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REPLY TO  
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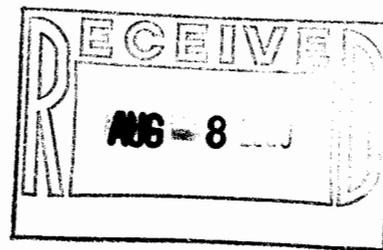
July 19, 1999

National Range Directorate of Environment and Safety

Ms. Julie Jacobs  
Groundwater Bureau  
New Mexico Environment Department  
2044 Galisteo  
P.O. Box 26110  
Santa Fe, New Mexico 87502

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GROUND WATER BUREAU



Dear Ms. Jacobs:

This letter is to provide your office with the final Soil and Preliminary Groundwater Investigation at Malpais Site (encl 1). The erosion potential assessment that you requested is included in this report at Section 4.1.5, page 10.

To define the extent of contamination, a soil and preliminary hydrogeologic investigation using a drill rig was completed. The depth to groundwater at the site is approximately 26-29 feet below ground surface and the approximate groundwater flow direction is south-southeast. Ten soil borings were completed within and surrounding the diesel contaminated area. Additionally, an upgradient groundwater monitoring well was completed to evaluate the groundwater quality at the site. Analytical results indicated diesel contamination in the groundwater located immediately beneath the former aboveground storage tank (AST) location at a concentration of 0.7 parts per million. However, the horizontal and vertical extent of contamination in the vadose zone was high (13,000 to 17,000 mg/kg). Groundwater at the site was determined to have a total dissolved solids concentration of approximately 16,000 mg/l.

Based on the results of the soil investigation provided in this report, we believe that removal of the source area is the most feasible and rational remediation alternative, and this is the course of action we propose to execute. The vadose zone will be abated such that the contaminants in the vadose zone will not infiltrate groundwater or surface water. White Sands proposes removal of all soil with a total petroleum hydrocarbon concentration above 1,000 mg/kg. Removal of the source area will meet the abatement requirements set forth in 20 New Mexico Administrative Code, Chapter 6, Part 2, Section 4103 A & B. Upon approval of this proposed remedial action by the New Mexico Environment Department, a Corrective Action Plan and proposed work schedule will be developed and submitted to the Groundwater Bureau.

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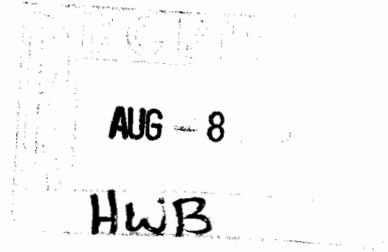


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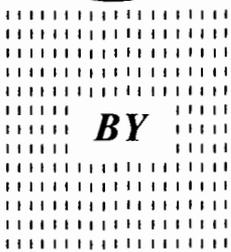
**GROUND WATER BUREAU**



# **SOIL AND PRELIMINARY GROUNDWATER INVESTIGATION AT MALPAIS SITE**



**FOR**



**BY**

**July 1999**



**White Sands Missile Range, New Mexico  
National Range  
Directorate of Environment and Safety  
White Sands Missile Range, New Mexico 88002**



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13. ABSTRACT (MAXIMUM 200 WORDS) A leaking aboveground storage tank was identified at Malpais Site during a field survey. Following removal of the tank, an initial hand auger boring investigation completed at the site identified two distinct plumes of diesel contaminated soil. This report summarizes the initial hand auger investigation and the ensuing hollow-stem auger drilling investigation to further evaluate the horizontal and vertical extent of contamination. Additionally, this report summarizes the results of a preliminary hydrogeologic investigation performed at the site to evaluate the hydrogeologic characteristics beneath and surrounding the release site.			
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**SOIL AND PRELIMINARY GROUNDWATER INVESTIGATION  
AT MALPAIS SITE, WHITE SANDS MISSILE RANGE, NM**

**Submitted to:**

**U.S. Army  
White Sands Missile Range  
National Range  
Directorate of Environment and Safety  
White Sands Missile Range, New Mexico 88002-5048**

**JULY 1999**

**Submitted by:**

**MEVATEC Corporation  
Building 126  
White Sands Missile Range, New Mexico 88002**

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## LIST OF ACRONYMS

AST	Aboveground Storage Tank
ASTM	American Society of Testing Materials
ATV	all terrain vehicle
bgs	below ground surface
cm	centimeter
cu m	cubic meter
cu yd	cubic yard
°C	degrees Celsius
°F	degrees Fahrenheit
DRO	Diesel Range Organics
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ft	foot, feet
gal	gallon
in	inch
km	kilometer
L	liter
m	meter
mi	mile
µg/L	micrograms per liter
µMHOs/cm	micromhos per centimeter
mg/L	milligrams per liter
MW	monitoring well
nd	no detection
NM	New Mexico
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NR-MT-AA	National Range Materiel Test Directorate – Applied Environments Test Branch – Chemistry Laboratory
PID	photo-ionization detector
PPE	personal protective equipment
ppm	parts per million
PVC	Poly-vinyl chloride
RCRA	Resource Recovery and Conservation Act
REC	Record of Environmental Consideration
RPPBA	Real Property Planning Board Action
SB	soil boring
SVOC	semi-volatile organic compound
TDS	Total Dissolved Solids
UXO	unexploded ordnance
VOC	volatile organic compound
White Sands	White Sands Missile Range
yd	yards

## **EXECUTIVE SUMMARY**

During a Range-wide aboveground storage tank (AST) survey, a leaking AST was discovered at Malpais Site, located approximately 20 miles (32 kilometers) northwest of Tularosa, NM on White Sands Missile Range (White Sands). Upon discovery of the leaking AST, the New Mexico Environment Department was notified on 5 February 1999 of the discharge. Copies of correspondence documentation between White Sands and the New Mexico Environment Department are in Appendix A. The remaining diesel fuel in the tank and the tank itself were immediately removed. A preliminary subsurface soil investigation was conducted, which consisted of advancing several hand auger borings into the subsurface and collecting depth specific soil samples for chemical analysis. Analytical results indicated significant concentrations of diesel in the subsurface at two locations: beneath the tank and beneath the north end of the product lines.

To further define the extent of contamination, a soil and preliminary hydrogeologic investigation using a drill rig was completed. Due to limited groundwater data for this particular region of the Tularosa Basin, four piezometers were completed to determine the depth to groundwater and the approximate groundwater flow direction at the site. The depth to groundwater at the site is approximate 26.5-29.0 feet (8.0-8.8 meters) below ground surface and the approximate groundwater flow direction is south-southeast. Once the potentiometric surface was identified, ten soil borings were completed within and surrounding the diesel contaminated area. Additionally, an upgradient groundwater monitoring well was completed to evaluate the groundwater quality at the site.

Analytical results indicated diesel contamination in the groundwater located immediately beneath the former AST location at a concentration of 0.7 parts per million (equivalent to 0.7 milligrams per liter). The horizontal and vertical extent of contamination in the vadose zone was identified. However, a significant quantity of diesel fuel, with concentrations as high as 13,000 to 17,000 milligrams per kilogram, remains in the vadose zone. Groundwater at the site was determined to have a total dissolved solids concentration of approximately 16,000 milligrams per liter.

Based on the results of the soil investigation provided in this report, removal of the source area is the most feasible and rational alternative. The vadose zone will be abated such that the contaminants in the vadose zone will not infiltrate groundwater or surface water. White Sands proposes removal of all soil with a total petroleum hydrocarbon concentration above 1,000 milligrams per kilogram. Following this remedial action, the remaining contaminants at the site will not be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property. Removal of the source area will meet the abatement requirements set forth in 20 New Mexico Administrative Code, Chapter 6, Part 2, Section 4103 A & B. Upon approval of this proposed remedial action by New Mexico Environment Department, a Corrective Action Plan and proposed work schedule will be developed and submitted to the Chief of the Groundwater Protection and Remediation Bureau.

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## **SOIL AND PRELIMINARY GROUNDWATER INVESTIGATION AT MALPAIS SITE, WHITE SANDS MISSILE RANGE, NM**

### **1.0 INTRODUCTION**

During a Range-wide aboveground storage tank (AST) survey of White Sands Missile Range (White Sands), a leaking AST was identified at Malpais Site. The tank was approximately 2,000-gallons (gal) [7,600-liters (L)] in capacity, however, 450-gal (1,700-L) remained in the AST at the time of discovery. Additionally, a surface stain located beneath the tank indicated that product leaked onto the ground surface for an unknown length of time. Upon discovery of the leaking AST, the Chief of the Groundwater Protection and Remediation Bureau was verbally notified on 5 February 1999 of the discharge, as required by 20 New Mexico Administrative Code (NMAC), Chapter 6, Part 2, Section 1203. Copies of correspondence documentation between White Sands and the New Mexico Environment Department (NMED) are in Appendix A.

