from the edge. • Do not place spoil piles closer than 2 feet from the edge of the excavation
	Exposure to soil contaminants	• Utilize appropriate PPE and decontamination procedures. • Conduct work activities in a manner that minimizes potential contact with excavated materials.

AHA – 3 (continued)

Activity	Potential Hazard(s)	Control Measures
Soils Loading Hazards and Controls associated with Excavation apply	Falling materials and flying debris striking personnel	• Loading equipment must have cab protection, functioning back-up alarms, signal lamps and alerting horns. Operators are required to use seat belts. • GROUND PERSONNEL ARE NOT PERMITTED TO APPROACH EQUIPMENT IN MOTION OR WHILE MATERIALS BEING HANDLED. MAINTAIN CLEAR RADIUS OF MACHINE. • Operator must minimize the amount of materials spilled on the exterior of trucks during loading operations.
	Dust	• Adequate dust suppression with water should be utilized to minimize visible dust emissions. If visible dust is prevalent, utilize personal dust monitor to evaluate.
	Striking heavy equipment and operators	• Only experienced personnel will operate equipment. • Equipment will be operated with cab doors and windows closed.
	Overloading capacity	• Load charts of all equipment will be reviewed and followed.
Equipment Used	**Inspection Requirements**	**Training Requirements**
Level D PPE First Aid Kits Portable Eyewash Fire Extinguishers Heavy Equipment (Loader, Excavator, Haul Trucks)	Weekly inspections will be performed on fire extinguishers. Weekly inspections will be performed on first aid kits. Portable eye wash will be inspected weekly.	Personnel have read and understand the work plan and AHA Site specific briefing At least two individuals on-site will have current CPR and First aid training

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ATTACHMENT D

QAPP ADDENDUM

QUALITY ASSURANCE PROJECT PLAN ADDENDUM

DRONE CRASH SITE

HOLLOMAN AIR FORCE BASE
NEW MEXICO

Prepared for:

49CES/CEV
Holloman Air Force Base
New Mexico

Under Contract To:

U.S. Army Corps of Engineers
Omaha, NE
Under Contract No. DACA45-03-D-0023
Task Order No. 1

December 2003

Prepared by:

Bhate Environmental Associates, Inc.
1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205

Bhate Project No. 9030232.03

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM

DRONE CRASH SITE
HOLLOMAN AIR FORCE BASE
NEW MEXICO

REVIEW SHEET

COMMITMENT TO IMPLEMENT THIS BASEWIDE QUALITY ASSURANCE PROJECT PLAN

Mike D'Auben		12/18/03
Project Chemist	Signature	Date
Frank Gardner		December 19, 2003
Project Manager	Signature	Date
Jerry Pelfrey		December 19, 2003
Site Manager	Signature	Date

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM

DRONE CRASH SITE
HOLLOMAN AIR FORCE BASE
NEW MEXICO

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3-2 Summary of Definitive Data

4-1 Summary of Field QC Requirements

4-2 Summary of Laboratory QC Limits

Attachments

A-1 NELAC Certification for ELAB of Tennessee

A-2 USACE Validation Letter to ELAB of Tennessee

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LIST OF ACRONYMS

DCS	Drone Crash Site
DO	Dissolved Oxygen
DQOs	Data Quality Objectives
DRO	Diesel Range Organics
ERPIMS	Environmental Resources Program Information Management System
FS	Feasibility Study
GRO	Gasoline Range Organics
HAFB	Holloman Air Force Base
LCL	Lower Control Limit
LCS	Laboratory Control Sample
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation Conference
NFA	No Further Action
ng/L	nanogram per liter
ORO	Oil Range Organics
ORP	Oxidation Reduction Potential
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SOPs	Standard Operating Procedures
SVOC	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
UCL	Upper Control Limit
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
0VOC	Volatile Organic Compound
WP	Work Plan

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM

This Quality Assurance Project Plan Addendum (QAPP Addendum) has been developed to assure that sample collection, analyses, and evaluations are legally and scientifically defensible for the Drone Crash Site (DCS) at Holloman Air Force Base (HAFB). This document is an addendum to the *Basewide Quality Assurance Project Plan, Holloman Air Force Base, New Mexico* (Bhate, November 2003) (Basewide QAPP) and must be used in conjunction with that document. This document contains the site specific information for the work at DCS outlined in the *Soil Disposal Work, Drone Crash Site, Holloman Air Force Base, New Mexico* (Bhate, November 2003) (DCS Work Plan).

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1 INTRODUCTION

Bhate Environmental Associates, Inc. (Bhate) has been retained by the U.S. Army Corps of Engineers (USACE), under contracts DACA45-03-D-0023, Task Order No. 1, to conduct soil removal activities, including soil sampling at Holloman Air Force Base (HAFB), New Mexico. .

See the Basewide QAPP and DCS Work Plan for additional information on HAFB and DCS.

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2 PROJECT LABORATORY

The analytical work for this project will be preformed by ELAB of Tennessee, 227 French Landing Drive, Nashville, TN 37228. The laboratory personnel who will be involved with this project include:

Rick Davis, ELAB Vice President of Operations, (615) 345-1115

Marcia McGinnity, ELAB Project Manager, (615) 345-1115

Doris Curry, ELAB Quality Assurance Manager, (615) 345-1115

ELAB is certified by both the National Environmental Laboratory Accreditation Council (NELAC) (Attachment A-1) and the USACE (Attachment A-2) and has extensive previous experience in working on USACE projects. The ELAB Laboratory Quality Assurance Manual (QAM) and Standard Operating Procedures (SOPs) have been reviewed by Bhate and found to meet all the requirements for this project. The QAM and SOPs are available for further review if required.