An initial hand auger investigation performed at the site identified two areas of significant diesel contamination in the soil 1) beneath the former tank location and 2) beneath the north end of the associated product lines, where a generator was likely located. The purpose of this investigation was to further evaluate the horizontal and vertical extent of diesel fuel contamination using a hollow-stem auger drill rig. Additionally, it was the intent of this investigation to evaluate the hydrogeologic characteristics beneath and surrounding the release site.

### **2.0 BACKGROUND**

#### **2.1 Site Description**

Malpais Site is located approximately 40 miles (mi) [64 kilometers (km)] northwest of Alamogordo, NM, adjacent to the southern edge of a large lava flow that traverses the Tularosa Basin (Figure 2-1). The tank, which was abandoned in excess of 10 years, was located at a remote site approximately 3-mi (4.8-km) north of Range Road 9. The Universal Transverse Mercator for this location is 3683221 Northing and 382760 Easting. Photographs of the tank and site are found in Appendix B.

#### **2.2 Remedial Actions to Date**

On 3 February 1999, the remaining contents of the tank were pumped-out, and the tank and concrete pedestals were removed. Approximately 1 cubic yard (cu yd) [0.76 cubic meter (cu m)] of contaminated surface soil was removed and disposed of at the White Sands Main Post Landfill. The ground surface was covered with surrounding soil until further investigation was completed. The product lines, which likely supplied a field generator, were removed on 18 February 1999. Photographs of the tank removal are in Appendix B.

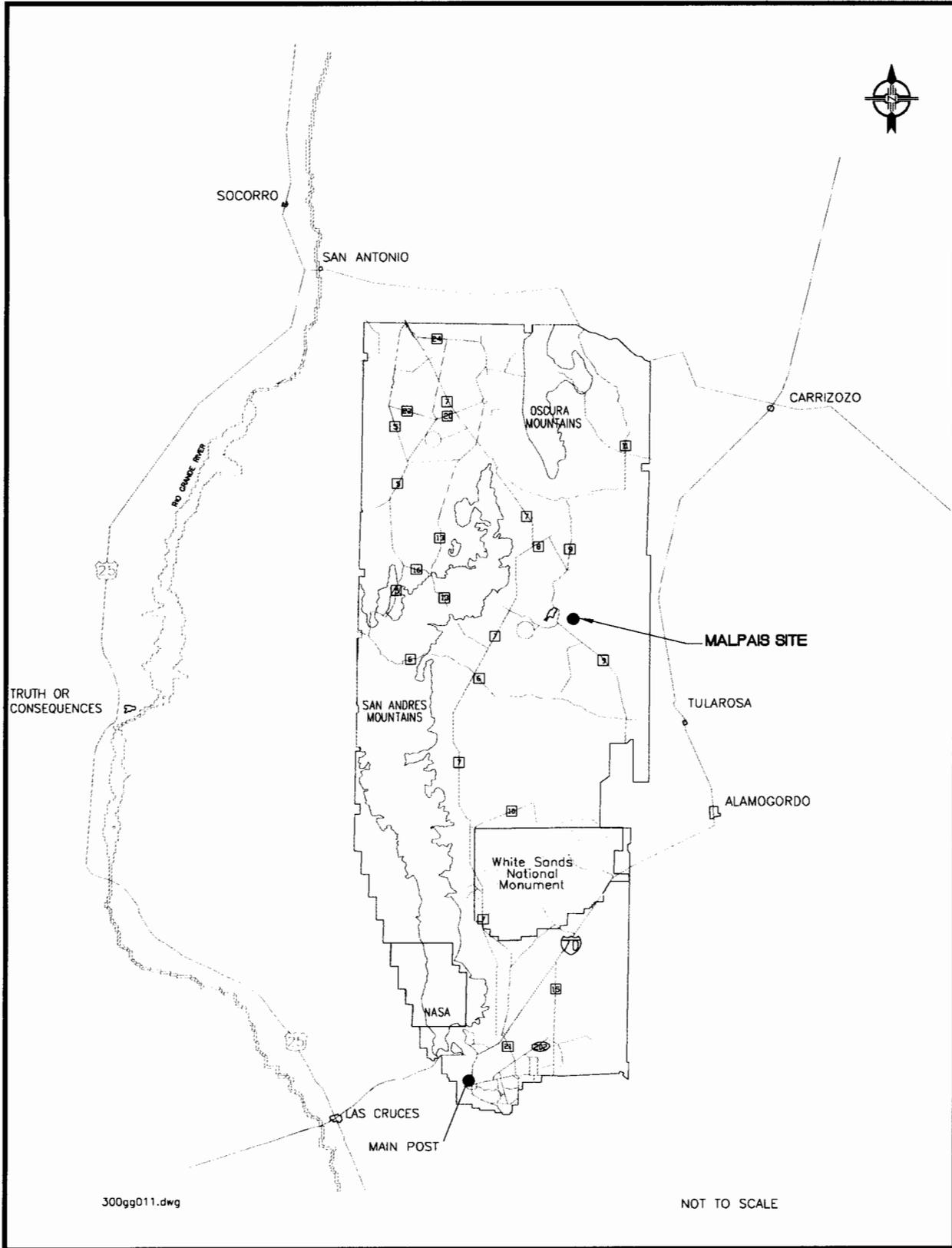


Figure 2-1. White Sands Missile Range.

## **2.3 Discussion of Regional Geologic and Hydrogeologic Setting**

### **2.3.1 Regional Geology**

White Sands Missile Range lies within the Mexican Highland Section of the Basin and Range Province, and is characterized by a series of tilted fault blocks forming longitudinal, asymmetric ridges or mountains and broad intervening basins. Figure 2-2 presents a generalized east-west cross section of the Tularosa Basin.

The major portion of White Sands lies within the Tularosa Basin, which is bounded on the west by the Organ, San Agustin, and San Andres Mountains. The eastern limit of the Tularosa Basin lies outside of the range, and is formed from north to south by the Jicarilla, Sierra Blanca, and Sacramento Mountains. The Tularosa Basin contains thick sequences of Tertiary and Quaternary age alluvial and bolson fill deposits. These sediments, more than 5,000-ft (1,524 m) thick in some areas, consist mainly of silt, sand, gypsum and clay weathered from the surrounding mountain ranges. The average elevation of the basin floor is 4,000-ft (1,219-m) above mean sea level and surface features consist of flat sandy areas, sand dunes, basalt flows, and playas (dry lake beds). Average elevations of regional mountains range from 5,700-ft (1,737.36-m) at St. Agustin Pass to more than 9,000-ft (2,743.2-m) at Salinas Peak, the tallest peak at White Sands.

The nature of the bolson-fill deposits varies both laterally and vertically throughout the Main Post Area. Coarse-grained, poorly sorted sediments deposited near mountain fronts grade into fine-grained, well-sorted sediments towards the center of the basin (Kelly, 1973). Sediments further from the mountain fronts also contain a greater percentage of clay and gypsum.

### **2.2.2 Regional Hydrogeology**

Very little water exists at White Sands due to the low annual precipitation, high evaporation rate, and high infiltration characteristics of the soils. Playas within the basin may contain standing water during the summer season when thunderstorm activity is most common. Streams that drain the surrounding mountains usually contain water only following a heavy precipitation event. The Tularosa Basin is a closed basin with no surface water drainage outside of White Sands. Much of White Sands drains toward Lake Lucero, a large playa in the center of the basin.

The majority of the groundwater recharge to the bolson aquifer occurs through the coarse, unconsolidated alluvial fan deposits along the eastern flank of the Organ and San Andres Mountains. Groundwater, which travels east through fractured bedrock and alluvium, becomes progressively more mineralized downgradient toward the interior of the basin. This is attributed to the slow migration rate of groundwater, and the presence of readily soluble minerals in the bolson sediments.

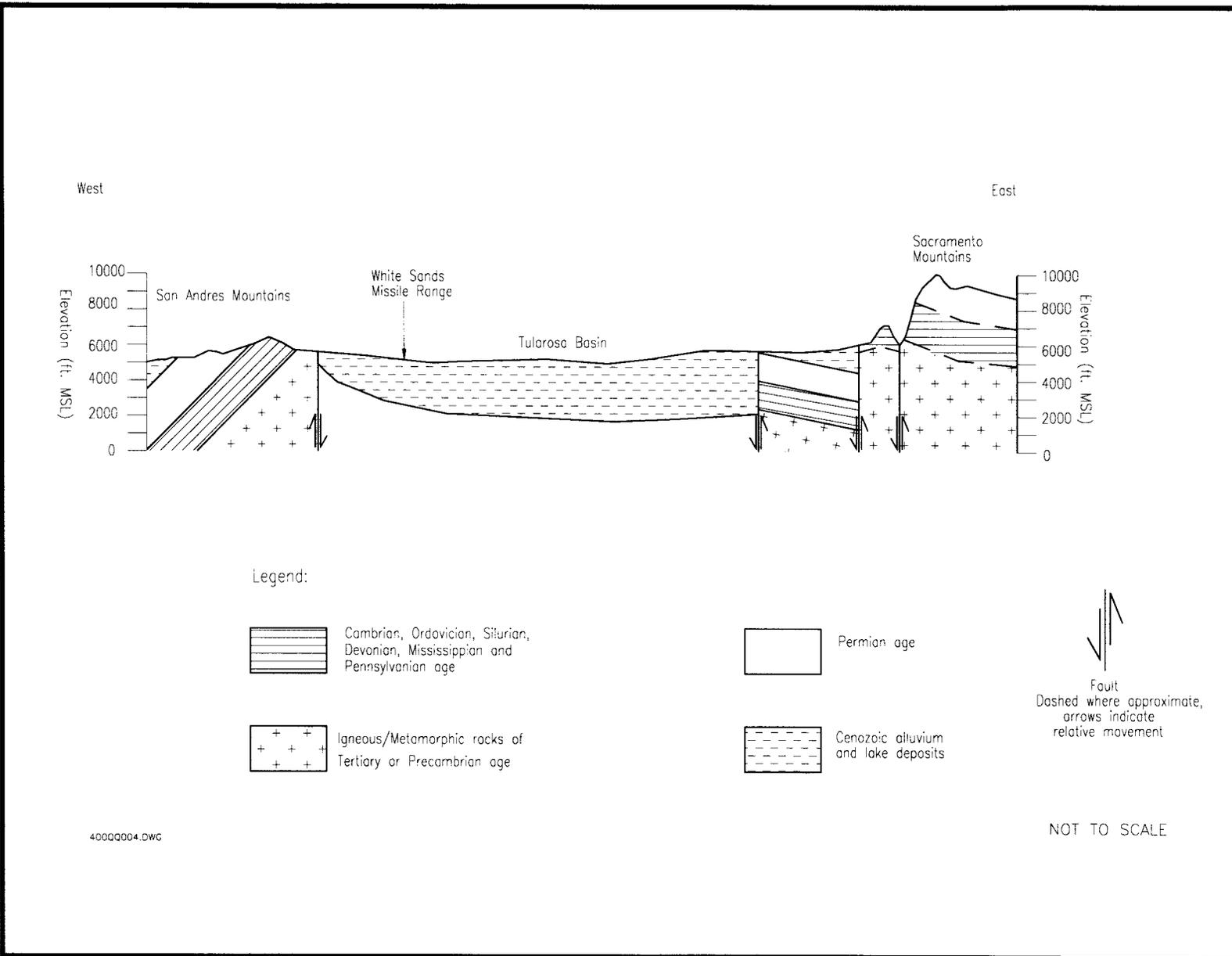


Figure 2-2. Generalized East-West Cross Section of the Southern Port of the Tularosa Basin, North of Highway 70.

Groundwater within the center basin is characterized by total dissolved solids (TDS) content of generally more than 10,000 milligrams per liter (mg/L), and is representative of a groundwater located within a closed, arid basin. As such, there are no drinking water or agricultural supply wells located within approximately 14-mi (22.5-km) of Malpais Site in all directions. However, due to a lack of previous study, the hydrogeology at Malpais Site was unknown. Therefore, as part of this project, additional groundwater information was collected to aid in the identification of the local hydrogeology.

### 3.0 INITIAL INVESTIGATION

Following removal of the tank on 3 February 1999, a series of preliminary hand auger investigations were conducted to determine the extent of contamination and to collect confirmatory soil samples beneath the removed product lines. Hand auger borings were completed and depth specific soil samples were collected for chemical analysis at the following locations:

- Beneath the former tank location.
- Beneath the product lines following removal.
- Beneath the north end of the product lines where a generator was likely located.

The first hand auger investigation consisted of the completion of one hand auger boring in the center of the former location of the surface stain and additional borings in the four cardinal directions to determine the horizontal extent of contamination (Figure 3-1). A total of seven hand auger borings were completed during the first hand auger investigation. The borings were identified as: *center*, *north*, *south*, *east*, *east-1*, *east-2*, & *west*. After soil staining and odor were evident in hand auger boring *east*, hand auger borings *east-1* and *east-2* were completed further in the east direction. Each hand auger boring was either completed to a depth beneath identifiable contamination, completed at auger refusal, or stopped when contamination was identified and another boring was started further away from the stained area (in the case of hand auger borings *east-1* and *east-2*). The soil cuttings were screened using a field photo-ionization detector (PID). All hand auger borings were backfilled with hydrated bentonite chips to prevent migration of the diesel fuel to groundwater.

Soil samples were collected at approximate 5-ft (1.5-m) intervals within each boring for chemical analysis. Sample collection equipment was decontaminated prior to each sample collection. Each soil sample was obtained from the bottom of the auger bucket, after approximately ½-1 inch (in) [1.3-2.5 centimeters (cm)] of soil was removed. All samples were packed in pre-cleaned 4 ounce jars, labeled, and placed in a cooler on ice to ensure that the samples remain below 39.2 degrees Fahrenheit (° F) [4 degrees Celsius (° C)]. Appropriate chain of custody procedures followed. The samples were submitted to the White Sands National Range - Materiel Test Directorate - Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory for hydrocarbon analysis by Environmental Protection Agency (EPA) Method 8015, Modified for diesel range organics (DRO). A copy of the analytical results is in Appendix C. Table 3-1 presents the analytical results for all diesel range hydrocarbon concentrations reported above laboratory detection limits.