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3 DATA CATEGORIES

The data use determines the required levels of data quality. The two levels of data quality established by the USACE are screening and definitive. Under this QAPP Addendum, the data to be generated under each level in this investigation are presented in Table 2-1 (Screening) and Table 2-2 (Definitive). The screening data collected for this project will include rad screening and VOC headspace screening of soil samples for guidance in sample selection for analysis. The Definitive data generated by the laboratory will be presented with limited data deliverables (i.e. Level II data packages), using a 21 day turn-around-time. Definitive data produced by the laboratory is not required to be presented in an Environmental Resources Program Information Management System (ERPIMS) format electronic data deliverable (EDD).

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4 DATA QUALITY ASSURANCE AND QUALITY CONTROL

The general data QA and QC requirements for HAFB are presented in the Basewide QAPP. The field QC requirements for this project are presented in Table 4-1. The project specific laboratory QC limits are listed in Table 4-2.

All final definitive data will be reviewed and validated by the Bhate Senior Chemist, Michael J. D'Auben, based on the guidelines of the USEPA National Functional Guidelines for Data Validation and the site specific laboratory QC limits.

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5 REFERENCES

Bhate, November 2003. Final Basewide Quality Assurance Project Plan, Holloman Air Force Base, New Mexico.

Bhate, November 2003. Soil Disposal Work, Drone Crash Site, Holloman Air Force Base, New Mexico.

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TABLES

Table 3-1
Summary of Screening Data

Parameter	Matrix	Testing Method
Rad Screening	Soil	TBD
Volatile Organics Compounds (VOCs)	Soil	Headspace using Photoionization detectior (PID) or Flame Ionization Detector (FID)

Table 3-2
Summary of Definitive Data

Parameter	Matrix	Testing Method
Volatile Organic Compounds (VOCs)	Soil	USEPA SW-846 Method 8260B
Semivolatile Organic Compounds (SVOCs)	Soil	USEPA SW-846 Method 8270C
Total Petroleum Hydrocarbons (TPH)	Soil	USEPA SW-846 Method 8015

Table 4-1
Summary of Field QC Samples

Matrix	Analysis	Number of Field Samples	Equipment Blanks	Trip Blanks*	Field Duplicates	Field Splits	MS/MSD	Total
Soil	VOCs per EPA Method 8260B	12	0	2	2	0	1	17
	SVOCs per EPA Method 8270C	12	0	0	2	0	1	15
	TPH by EPA Method 8015	12	0	2	2	0	1	17

*Estimated, one trip blank will accompany every shipment of volatile samples

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
VOCs per EPA Method 8260B	ug/L	ug/kg	%	%	%	%	%	%	%	%	%	%
Acetone	5	5	51	157	50	150	51	157	20	50	150	20
Benzene	1	1	70	125	71	123	70	125	20	71	123	20
Bromodichloromethane	1	1	70	130	71	130	70	130	20	71	130	20
Bromoform	2	1	72	136	62	141	72	136	20	62	141	20
Bromomethane	2	2	35	153	57	153	35	153	20	57	153	20
2-Butanone (MEK)	10	10	45	150	50	150	45	150	20	50	150	20
Carbon disulfide	1	1	74	123	64	123	74	123	20	64	123	20
Carbon tetrachloride	1	1	71	132	69	132	71	132	20	69	132	20
Chlorobenzene	1	1	78	114	69	118	78	114	20	69	118	20
Chloroethane	2	3	72	129	62	140	72	129	20	62	140	20
Chloroform	1	1	74	127	75	132	74	127	20	75	132	20
Chloromethane	2	2	58	135	50	150	58	135	20	50	150	20
Dibromochloromethane	1	1	74	145	61	147	74	145	20	61	147	20
1,2-Dichlorobenzene	1	1	73	120	75	132	73	120	20	75	132	20
1,3-Dichlorobenzene	1	1	73	120	75	122	73	120	20	75	122	20
1,4-Dichlorobenzene	1	1	74	123	74	126	74	123	20	74	126	20
1,1-Dichloroethane	1	1	75	133	80	126	75	133	20	80	126	20
1,2-Dichloroethane	1	1	67	132	75	121	67	132	20	75	121	20
1,1-Dichloroethene	1	1	74	133	57	142	74	133	20	57	142	20
cis-1,2-Dichloroethene	1	1	73	133	70	129	73	133	20	70	129	20
trans-1,2-Dichloroethen	1	1	75	134	75	123	75	134	20	75	123	20
1,2-Dichloropropane	1	1	75	133	72	124	75	133	20	72	124	20
cis-1,3-Dichloropropene	1	1	73	132	72	132	73	132	20	72	132	20
trans-1,3-Dichloroprope	1	1	74	131	69	131	74	131	20	69	131	20
Ethylbenzene	1	1	75	120	75	120	75	120	20	75	120	20
2-Hexanone	3	2	53	139	55	144	53	139	20	55	144	20
Methylene chloride	2	3	69	118	66	131	69	118	20	66	131	20
4-Methyl-2-pentanone	2	2	59	150	50	150	59	150	20	50	150	20
Styrene	1	1	75	130	75	130	75	130	20	75	130	20
1,1,2,2-Tetrachloroetha	1	1	68	129	68	144	68	129	20	68	144	20
Tetrachloroethene	1	1	75	129	75	129	75	129	20	75	129	20
Toluene	1	1	73	119	63	128	73	119	20	63	128	20
1,2,4-Trichlorobenzene	2	1	75	130	69	139	75	130	20	69	139	20
1,1,1-Trichloroethane	1	1	70	127	75	133	70	127	20	75	133	20
1,1,2-Trichloroethane	1	1	75	136	71	129	75	136	20	71	129	20
Trichloroethene	1	1	74	118	69	120	74	118	20	69	120	20
Vinyl chloride	2	2	73	134	75	134	73	134	20	75	134	20
Xylene (total)	1	1	75	122	75	125	75	122	20	75	125	20
1,2,4-Trimethylbenzene	2	2	75	125	75	125	75	125	20	75	125	20
1,3,5-Trimethylbenzene	2	2	75	125	75	125	75	125	20	75	125	20