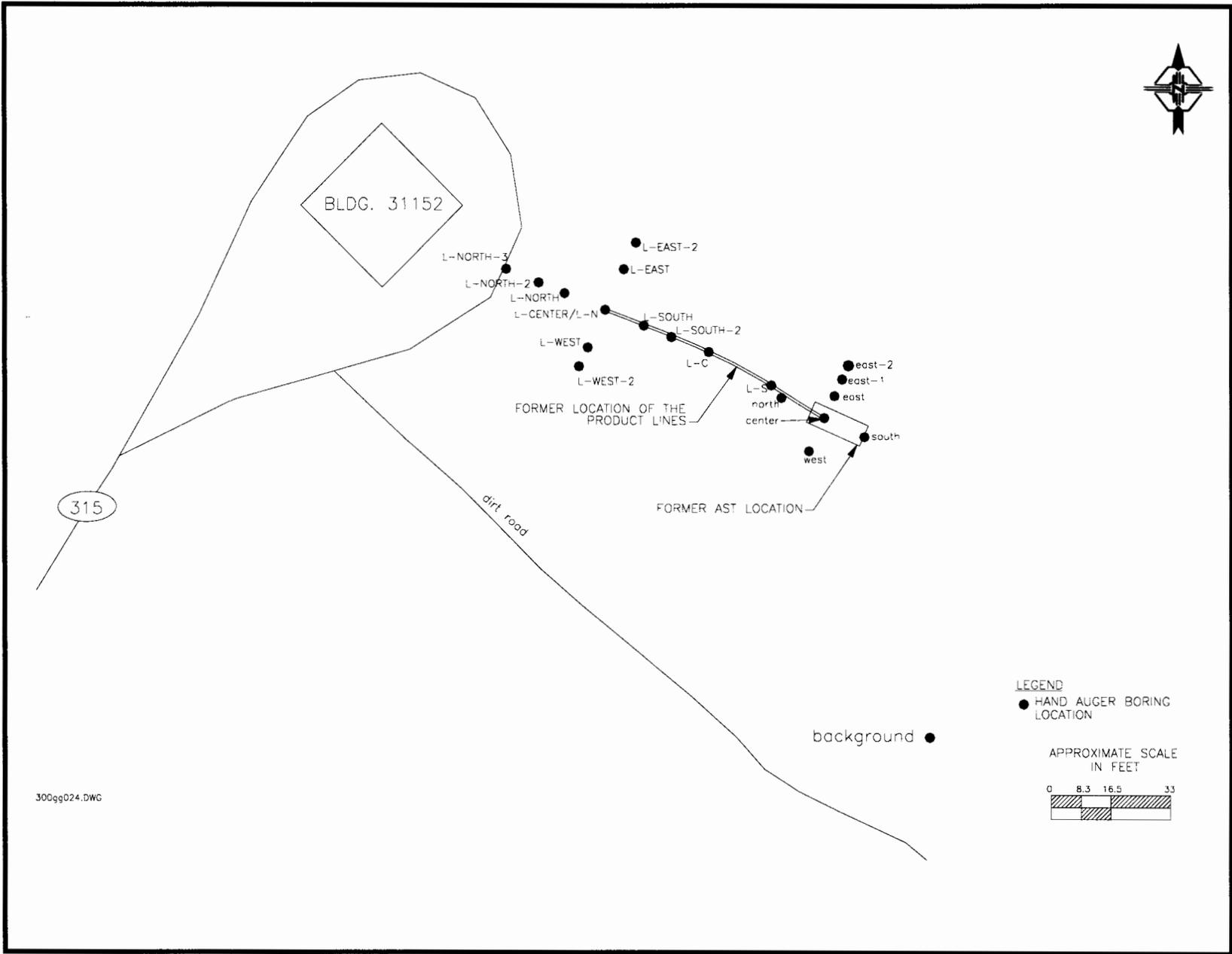


Figure 3-1. Location of Hand Auger Borings.

Table 3-1. Diesel Range Hydrocarbons Detected below the Former Tank

Sample Identification	White Sands NR-MT-AA Chemistry Laboratory	
	Analytical Results (ppm)	Detection Limit (ppm)
<b>Center Borehole</b>		
Center, depth 2.0'-2.5'	1,030	5
Center, depth 4.5'-5.0'	6,860	5
Center, depth 9.0'-9.5'	6,250	5
Center, depth 10.5'-11.0'	3,820	5
Center, depth 14.5'-15.0'	10,000	5
Center, depth 20.0'-20.5'	29	5
Center, depth 24.5'-25.0'	435	5
<b>West Borehole</b>		
West, depth 6"-12"	8	5
<b>East Boreholes (East, East-1, &amp; East-2)</b>		
East, depth 6"-12"	840	5
East-1, depth 3.0'-3.5'	22	5
East-2, depth 9.5'-10.0'	23	5
East-2, depth 14.5'-15.0'	25	5
<b>South Borehole</b>		
South, depth 6"-12"	7	5
South, depth 9.5'-10.0'	12	5
South, depth 20.5'-21.0'	9	5
<b>North Borehole</b>		
North, depth 6"-12"	26	5
North, depth 4.5'-5.0'	7	5
North, depth 8.0'-8.5'	6	5

Following removal of the product lines on 18 February 1999, three confirmatory soil samples were collected from beneath the product lines. The hand auger borings were identified as: *L-S* (*line-south*), *L-C* (*line-center*), & *L-N* (*line-north*). Figure 3-1 shows the location of each boring. The samples were collected approximately 2.0-ft (0.6-m) beneath the product lines. The soil samples were sent to the NR-MT-AA laboratory and analyzed for diesel by EPA Method 8015, Modified DRO. A copy of the analytical results is in Appendix C. Table 3-2 presents the analytical results for each sample collected from beneath the product lines.

Table 3-2. Analytical Results of Soil Samples Collected below the Product Lines

Sample Identification	White Sands NR-MT-AA Chemistry Laboratory	
	Analytical Results (ppm)	Detection Limit (ppm)
L-S, depth 3.5'-4.0'	ND <sup>1</sup>	5
L-C, depth 3.5'-4.0'	8	5
L-N, depth 3.5'-4.0'	5,600	5

Note: 1: ND – no detection

Soil sample *L-N*, depth 3.5'-4.0' was collected at the north end of the product lines, where the field generator was likely connected. To further delineate this diesel contamination, an additional hand auger boring investigation was conducted during 11-12 March 1999, using the same procedures as described for the first investigation. A total of ten hand auger borings were completed during this second investigation. The hand auger borings were identified as: *L-center*, *L-north*, *L-north-2*, *L-north-3*, *L-east*, *L-east-2*, *L-south*, *L-south-2*, *L-west*, & *L-west-2*. Figure 3-1 shows the location of each boring. Soil samples were collected at approximate 5-ft (1.5-m) intervals within each boring and submitted to the NR-MT-AA Chemistry Laboratory for hydrocarbon analysis by EPA Method 8015, Modified DRO. A copy of the analytical results is in Appendix C. Table 3-3 presents the analytical results for all diesel range hydrocarbon concentrations reported above laboratory detection limits.

**Table 3-3. Diesel Range Hydrocarbons Detected below the North End of the Product Lines**

Sample Identification	White Sands NR-MT-AA Chemistry Laboratory	
	Analytical Results (ppm)	Detection Limit (ppm)
<b>East Boreholes (L-east &amp; L-east-2)</b>		
L-east, depth 9.5'-10.0'	7	5
L-east-2, depth 4.5'-5.0'	10	5
L-east-2, depth 9.5'-10.0'	7	5
L-east-2, depth 14.5'-15.0'	6	5
L-east-2, depth 19.5'-20.0'	5	5
<b>West Boreholes (L-west &amp; L-west-2)</b>		
L-west, depth 6"-12"	6	5
L-west, depth 4.5'-5.0'	5	5
L-west, depth 9.5'-10.0'	279	5
L-west-2, depth 6"-12"	5	5
L-west-2, depth 4.5'-5.0'	5	5
L-west-2, depth 9.5'-10.0'	5	5
<b>Center Borehole</b>		
L-center, depth 9.5'-10.0'	352	5
L-center, depth 14.5'-15.0'	6,360	5
L-center, depth 19.5'-20.0'	6	5
L-center, depth 23.0'-23.5'	5	5
<b>North Boreholes (L-north, L-north-2, &amp; L-north-3)</b>		
L-north, depth 4.5'-5.0'	13	5
L-north, depth 9.5'-10.0'	435	5
L-north-2, depth 4.0'-4.5'	17,100	5
L-north-3, depth 6"-12"	6	5
L-north-3, depth 4.5'-5.0'	8	5
L-north-3, depth 9.5'-10.0'	6	5
L-north-3, depth 14.5'-15.0'	6	5
<b>South Boreholes (L-south &amp; L-south-2)</b>		
L-south, depth 4.5'-5.0'	5	5
L-south, depth 8.5'-9.0'	8	5
L-south-2, depth 6"-12"	5	5
L-south-2, depth 4.5'-5.0'	6	5

Due to significant diesel concentrations, specifically in soil samples *Center, depth 24.5'-25.0'* and *L-center, depth 14.5'-15.0'*, and the fact that no groundwater quality and depth information was available for the site, it was determined that completion of soil borings using a drill rig (see Section 4.0) was required to further determine the vertical extent of contamination.

#### **4.0 SUMMARY OF DRILLING INVESTIGATION**

Based on the results of the preliminary site investigation, an approach was developed to further define the horizontal and vertical extent of diesel contamination within the soil at Malpais Site. Additionally, a preliminary groundwater investigation was conducted at the site, which consisted of identifying the depth, flow direction, and quality of the groundwater beneath the release site. The following sections describe the field activities performed.

##### **4.1 Preparatory Work**

###### **4.1.1 Real Property Planning Board Action and Record of Environmental Consideration**

All necessary documentation required to complete the Real Property Planning Board Action (RPPBA) and Record of Environmental Consideration (REC) for the proposed action was submitted and approved.

###### **4.1.2 Utility & Unexploded Ordnance Clearances**

All utility clearances (gas, water, electric, & communication) were obtained. Additionally, due to the proximity of the site to Range impact areas, an unexploded ordnance (UXO) ground surface clearance was performed by White Sands Explosive Ordnance Disposal (EOD) personnel. Copies of the signed clearances are provided in Appendix D.

###### **4.1.3 Site Safety**

A comprehensive Site Specific Health and Safety Plan for all field activities was prepared and distributed to all field personnel. A "tailgate" health and safety briefing was performed each morning, and again for personnel arriving throughout the day. Specifically, all personnel were notified of UXO located on White Sands property. Additionally, the White Sands Fire Department was notified of the drilling activities in case of a fire or explosion. Personal protective equipment (PPE) for this project consisted of Level-D in non-contaminated areas and "modified" Level-D in contaminated areas. "Modified" Level-D PPE consisted of a hard hat, steel toed boots, safety glasses, earplugs, leather/latex gloves, and Tyvek.

###### **4.1.4 Level Loop of Selected Piezometer Locations**

Prior to the start of drilling, the locations of soil borings SB-01 through SB-04, which were converted into piezometers, were selected and identified with wooden markers. Once the locations were determined, a level loop using a self-leveling level and a level rod was

completed to determine the relative ground surface elevation of each location. All borings were referenced to the concrete foundation of Building 31152, which was assumed to be 100-ft (30.5-m). The relative ground surface elevation was used in conjunction with groundwater level elevations to determine the flow direction of the groundwater at the site.

#### **4.1.5 Erosion Potential Assessment**

Surveys were conducted by a White Sands Range-Biologist to ascertain the erosion potential at proposed soil boring locations at Malpais Site. At each of the proposed soil boring locations, field notes were collected on soils, vegetation, slope, distance from existing roads, and overall susceptibility to erosion.

The soil boring locations at Malpais Site are all located in close proximity to existing surface disturbance. Topography at the site is typical mesquite coppice dune that dominates much of the Tularosa Basin. Coppice mesquite dune topography is created through wind erosion/deposition of soils. Aspect at the site is nearly flat overall, with a slight gradient toward the east (Figure 4-1). Soils are sandy to sandy-loam and inter-dune ground cover is sparse. Dominant vegetation at the site includes honey mesquite, four-winged saltbush (*Atriplex canescens*), alkali sacatone (*Sporobolus airoides*), and snakeweed (*Gutierrezia sarothrae*). Based on the site conditions, the investigation activities were not anticipated to increase the erosion potential of the site. The minimal disturbance at the site due to drilling activities is expected to naturally attenuate through re-colonization of plants and soil deposition.

#### **4.2 Drilling Activities**

A phased approach was developed for this investigation. First, four soil borings, which were converted to piezometers, were completed approximately 200-yards (yd) (183-m) from the former tank location at 90-degree intervals. Soil samples were collected from each boring for use in the White Sands lithologic library. Water level data gathered from the completed piezometers was used in connection with level loop elevations to determine the approximate groundwater flow direction.

Following completion of the piezometers, five soil borings were drilled at the former tank location, and five soil borings were drilled at the north end of the former product lines. One soil boring was drilled at the suspected center of each plume, and the remaining eight were placed at the suspected outer edge of contamination. Soil samples were collected at 5-ft (1.5-m) intervals for chemical analysis. Once the approximate extent of diesel contamination was identified, an up-gradient groundwater monitoring well was installed to evaluate the quality of groundwater at the site. The following sections provide a summary of each phase of the hollow-stem auger drilling activities. Photographs of the field activities are in Appendix B.

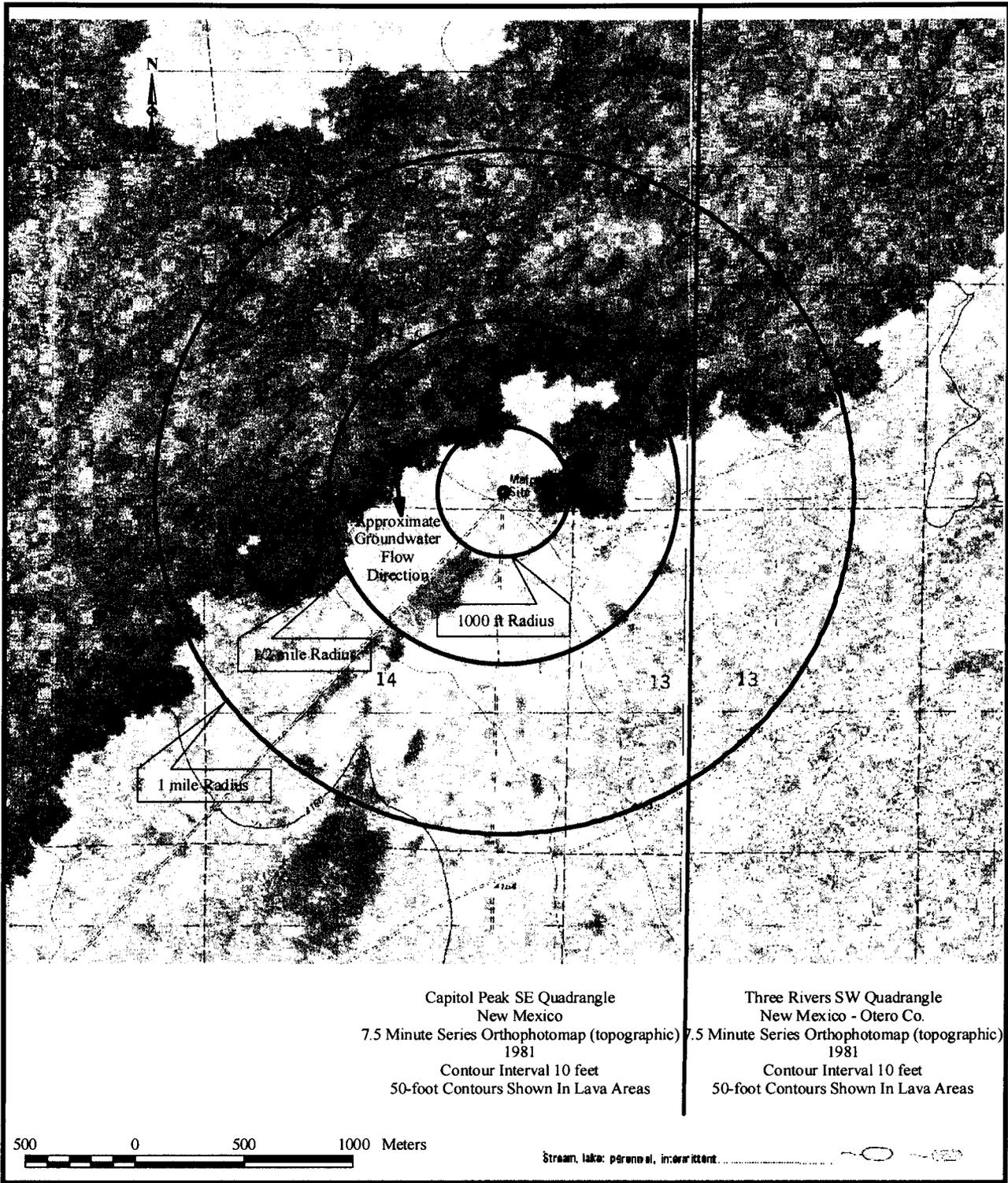


Figure 4-1. Topographic Map at Malpais Site.

#### **4.2.1 Drilling Apparatus**

Stewart Brothers Drilling Incorporated (Grants, NM) was sub-contracted to complete the required drilling for this project. All borings were drilled using a CME 750 all-terrain-vehicle (ATV), continuous, hollow-stem auger drill rig. The soil borings and piezometers were drilled using 8.75-in (22.2-cm) diameter auger flights and the monitoring well was drilled using 11.75-in (29.8-cm) diameter auger flights. Soil samples were collected using a 3-in (7.6-cm) diameter, 5-ft (1.5-m) long split-barrel sampler.

#### **4.2.2 Piezometer Construction**

The first phase of field activities consisted of constructing four piezometers situated at 90-degree intervals to determine groundwater depth and flow direction. Figure 4-2 shows the location of each piezometer in reference to the release site. Each soil boring at the site was referenced in the following manner.

31152-SB-xx

where: 31152 - building number at Malpais Site

SB - soil boring

xx - number of boring (i.e. 01, 02, etc..)