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
1,2-Dichloroethane-d4 (surr)	--	--	74	131	70	125	--	--	--	--	--	--
4-Bromofluorobenzene (surr)	--	--	76	128	75	116	--	--	--	--	--	--
Dibromofluoromethane (surr)	--	--	80	129	64	131	--	--	--	--	--	--
Toluene-d8 (surr)	--	--	85	115	70	123	--	--	--	--	--	--
SVOCs by EPA Method 8270C	**ug/L**	**ug/kg**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Acenaphthene	2	100	40	112	27	116	40	112	20	27	116	20
Acenaphthylene	2	100	37	115	33	120	37	115	20	33	120	20
Anthracene	2	100	45	118	35	122	45	118	20	35	122	20
Benzoic acid	2	100	30	136	30	160	30	136	20	30	160	20
Benzo(a)anthracene	2	100	43	138	33	139	43	138	20	33	139	20
Benzo(b)fluoranthene	2	100	31	146	30	140	31	146	20	30	140	20
Benzo(k)fluoranthene	2	100	40	127	30	150	40	127	20	30	150	20
Benzo(g,h,i)perylene	2	100	35	129	30	146	35	129	20	30	146	20
Benzo(a)pyrene	2	100	38	144	30	144	38	144	20	30	144	20
bis(2-Chloroethoxy)meth	1	100	30	115	30	126	30	115	20	30	126	20
bis(2-Chloroethyl)ether	2	100	30	115	30	121	30	115	20	30	121	20
bis(2-Chloroisopropyl)e	1	100	50	150	30	131	50	150	20	30	131	20
Bis(2-ethylhexyl)phthal	2	1300	30	154	34	149	30	154	20	34	149	20
4-Bromophenyl-phenyleth	2	100	43	118	34	120	43	118	20	34	120	20
Butylbenzylphthalate	2	100	37	136	30	153	37	136	20	30	153	20
4-Chloroaniline	1	100	30	115	30	110	30	115	20	30	110	20
4-Chloro-3-methylphenol	2	100	32	110	18	111	32	110	20	18	111	20
2-Chloronaphthalene	2	100	35	115	32	115	35	115	20	32	115	20
2-Chlorophenol	2	100	29	110	10	110	29	110	20	10	110	20
4-Chlorophenyl-phenylet	2	100	40	115	33	118	40	115	20	33	118	20
Chrysene	1	100	42	142	33	142	42	142	20	33	142	20
Dibenz(a,h)anthracene	2	100	38	130	34	148	38	130	20	34	148	20
Dibenzofuran	2	100	40	115	30	110	40	115	20	30	110	20
3,3'-Dichlorobenzidine	2	500	30	160	31	137	30	160	20	31	137	20
2,4-Dichlorophenol	2	100	34	115	32	121	34	115	20	32	121	20
Diethylphthalate	1	100	43	132	32	126	43	132	20	32	126	20
2,4-Dimethylphenol	2	100	31	120	33	119	31	120	20	33	119	20
Dimethylphthalate	2	100	42	116	36	124	42	116	20	36	124	20
Di-n-butylphthalate	2	100	46	123	36	135	46	123	20	36	135	20
4,6-Dinitro-2-methylphe	4	100	42	144	30	160	42	144	20	30	160	20
2,4-Dinitrophenol	7	700	29	146	34	160	29	146	20	34	160	20
2,4-Dinitrotoluene	2	100	46	122	34	110	46	122	20	34	110	20
2,6-Dinitrotoluene	1	100	43	122	32	133	43	122	20	32	133	20
Di-n-octylphthalate	2	100	36	151	50	160	36	151	20	50	160	20
Fluoranthene	2	100	47	132	32	122	47	132	20	32	122	20
Fluorene	1	100	41	115	32	127	41	115	20	32	127	20