To properly screen each piezometer, each boring was drilled to a depth of 5-7 ft (1.5-2.1 m) below the confining layer located immediately above the saturated zone, as determined by the field geologist. Soil boring 31152-SB-02 was drilled to a depth of 75.0 ft (22.9 m) such that additional lithology of the site could be determined. Lithologic soil samples were collected at each change in geology, as determined by the field geologist. The field geologist then constructed a soil boring log through the examination of lithologic soil samples from each boring. The piezometers were constructed of 2-in (5-cm) diameter, flush-threaded, mill-slotted Schedule 40 PVC casing with bottom cap. Filter pack material was placed across and above the screened interval. Approximately 5-ft (1.5-m) of hydrated bentonite chips was placed above the filter pack, and then the remainder of the hole was backfilled with a 5% bentonite-cement slurry. A section of 4-in (10-cm) diameter Schedule 40 PVC casing was placed over the aboveground section of each piezometer casing for additional protection. Following completion of each piezometer, approximately 15-gal (56.8-L) of water was purged using a Teflon hand bailer. Table 4-1 presents relevant construction data for each piezometer. Copies of the soil boring logs and construction diagrams for each piezometer are in Appendices E-H.

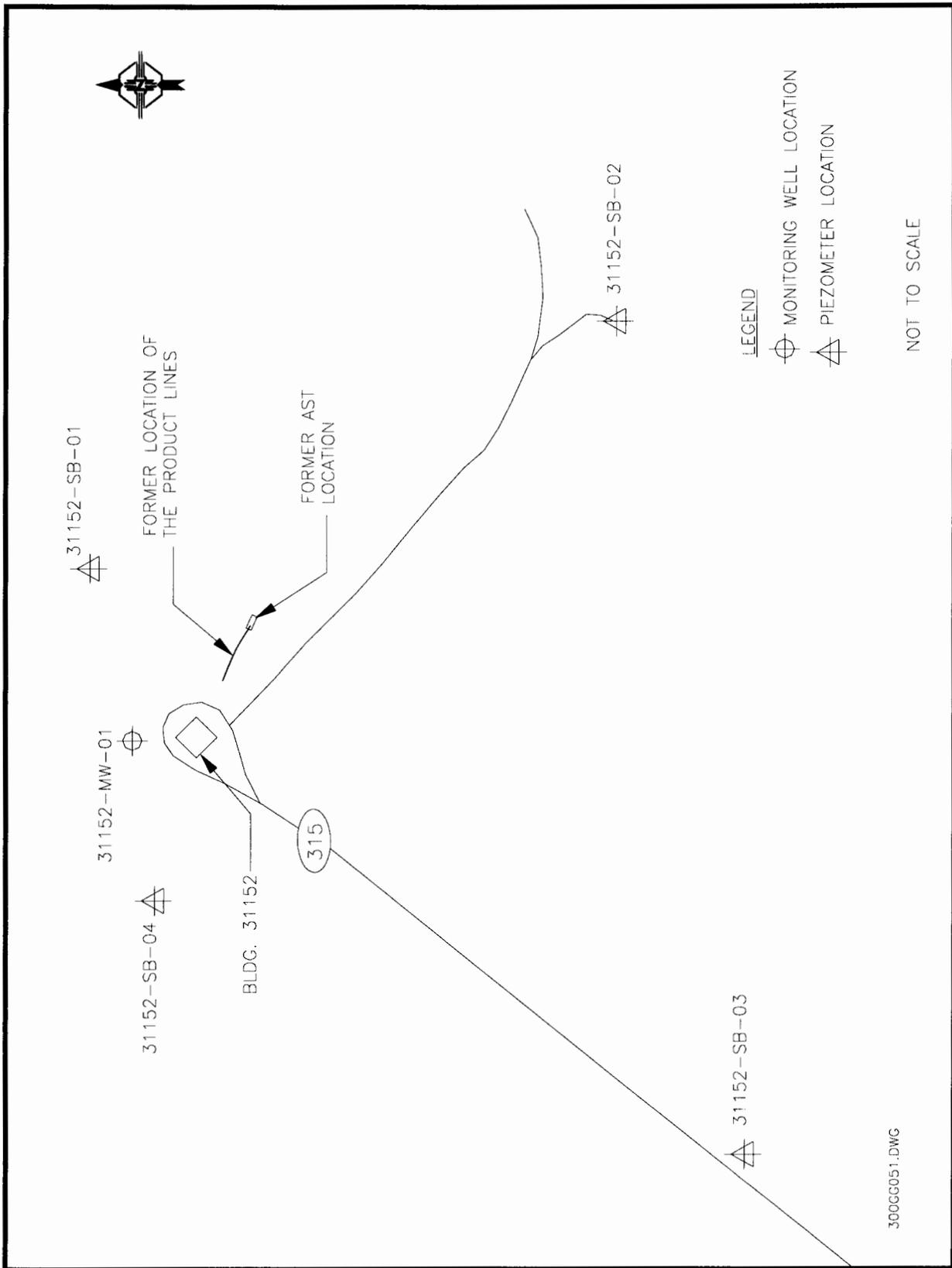


Figure 4-2. Location of Piezometers and Groundwater Monitoring Well.

**Table 4-1. Piezometer Construction Data**

Piezometer ID	Date of Installation	Ground Surface Elevation <sup>1</sup> (bgs <sup>2</sup> )	Total Piezometer Depth (bgs)	Screen Interval (bgs)	Depth to Groundwater (bgs)
31152-SB-01	4-22-99	99.9 ft	35.0 ft	25.0-35.0 ft	25.42 ft
31152-SB-02	4-21-99	100.59 ft	48.0 ft	38.0-48.0 ft	27.92 ft
31152-SB-03	4-21-99	97.51 ft	38.0 ft	28.0-38.0 ft	25.05 ft
31152-SB-04	4-22-99	98.97 ft	35.0 ft	25.0-35.0 ft	24.30 ft

Notes: 1: Ground surface elevation was determined relative to the other piezometers and concrete foundation for Building 31152, which was assumed to be 100.0 ft.  
 2: bgs – below ground surface

Data yielded from the piezometers was used to determine the potentiometric surface at the site, which is discussed in Section 6.2 of this report. Photographs of the piezometers are in Appendix B.

### 4.2.3 Soil Borings

Following installation of the piezometers, a total of ten soil borings were drilled at the release sites. The location of each soil boring is shown in Figure 4-3. Each soil boring was drilled in the same fashion as stated in Section 4.2.2. Copies of the soil boring logs for borings 31152-SB-05 through 31152-SB-14 are found in Appendix I. Soil samples for chemical analysis were collected from the split-barrel sampler at 5-ft (1.5-m) intervals to a depth of 25.0-ft (7.6-m) bgs. All soil samples were sent to Trace Analysis Incorporated (El Paso, TX) for analysis by EPA Method 8015, Modified DRO. Additionally, approximately 10 percent of the soil samples were split and sent to the NR-MT-AA Chemistry Laboratory for quality assurance analysis. Analytical results are presented in Section 6.0 of this report. The soil samples were identified as follows:

31152-SB-xx-(yy.y-zz.z)

where: 31152 - building number at Malpais Site

SB - soil boring

xx - number of boring (i.e. 01, 02, etc..)