Table 4-2
Summary of Laboratory QC Limits

Parameter	MDL		LCS				Matrix Spike Water			Matrix Spike Soil		
			Water		Soil		Recovery		MSD	Recovery		MSD
	Water	Soil	LCL	UCL	LCL	UCL	LCL	UCL	RPD	LCL	UCL	RPD
Hexachlorobenzene	2	100	42	123	32	127	42	123	20	32	127	20
Hexachlorobutadiene	2	100	30	120	30	118	30	120	20	30	118	20
Hexachlorocyclopentadiene	1	100	30	115	30	123	30	115	20	30	123	20
Hexachloroethane	1	100	30	120	30	115	30	120	20	30	115	20
Indeno(1,2,3-cd)pyrene	2	100	37	130	34	147	37	130	20	34	147	20
Isophorone	2	100	33	115	34	115	33	115	20	34	115	20
2-Methylnaphthalene	2	100	32	115	30	120	32	115	20	30	120	20
2-Methylphenol	2	100	30	116	30	123	30	116	20	30	123	20
4-Methylphenol	4	100	31	115	30	127	31	115	20	30	127	20
Naphthalene	2	100	30	119	30	115	30	119	20	30	115	20
2-Nitroaniline	2	100	30	115	30	148	30	115	20	30	148	20
3-Nitroaniline	2	100	30	115	30	110	30	115	20	30	110	20
4-Nitroaniline	2	100	30	115	30	110	30	115	20	30	110	20
Nitrobenzene	1	100	31	115	30	115	31	115	20	30	115	20
2-Nitrophenol	1	100	33	115	30	126	33	115	20	30	126	20
4-Nitrophenol	3	100	21	110	24	120	21	110	20	24	120	20
N-Nitrosodiphenylamine	2	100	35	124	50	134	35	124	20	50	134	20
N-Nitroso-di-n-propylamine	2	100	39	110	24	112	39	110	20	24	112	20
Pentachlorophenol	5	500	32	133	10	114	32	133	20	10	114	20
Phenanthrene	2	100	45	117	35	119	45	117	20	35	119	20
Phenol	1	100	10	110	10	110	10	110	20	10	110	20
Pyrene	2	100	51	137	33	150	51	137	20	33	150	20
2,4,5-Trichlorophenol	2	100	36	135	34	128	36	135	20	34	128	20
2,4,6-Trichlorophenol	2	100	39	115	35	120	39	115	20	35	120	20
2,4,6-Tribromophenol (surr)	--	--	34	129	38	121	--	--	--	--	--	--
2-Fluorobiphenyl (surr)	--	--	30	103	31	100	--	--	--	--	--	--
2-Fluorophenol (surr)	--	--	14	100	21	100	--	--	--	--	--	--
Nitrobenzene-d5 (surr)	--	--	32	107	27	100	--	--	--	--	--	--
Phenol-d5 (surr)	--	--	15	100	19	106	--	--	--	--	--	--
Terphenyl-d14 (surr)	--	--	28	154	35	123	--	--	--	--	--	--
Total Petroleum Hydrocarbons by EPA Method 8015	**ug/L**	**ug/kg**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
C6-C10 (GRO)	100	5000	50	150	50	150	50	150	20	50	150	20
Bromofluorobenzene (surr)	--	--	50	150	50	150	--	--	--	--	--	--
C10-C22 (DRO)	35	3000	50	150	50	150	50	150	25	50	150	25
C22-C36 (ORO)	35	5000	50	150	50	150	50	150	25	50	150	25
Ortho-terphenyl (surr)	--	--	50	150	50	150	--	--	--	--	--	--

ATTACHMENTS

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
12565 WEST CENTER ROAD
OMAHA NE 68144-3869

REPLY TO
ATTENTION OF

December 1, 2003

Hazardous, Toxic and Radioactive Waste
Center of Expertise

Doris Curry
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Dear Ms. Curry:

This correspondence addresses the ongoing validation status of ELAB of Tennessee, LLC of Nashville, TN by the U.S. Army Corps of Engineers (USACE) for chemical analysis in support of the Hazardous, Toxic and Radioactive Waste Program.

Your laboratory is now validated for the parameters listed below:

METHOD	PARAMETERS	MATRIX[1]
300 Series	Anions	Water[2]
9010B/9012A	Cyanide	Water[2]
9013/9012A	Cyanide	Solids
8330	Explosives	Water
8330	Explosives	Solids[2]
8151A	Herbicides	Water[2]
8151A	Herbicides	Solids
8081A	Organochlorine Pesticides	Water[2]
8081A	Organochlorine Pesticides	Solids
8082	Polychlorinated Biphenyls	Water[2]
8082	Polychlorinated Biphenyls	Solids[2]
8270C	Semivolatile Organics	Water[2]
8270C	Semivolatile Organics	Solids[2]
6010B/7000A Series	TAL Metals[3]	Water[2]
6010B/7000A Series	TAL Metals[3]	Solids[2]
8260B	Volatile Organics	Water[2]
8260B	Volatile Organics	Solids

Remarks:
1) 'Solids' includes soils, sediments, and solid waste.
2) The laboratory has successfully analyzed a performance evaluation sample for this method/matrix.

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3) TAL Metals: Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

4) Anions: Chloride, fluoride, sulfate, nitrate, nitrite, and ortho-phosphate.

Based on acceptable past performance of your laboratory, the validation of your laboratory is hereby extended from November 21, 2003 to March 30, 2004 to provide time to complete the revalidation process.

The USACE reserves the right to conduct additional laboratory inspections or to suspend validation status for any or all of the listed parameters if deemed necessary. It should be noted that your laboratory may not subcontract USACE analytical work to any other laboratory location without the approval of this office.

Any questions or comments can be directed to Richard Kissinger at (402) 697-2569. General questions regarding laboratory validation may be directed to the Laboratory Validation Coordinator at (402) 697-2574.

Sincerely,

for Marcia C. Davies, Ph.D.
Director, USACE Hazardous,
Toxic and Radioactive Waste
Center of Expertise

FLORIDA DEPARTMENT OF HEALTH

State of Florida
Department of Health, Bureau of Laboratories

This is to certify that

E87646

ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

has complied with Florida Administrative Code 64E-1, for the examination of Environmental samples in the following categories:

NON-POTABLE WATER - Extractable Organics, General Chemistry, Metals, Pesticides-Herbicides-PCB's, Volatile Organics, Whole Effluent Toxicity; SOLID AND CHEMICAL MATERIALS - Extractable Organics, Pesticides-Herbicides-PCB's, General Chemistry, Metals, Volatile Organics

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

EFFECTIVE JULY 1, 2003 THROUGH JUNE 30, 2004

Ming S. Chan, Ph.D.
Bureau Chief, Bureau of Laboratories
Florida Department of Health
DH Form 1697, 7/03
NON-TRANSFERABLE 07/02/2003-E87646

Jeb Bush
Governor

John O. Agwunobi, M.D., M.B.A.
Secretary

Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1-Trichloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,1,2,2-Tetrachloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,1,2-Trichloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,1-Dichloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,1-Dichloroethylene	EPA 624	Volatile Organics	NELAP	10/11/2002
1,2,4-Trichlorobenzene	EPA 625	Extractable Organics	NELAP	10/11/2002
1,2-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	10/11/2002
1,2-Dichloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,2-Dichloropropane	EPA 624	Volatile Organics	NELAP	10/11/2002
1,3-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	10/11/2002
1,4-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	10/11/2002
2,4,5-T	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
2,4,6-Trichlorophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2,4-D	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
2,4-DB	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
2,4-Dichlorophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2,4-Dimethylphenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2,4-Dinitrophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Extractable Organics	NELAP	10/11/2002
2,6-Dinitrotoluene (2,6-DNT)	EPA 625	Extractable Organics	NELAP	10/11/2002
2-Chloroethyl vinyl ether	EPA 624	Volatile Organics	NELAP	10/11/2002
2-Chloronaphthalene	EPA 625	Extractable Organics	NELAP	10/11/2002
2-Chlorophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2-Methyl-4,6-dinitrophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
2-Nitrophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
3,3'-Dichlorobenzidine	EPA 625	Extractable Organics	NELAP	10/11/2002
4,4'-DDD	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4,4'-DDE	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4,4'-DDT	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4-Bromophenyl phenyl ether	EPA 625	Extractable Organics	NELAP	10/11/2002
4-Chloro-3-methylphenol	EPA 625	Extractable Organics	NELAP	10/11/2002
4-Chlorophenyl phenylether	EPA 625	Extractable Organics	NELAP	10/11/2002
4-Nitrophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
Acenaphthene	EPA 625	Extractable Organics	NELAP	10/11/2002
Acenaphthylene	EPA 625	Extractable Organics	NELAP	10/11/2002
Acrolein (Propenal)	EPA 624	Volatile Organics	NELAP	10/11/2002

"STATE" indicates certification for the analyte by the method specified. "NELAP" further indicates certification compliant with the NELAC Standards.

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State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Acrylonitrile	EPA 624	Volatile Organics	NELAP	10/11/2002
Aldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Alkalinity as CaCO3	EPA 310.1	General Chemistry	NELAP	10/11/2002
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aluminum	EPA 200.7	Metals	NELAP	10/11/2002
Amenable cyanide	EPA 335.1	General Chemistry	NELAP	10/11/2002
Ammonia as N	EPA 350.2	General Chemistry	NELAP	10/11/2002
Anthracene	EPA 625	Extractable Organics	NELAP	10/11/2002
Antimony	EPA 200.7	Metals	NELAP	10/11/2002
Aroclor-1016 (PCB-1016)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1221 (PCB-1221)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1232 (PCB-1232)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1242 (PCB-1242)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1248 (PCB-1248)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1254 (PCB-1254)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1260 (PCB-1260)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Arsenic	EPA 200.7	Metals	NELAP	10/11/2002
Arsenic	EPA 6010	Metals	NELAP	10/11/2002
Barium	EPA 200.7	Metals	NELAP	10/11/2002
Benzene	EPA 624	Volatile Organics	NELAP	10/11/2002
Benzidine	EPA 625	Extractable Organics	NELAP	10/11/2002
Benzo(a)anthracene	EPA 625	Extractable Organics	NELAP	10/11/2002
Benzo(a)pyrene	EPA 625	Extractable Organics	NELAP	10/11/2002
Benzo(b)fluoranthene	EPA 625	Extractable Organics	NELAP	10/11/2002
Benzo(g,h,i)perylene	EPA 625	Extractable Organics	NELAP	10/11/2002
Benzo(k)fluoranthene	EPA 625	Extractable Organics	NELAP	10/11/2002
Beryllium	EPA 200.7	Metals	NELAP	10/11/2002
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Biochemical oxygen demand	EPA 405.1	General Chemistry	NELAP	10/11/2002
bis(2-Chloroethoxy)methane	EPA 625	Extractable Organics	NELAP	10/11/2002
bis(2-Chloroethyl) ether	EPA 625	Extractable Organics	NELAP	10/11/2002
bis(2-Chloroisopropyl) ether	EPA 625	Extractable Organics	NELAP	10/11/2002
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625	Extractable Organics	NELAP	10/11/2002
Boron	EPA 200.7	Metals	NELAP	10/11/2002
Bromodichloromethane	EPA 624	Volatile Organics	NELAP	10/11/2002
Bromoform	EPA 624	Volatile Organics	NELAP	10/11/2002