(yy.y – zz.z) – collection depth

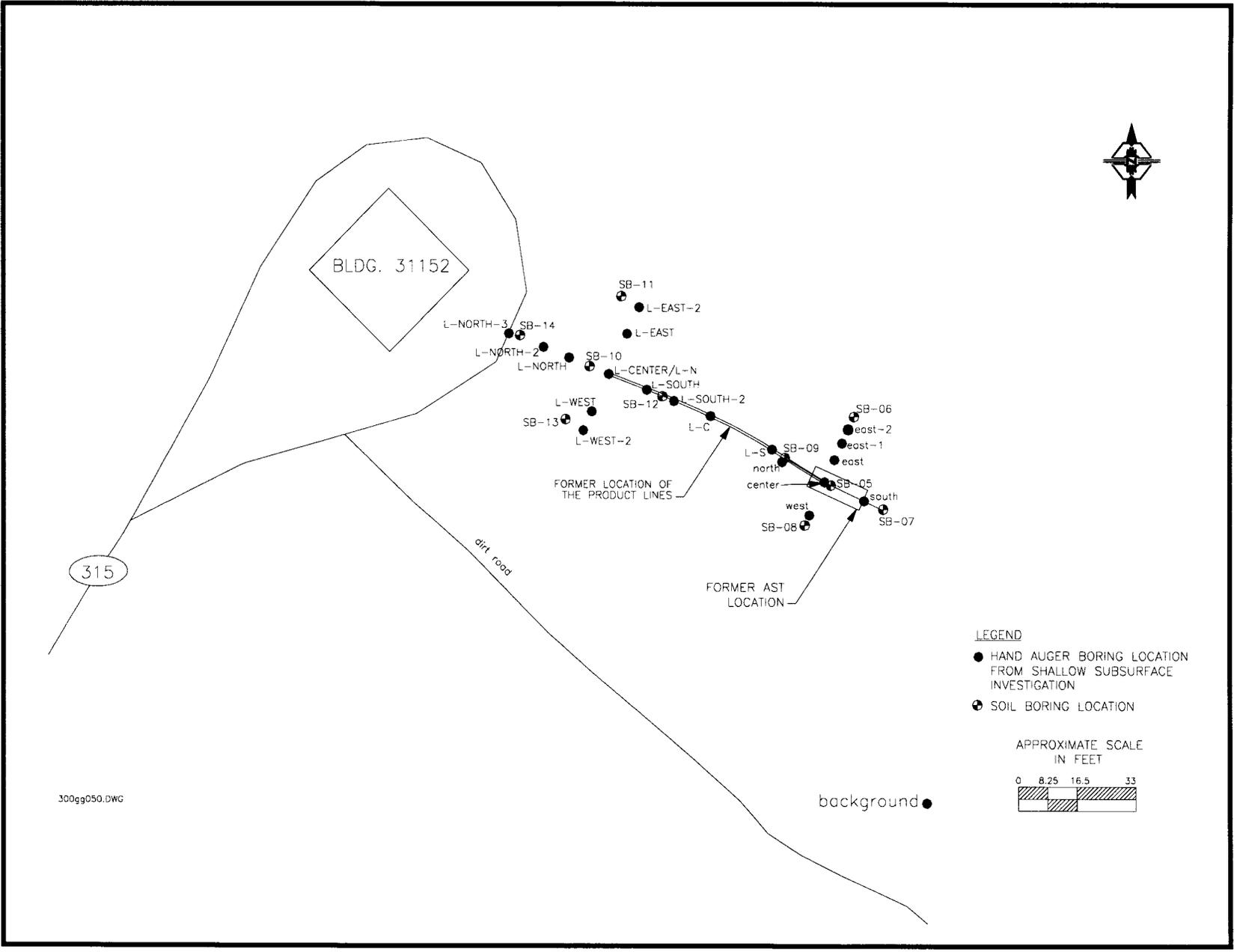


Figure 4-3. Soil Boring Locations.

Soil borings *31152-SB-05* and *31152-SB-10*, located in the center of each release site, were advanced until the uppermost zone of saturation was reached to determine if contamination had migrated to groundwater. Upon reaching groundwater, approximately 26.5-29.0 ft (8.0-8.8 m) bgs, the auger flights were pulled back 2-ft (0.6-m) to allow the bottom of the boring to collect water. Field personnel collected a grab sample of groundwater to complete analysis for diesel range hydrocarbons (EPA Method 8015, Modified DRO) and physical characteristics (pH, TDS, and conductivity). The groundwater grab samples were identified as *31152-SB-05-GB* and *3115-SB-10-GB*. Due to the requirement for a quick turn-around time, the groundwater grab samples were submitted to the NR-MT-AA Chemistry Laboratory for analysis. Analytical results are presented in Section 6.0 of this report.

#### 4.2.4 Monitoring Well Construction

Upon delineation of the potentiometric surface (see Section 6-2), an up-gradient monitoring well (*31152-MW-01*) was installed to further determine the groundwater quality at the site. The location of the monitoring well is shown in Figure 4-2. A photograph of the well is in Appendix B.

The soil boring for the well was drilled in the same fashion as previously described. The well riser consisted of new, 4-in (10.2-cm) diameter PVC casing (ASTM-D 1785 Schedule 40). Threaded, flush-joint couplings joined screen and riser sections. Solvent glues, cements, or adhesive tapes were not used to join sections of the riser or screen. A 0.010-in (0.025-cm) slot size screen constructed of Schedule 40 PVC was positioned such that 5-ft (1.5-m) was located above the potentiometric surface and 15-ft (4.6-m) was located below the potentiometric surface. A 5-ft (1.5-m) length sump, with end cap, was constructed below the screen. Filter pack material, consisting of clean, washed, well graded, rounded to sub-rounded 20/40 silica sand, was placed from the base of the boring to approximately 6-ft (1.8-m) above the screen. Four feet (1.2-m) of hydrated bentonite was placed above the filter pack, and the remaining borehole was filled with a 5 % bentonite-cement mix. Table 4-2 lists pertinent construction data for monitoring well *31152-MW-01*. Copies of the soil boring log and monitoring well construction diagram are in Appendix J.

**Table 4-2. Monitoring Well Construction Data**

Well Segment	Interval (bgs <sup>1</sup> )
Well Casing (4 in Schedule 40 PVC)	-3.0-20.0 ft
Screen (4 in Schedule 40 PVC, 0.010 in slot size)	20.0-40.0 ft
Sand Trap (4 in Schedule 40 PVC) with end cap	40.0-45.0 ft
5 % Bentonite-Cement Grout	0.0-10.0 ft
Bentonite Seal	10.0-14.0 ft
Filter Pack (20/10 sand)	14.0-45.0 ft

Notes: 1: bgs – below ground surface

A protective aluminum casing with a hinged, locking aluminum cap was installed around the well and embedded into the Portland cement. A 4-ft x 4-ft x 1-ft (1.2-m x 1.2-m x 0.3-m) thick concrete pad, with protective bollards, was constructed around the protective casing at final

ground elevation. A survey marker was permanently placed in each pad. The horizontal and vertical location of the well will be surveyed and inscribed on the brass marker.

Following surface completion of the well, approximately 150-gal (570-L) of water was purged from the well using a Grundfos 2-in (5.1-cm) diameter submersible pump. Field personnel recorded water quality parameters (temperature, pH, and conductivity) at 20-gal (76-L) intervals. The water appeared only slightly cloudy at the completion of purging,

### 4.3 Groundwater Sampling Activities

Upon completion of well development, field personnel collected groundwater samples for chemical analysis. Table 4-3 indicates the constituents for which the groundwater was analyzed. The groundwater sample, identified as *31152-MW-01-0599*, was sent to Trace Analysis Inc. for analysis. An additional groundwater sample (*31152-MW01-0599-QA*) was collected and sent to the NR-MT-AA Chemistry Laboratory for duplicate quality assurance analysis. Analytical results are presented in Section 6.1.2 of this report.

**Table 4-3. Groundwater Analytical Parameters**

Analytical Parameter	Analytical Method (EPA or SW846)
<b>Dissolved Anions/Cations</b>	
Calcium	200.7
Magnesium	200.7
Potassium	200.7
Sodium	200.7
Bicarbonate	310.1
Bromide	200.7
Carbonate	310.1
Chloride	325.3
Sulfate	375.4
Fluoride	340.2
<b>Physical Characteristics</b>	
Lab Conductivity ( $\mu\text{S}/\text{cm}$ at 25°C)	120.1
pH	150.1
TDS ( $\mu\text{g}/\text{L}$ ROE at 180°C)	160.1
<b>Dissolved Nutrients</b>	
Nitrate	352.1
Phosphorus	365.2
<b>Dissolved Metals</b>	
Barium	6010
Boron	6010
Iron	6010
Lithium	6010
Manganese	6010
Strontium	6010
Uranium	908.1
<b>Total Petroleum Hydrocarbons</b>	
Diesel	8015, Modified DRO

#### 4.4 Investigation Derived Waste

Upon completion of soil and groundwater sampling activities, composite samples were collected from containers that contained purge water from the piezometers, decontamination water, and soil cuttings to determine the disposal method. Table 4-4 summarizes the sample name, location, and requested laboratory analysis for characterization. The water samples were screened using EPA Method 8015, Modified DRO to determine if diesel was present in the drums. If diesel concentrations are present, another composite sample will be analyzed for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), and RCRA metals.