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E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Butyl benzyl phthalate	EPA 625	Extractable Organics	NELAP	10/11/2002
Cadmium	EPA 200.7	Metals	NELAP	10/11/2002
Cadmium	EPA 6010	Metals	NELAP	10/11/2002
Calcium	EPA 200.7	Metals	NELAP	10/11/2002
Carbon tetrachloride	EPA 624	Volatile Organics	NELAP	10/11/2002
Ceriodaphnia dubia	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Ceriodaphnia dubia	EPA/600/4-91/ 002 (1002.0)	Whole Effluent Toxicity	NELAP	5/31/2001
Chemical oxygen demand	EPA 410.4	General Chemistry	NELAP	10/11/2002
Chlordane (tech.)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Chloride	EPA 325.2	General Chemistry	NELAP	1/7/2003
Chlorobenzene	EPA 624	Volatile Organics	NELAP	10/11/2002
Chloroethane	EPA 624	Volatile Organics	NELAP	10/11/2002
Chloroform	EPA 624	Volatile Organics	NELAP	10/11/2002
Chromium	EPA 200.7	Metals	NELAP	10/11/2002
Chromium	EPA 6010	Metals	NELAP	10/11/2002
Chrysene	EPA 625	Extractable Organics	NELAP	10/11/2002
cis-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	10/11/2002
Cobalt	EPA 200.7	Metals	NELAP	10/11/2002
Conductivity	EPA 120.1	General Chemistry	NELAP	10/11/2002
Copper	EPA 200.7	Metals	NELAP	10/11/2002
Copper	EPA 6010	Metals	NELAP	10/11/2002
Cyprinella leedsi	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Cyprinodon variegatus	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Dalapon	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Daphnia magna	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
delta-BHC	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Dibenz(a,h) anthracene	EPA 625	Extractable Organics	NELAP	10/11/2002
Dibromochloromethane	EPA 624	Volatile Organics	NELAP	10/11/2002
Dicamba	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Dichloroprop (Dichlorprop)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Dieldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Diethyl phthalate	EPA 625	Extractable Organics	NELAP	10/11/2002
Dimethyl phthalate	EPA 625	Extractable Organics	NELAP	10/11/2002
Di-n-butyl phthalate	EPA 625	Extractable Organics	NELAP	10/11/2002
Di-n-octyl phthalate	EPA 625	Extractable Organics	NELAP	10/11/2002
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002

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State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Endosulfan I	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endosulfan II	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endosulfan sulfate	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endrin aldehyde	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Ethylbenzene	EPA 624	Volatile Organics	NELAP	10/11/2002
Fluoranthene	EPA 625	Extractable Organics	NELAP	10/11/2002
Fluorene	EPA 625	Extractable Organics	NELAP	10/11/2002
Fluoride	EPA 340.2	General Chemistry	NELAP	10/11/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Heptachlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Heptachlor epoxide	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Hexachlorobenzene	EPA 625	Extractable Organics	NELAP	10/11/2002
Hexachlorobutadiene	EPA 625	Extractable Organics	NELAP	10/11/2002
Hexachlorocyclopentadiene	EPA 625	Extractable Organics	NELAP	10/11/2002
Hexachloroethane	EPA 625	Extractable Organics	NELAP	10/11/2002
Indeno(1,2,3-cd)pyrene	EPA 625	Extractable Organics	NELAP	10/11/2002
Iron	EPA 200.7	Metals	NELAP	10/11/2002
Isophorone	EPA 625	Extractable Organics	NELAP	10/11/2002
Kjeldahl nitrogen - total	EPA 351.2	General Chemistry	NELAP	10/11/2002
Lead	EPA 200.7	Metals	NELAP	10/11/2002
Lead	EPA 6010	Metals	NELAP	10/11/2002
Magnesium	EPA 200.7	Metals	NELAP	10/11/2002
Manganese	EPA 200.7	Metals	NELAP	10/11/2002
MCPA	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
MCPP	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Menidia beryllina	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Mercury	EPA 245.1	Metals	NELAP	10/11/2002
Mercury	EPA 7470	Metals	NELAP	10/11/2002
Mercury	EPA 7471	Metals	NELAP	10/11/2002
Methoxychlor	EPA 608.2	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Methyl bromide (Bromomethane)	EPA 624	Volatile Organics	NELAP	10/11/2002
Methyl chloride (Chloromethane)	EPA 624	Volatile Organics	NELAP	10/11/2002
Methylene chloride	EPA 624	Volatile Organics	NELAP	10/11/2002
Mysidopsis bahia	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Naphthalene	EPA 625	Extractable Organics	NELAP	10/11/2002

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State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Nickel	EPA 200.7	Metals	NELAP	10/11/2002
Nickel	EPA 6010	Metals	NELAP	10/11/2002
Nitrobenzene	EPA 625	Extractable Organics	NELAP	10/11/2002
n-Nitrosodimethylamine	EPA 625	Extractable Organics	NELAP	10/11/2002
n-Nitrosodi-n-propylamine	EPA 625	Extractable Organics	NELAP	10/11/2002
n-Nitrosodiphenylamine	EPA 625	Extractable Organics	NELAP	10/11/2002
Oil & Grease	EPA 1664	General Chemistry	NELAP	10/11/2002
Pentachlorophenol	EPA 625	Extractable Organics	NELAP	10/11/2002
pH	EPA 150.1	General Chemistry	NELAP	10/11/2002
Phenanthrene	EPA 625	Extractable Organics	NELAP	10/11/2002
Phenol	EPA 625	Extractable Organics	NELAP	10/11/2002
Phosphorus, total	EPA 365.2	General Chemistry	NELAP	10/11/2002
Pimephales promelas	EPA/600/4-90/ 027F SEC. 9	Whole Effluent Toxicity	NELAP	5/31/2001
Pimephales promelas	EPA/600/4-91/ 002 (1000.0)	Whole Effluent Toxicity	NELAP	5/31/2001
Potassium	EPA 200.7	Metals	NELAP	10/11/2002
Pyrene	EPA 625	Extractable Organics	NELAP	10/11/2002
Residue-filterable (TDS)	EPA 160.1	General Chemistry	NELAP	10/11/2002
Residue-nonfilterable (TSS)	EPA 160.2	General Chemistry	NELAP	10/11/2002
Residue-total	EPA 160.3	General Chemistry	NELAP	10/11/2002
Selenium	EPA 200.7	Metals	NELAP	10/11/2002
Selenium	EPA 6010	Metals	NELAP	10/11/2002
Silver	EPA 200.7	Metals	NELAP	10/11/2002
Silvex (2,4,5-TP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Sodium	EPA 200.7	Metals	NELAP	10/11/2002
Sulfate	EPA 375.4	General Chemistry	NELAP	10/11/2002
Sulfide	EPA 376.1	General Chemistry	NELAP	10/11/2002
Surfactants - MBAS	EPA 425.1	General Chemistry	NELAP	10/11/2002
Tetrachloroethylene (Perchloroethylene)	EPA 624	Volatile Organics	NELAP	10/11/2002
Thallium	EPA 200.7	Metals	NELAP	10/11/2002
Tin	EPA 200.7	Metals	NELAP	10/11/2002
Toluene	EPA 624	Volatile Organics	NELAP	10/11/2002
Total cyanide	EPA 335.3	General Chemistry	NELAP	10/11/2002
Total hardness as CaCO3	EPA 200.7	Metals	NELAP	10/11/2002
Total nitrate-nitrite	EPA 353.2	General Chemistry	NELAP	10/11/2002
Total organic carbon	EPA 415.1	General Chemistry	NELAP	10/11/2002
Total Petroleum Hydrocarbons (TPH)	EPA 1664	General Chemistry	NELAP	1/7/2003

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E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Total phenolics	EPA 420.2	General Chemistry	NELAP	1/7/2003
Toxaphene (Chlorinated camphene)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
trans-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	10/11/2002
trans-1,3-Dichloropropylene	EPA 624	Volatile Organics	NELAP	10/11/2002
Trichloroethene (Trichloroethylene)	EPA 624	Volatile Organics	NELAP	10/11/2002
Trichlorofluoromethane	EPA 624	Volatile Organics	NELAP	10/11/2002
Vanadium	EPA 200.7	Metals	NELAP	10/11/2002
Vinyl chloride	EPA 624	Volatile Organics	NELAP	10/11/2002
Xylene (total)	EPA 624	Volatile Organics	NELAP	10/11/2002
Zinc	EPA 200.7	Metals	NELAP	10/11/2002
Zinc	EPA 6010	Metals	NELAP	10/11/2002

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State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2,4,5-Tetrachlorobenzene	EPA 8270	Extractable Organics	NELAP	10/11/2002
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	1/7/2003
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/11/2002
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,2-Diphenylhydrazine	EPA 8270	Extractable Organics	NELAP	1/7/2003
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270	Extractable Organics	NELAP	1/7/2003
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,3-Dinitrobenzene (1,3-DNB)	EPA 8270	Extractable Organics	NELAP	1/7/2003
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260	Volatile Organics	NELAP	10/11/2002
1,4-Naphthoquinone	EPA 8270	Extractable Organics	NELAP	10/11/2002
1,4-Phenylenediamine	EPA 8270	Extractable Organics	NELAP	1/7/2003
1-Naphthylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	10/11/2002
2,3,4,6-Tetrachlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,6-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Acetylaminofluorene	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	10/11/2002
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	10/11/2002
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	10/11/2002
2-Hexanone	EPA 8260	Volatile Organics	NELAP	10/11/2002
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Naphthylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Nitroaniline	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
2-Picoline (2-Methylpyridine)	EPA 8270	Extractable Organics	NELAP	10/11/2002
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
3,3'-Dimethylbenzidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
3-Methylcholanthrene	EPA 8270	Extractable Organics	NELAP	10/11/2002
3-Nitroaniline	EPA 8270	Extractable Organics	NELAP	10/11/2002
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
4-Aminobiphenyl	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Chlorophenol	EPA 8270	Extractable Organics	NELAP	1/7/2003
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	10/11/2002
4-Dimethyl aminoazobenzene	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	10/11/2002
4-Methylphenol (p-Cresol)	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Nitroaniline	EPA 8270	Extractable Organics	NELAP	10/11/2002
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
5-Nitro-o-toluidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
7,12-Dimethylbenz(a) anthracene	EPA 8270	Extractable Organics	NELAP	10/11/2002
a-a-Dimethylphenethylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002

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Acenaphthene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Acetone	EPA 8260	Volatile Organics	NELAP	10/11/2002
Acetonitrile	EPA 8260	Volatile Organics	NELAP	10/11/2002
Acetophenone	EPA 8270	Extractable Organics	NELAP	10/11/2002
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	10/11/2002
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Allyl chloride (3-Chloropropene)	EPA 8260	Volatile Organics	NELAP	10/11/2002
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aluminum	EPA 6010	Metals	NELAP	10/11/2002
Aniline	EPA 8270	Extractable Organics	NELAP	10/11/2002
Anthracene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Antimony	EPA 6010	Metals	NELAP	10/11/2002
Aramite	EPA 8270	Extractable Organics	NELAP	10/11/2002
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Arsenic	EPA 6010	Metals	NELAP	10/11/2002
Barium	EPA 6010	Metals	NELAP	10/11/2002
Benzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Benzidine	EPA 8270	Extractable Organics	NELAP	1/7/2003
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzoic acid	EPA 8270	Extractable Organics	NELAP	10/11/2002
Benzyl alcohol	EPA 8270	Extractable Organics	NELAP	10/11/2002
Beryllium	EPA 6010	Metals	NELAP	10/11/2002
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	10/11/2002
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	10/11/2002
bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	10/11/2002
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	10/11/2002
Bromobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Bromoform	EPA 8260	Volatile Organics	NELAP	10/11/2002
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Cadmium	EPA 6010	Metals	NELAP	10/11/2002
Calcium	EPA 6010	Metals	NELAP	10/11/2002
Carbazole	EPA 8270	Extractable Organics	NELAP	10/11/2002
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	10/11/2002
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	10/11/2002
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Chlorobenzilate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Chloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Chloroform	EPA 8260	Volatile Organics	NELAP	10/11/2002
Chloroprene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Chromium	EPA 6010	Metals	NELAP	10/11/2002
Chromium VI	EPA 7196	Metals,General Chemistry	NELAP	10/11/2002
Chrysene	EPA 8270	Extractable Organics	NELAP	10/11/2002
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	10/11/2002
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Cobalt	EPA 6010	Metals	NELAP	10/11/2002
Copper	EPA 6010	Metals	NELAP	10/11/2002
Corrosivity (pH)	EPA 9040	General Chemistry	NELAP	10/11/2002
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Diallate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Dibenz(a,h) anthracene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Dibromomethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	1/7/2003
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Dimethoate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270	Extractable Organics	NELAP	10/11/2002
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Ethyl methacrylate	EPA 8260	Volatile Organics	NELAP	10/11/2002
Ethyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Famphur	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Fluoranthene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Fluorene	EPA 8270	Extractable Organics	NELAP	10/11/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Gasoline range organics (GRO)	EPA 8015	Extractable Organics	NELAP	1/7/2003
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Hexachlorobenzene	EPA 8270	Extractable Organics,Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics,Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	10/11/2002
Hexachlorophene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Hexachloropropene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Ignitability	EPA 1010	General Chemistry	NELAP	10/11/2002
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	10/11/2002

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Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Iron	EPA 6010	Metals	NELAP	10/11/2002
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Isodrin	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Isophorone	EPA 8270	Extractable Organics	NELAP	10/11/2002
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Isosafrole	EPA 8270	Extractable Organics	NELAP	10/11/2002
Kepone	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Lead	EPA 6010	Metals	NELAP	10/11/2002
Magnesium	EPA 6010	Metals	NELAP	10/11/2002
Manganese	EPA 6010	Metals	NELAP	10/11/2002
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Mercury	EPA 7470	Metals	NELAP	10/11/2002
Mercury	EPA 7471	Metals	NELAP	10/11/2002
Methacrylonitrile	EPA 8260	Volatile Organics	NELAP	1/7/2003
Methapyrilene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Methyl methacrylate	EPA 8260	Volatile Organics	NELAP	10/11/2002
Methyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	10/11/2002
Methyl parathion (Parathion, methyl)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Methylene chloride	EPA 8260	Volatile Organics	NELAP	10/11/2002
Molybdenum	EPA 6010	Metals	NELAP	10/11/2002
Naphthalene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Naphthalene	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Nickel	EPA 6010	Metals	NELAP	10/11/2002
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Nitroquinoline-1-oxide	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosodiethylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitroso-di-n-butylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
n-Nitrosomethylethylamine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosomorpholine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosopiperidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Nitrosopyrrolidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
o,o,o-Triethyl phosphorothioate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
o-Toluidine	EPA 8270	Extractable Organics	NELAP	10/11/2002
Paint Filter Liquids Test	EPA 9095	General Chemistry	NELAP	10/11/2002
Parathion, ethyl	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Pentachlorobenzene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Pentachloroethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Pentachloronitrobenzene	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
Phenacetin	EPA 8270	Extractable Organics	NELAP	10/11/2002
Phenanthrene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Phenol	EPA 8270	Extractable Organics	NELAP	10/11/2002
Phorate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Potassium	EPA 6010	Metals	NELAP	10/11/2002
Pronamide (Kerb)	EPA 8270	Extractable Organics	NELAP	10/11/2002
Propionitrile (Ethyl cyanide)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Pyrene	EPA 8270	Extractable Organics	NELAP	10/11/2002
Pyridine	EPA 8270	Extractable Organics	NELAP	10/11/2002
Reactive sulfide	EPA 7.3.4.2	General Chemistry	NELAP	10/11/2002
Safrole	EPA 8270	Extractable Organics	NELAP	10/11/2002
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Selenium	EPA 6010	Metals	NELAP	10/11/2002
Silver	EPA 6010	Metals	NELAP	10/11/2002
Sodium	EPA 6010	Metals	NELAP	10/11/2002
Styrene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Sulfate	EPA 9038	General Chemistry	NELAP	10/11/2002
Sulfotepp	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Synthetic Precipitation Leaching Procedure	EPA 1312	General Chemistry	NELAP	10/11/2002
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Thallium	EPA 6010	Metals	NELAP	10/11/2002

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Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87646 **EPA Lab Code: TN00004** **(615) 345-1119**

E87646
ELAB of Tennessee, LLC
227 French Landing Drive
Nashville, TN 37228

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Thionazin (Zinophos)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	1/7/2003
Tin	EPA 6010	Metals	NELAP	10/11/2002
Toluene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Total cyanide	EPA 9012	General Chemistry	NELAP	10/11/2002
Total Petroleum Hydrocarbons (TPH)	FL-PRO	Extractable Organics	NELAP	1/7/2003
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	10/11/2002
Toxicity Characteristic Leaching Procedure	EPA 1311	General Chemistry	NELAP	10/11/2002
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	10/11/2002
trans-1,3-Dichloropropylene	EPA 8260	Volatile Organics	NELAP	10/11/2002
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	10/11/2002
Vanadium	EPA 6010	Metals	NELAP	10/11/2002
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	10/11/2002
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	10/11/2002
Xylene (total)	EPA 8260	Volatile Organics	NELAP	10/11/2002
Zinc	EPA 6010	Metals	NELAP	10/11/2002

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