**Table 4-4. Composite Samples for Investigation Derived Waste Disposal**

Sample ID	Sample Location	Requested Analysis
31152-R#840-0599	Composite soil sample collected from roll-off box number 840	TCLP-VOC TCLP-SVOC
31152-SB-0599	Composite water sample collected from drums associated with the completion of the soil borings and piezometers.	8015 Modified DRO
31152-DeconWater-0599	Composite water sample collected from the drums containing water removed from the decontamination pad	8015 Modified DRO

#### 5.0 DEVIATIONS FROM PROPOSED SCOPE OF WORK

The scope of work for this project stated that the filter pack for each piezometer would consist of the same sand as used in construction of the groundwater monitoring well filter pack. Due to a shortage of 20/40 sand and the fact that the piezometers would only be used to determine groundwater depth, it was determined that each piezometer filter pack could consist of pea gravel obtained from a local supplier. No other deviations from the scope of work were performed.

#### 6.0 SUMMARY OF RESULTS FROM THE DRILLING INVESTIGATION

The following sections summarize the analytical results for the soil and groundwater samples collected during field activities. Additionally, this section presents a summary of the site geology and hydrogeology, as determined from the investigation. From these results, the approximate horizontal and vertical extent of diesel contamination was delineated.

##### 6.1 Analytical Results

Copies of the analytical results from Trace Analysis Inc. are in Appendix K and copies of the analytical results from the White Sands NR-MT-AA Chemistry Laboratory are found in Appendix L. Differences in following results between Trace Analysis Inc. and the NR-MT-AA Chemistry Laboratory was likely due to uncertified quality assurance/quality control procedures employed at the NR-MT-AA Chemistry Laboratory.

## 6.1.1 Soil

Table 6-1 presents the analytical results for all diesel range hydrocarbon concentrations reported above laboratory detection limits.

**Table 6-1. Detected Diesel Range Hydrocarbons Collected from Soil Borings 05-14**

Sample Identification	Trace Analysis Inc.		White Sands NR-MT-AA Chemistry Lab	
	Analytical Results (mg/kg)	Detection Limit (50 mg/kg)	Analytical Results (ppm)	Detection Limit (ppm)
<b>Soil Boring 05</b>				
31152-SB-05-(4.5-5.0)	13,000	50	No sample.	5
31152-SB-05-(9.5-10.0)	13,000	50	No sample.	5
31152-SB-05-(14.5-15.0)	4,400	50	9,230	5
<b>Soil Boring 06</b>	no detection above laboratory detection limits			
<b>Soil Boring 07</b>	no detection above laboratory detection limits			
<b>Soil Boring 08</b>	no detection above laboratory detection limits			
<b>Soil Boring 09</b>	no detection above laboratory detection limits			
<b>Soil Boring 10</b>				
31152-SB-10-(4.5-5.0)	3,500	50	No sample.	5
31152-SB-10-(9.5-10.0)	2,800	50	No sample.	5
31152-SB-10-(14.5-15.0)	7,900	50	No sample.	5
<b>Soil Boring 11</b>	no detection above laboratory detection limits			
<b>Soil Boring 12</b>	no detection above laboratory detection limits			
<b>Soil Boring 13</b>	no detection above laboratory detection limits			
<b>Soil Boring 14</b>	no detection above laboratory detection limits			

## 6.1.2 Groundwater

### 6.1.2.1 Grab Groundwater Samples from Soil Borings 31152-SB-05 & 31152-SB-10

Table 6-2 presents the analytical results for the grab groundwater samples.

**Table 6-2. Analytical Results – Grab Groundwater Samples from Soil Borings 05 & 10**

Sample Identification	TPH (parts per million <sup>1</sup> )	pH	Conductivity (micromhos/cm)	TDS (mg/L)
31152-SB-05-GB	0.7	6.3	40,000	26,700
31152-SB-10-GB	ND <sup>2</sup>	6.2	32,000	21,200

Notes: 1: parts per million equates to milligrams per liter

2: ND – no detection

**6.1.2.2 Groundwater Sample from Monitoring Well 31152-MW-01**

Tables 6-3 through 6-6 present the analytical results for both the primary and quality assurance groundwater samples collected from monitoring well 31152-MW-01. The NR-MT-AA Chemistry Laboratory was not able to perform analysis for all analytical parameters.

**Table 6-3. Analytical Results for Dissolved Metals**

Analytical Parameter	Trace Analysis Inc.		White Sands NR-MT-AA Chemistry Lab	
	Analytical Results (mg/L)	Detection Limit (mg/L)	Analytical Results (ppm)	Detection Limit (ppm)
Barium	<0.02	0.02	ND	0.5
Boron	0.27	0.01	Not analyzed	--
Iron	<0.003	0.003	Not analyzed	--
Lithium	<0.01	0.01	Not analyzed	--
Manganese	<0.001	0.001	Not analyzed	--
Strontium	52	0.20	Not analyzed	--
Uranium	0.0355	0.0008	Not analyzed	--

**Table 6-4. Analytical Results for Dissolved Anions/Cations**

Analytical Parameter	Trace Analysis Inc.		White Sands NR-MT-AA Chemistry Lab	
	Analytical Results (mg/L)	Detection Limit (mg/L)	Analytical Results (ppm)	Detection Limit (ppm)
Alkalinity, Total	190	5.0		
Calcium	850	1.0	2,400	1.0
Carbonate	<5.0	5.0		
Chloride	24,000	2.0	7,100	1.0
Bicarbonate	190	5.0	Not analyzed	--
Fluoride	6.2	0.2	Not analyzed	--
Magnesium	2,900	1.0	370	1.0
Potassium	120	1.0	8.0	1.0
Sodium	13,000	1.0	2,100	1.0
Sulfate	9,600	2.0	2,100	1.0

**Table 6-5. Analytical Results for Physical Characteristics and TPH**

Analytical Parameter	Trace Analysis Inc.		White Sands NR-MT-AA Chemistry Lab	
	Analytical Results	Detection Limit	Analytical Results	Detection Limit
Lab Conductivity	10,000 µMHOs/cm	--	26,500 µMHOs/cm	--
Lab pH	7.6	--	6.7	--
TDS	16,000 mg/L	--	14,400 mg/L	--
TPH-DRO	<50.0 µg/L	50 µg/L	<0.1 ppm	0.1 ppm

Table 6-6. Analytical Results for Dissolved Nutrients

Analytical Parameter	Trace Analysis Inc.		White Sands NR-MT-AA Chemistry Lab	
	Analytical Results (mg/L)	Detection Limit (mg/L)	Analytical Results (ppm)	Detection Limit (ppm)
Nitrate as N	28.0	0.1	ND	1.0
Phosphorus	<0.01	0.01	Not analyzed	--

### 6.1.3 Investigation Derived Waste

Upon receipt of analytical results, the waste will be properly disposed.

## 6.2 Subsurface Geology and Hydrogeology

The field investigation confirmed that the subsurface beneath the Malpais site is dominated by coarse- to fine-grained unconsolidated sediments characteristic of the Tularosa Basin. Alternating layers of gravel, sand, silt and clay extend from the surface to the maximum depth investigated, 75-ft (22.9-m) bgs. Most sedimentary units are thin, ranging from a few inches to a few feet in thickness. Individual units are typically poorly sorted, consisting of a mixture of several grain sizes with grain sizes ranging from silt to course-grained sand. These units appear to be fluvial in nature. Several of the units appear to be eolian and exhibit a well-sorted grain distribution. Several of the units are lightly cemented with calcite cement.

Continuous soil samples were collected while drilling the soil borings for each of the four piezometers. In each of these boreholes (31152-SB-01 through 31152-SB-04), a 2.0-5.5 ft (0.6-1.7 m) thick, medium- to fine-grained saturated sand was first encountered at approximately 26.5-29.0 ft (8.0-8.8 m) bgs. Immediately below the saturated sand, each borehole contained a silt/clay unit of sufficient thickness to impede infiltration. These units are characterized as stiff, damp to saturated, and contain less than 10 percent sand. Saturated zones located immediately below these units are characterized as moist to wet in the upper 0.5-1.0 ft (0.2-0.3 m), with water content approaching saturation in the lower portions.

The geologic conditions are generally consistent across the Malpais site, with boreholes exhibiting similar alternating sequences of course- and fine-grained materials. These sequences are pertinent to interpretation of local groundwater flow and infiltration of contamination. The uppermost zone of saturation encountered within each borehole was suspected to be perched groundwater; as such, the piezometers were screened across a deeper zone suspected of being the true regional groundwater. Upon completion of these piezometers, water levels stabilized at the same elevation as the uppermost saturated zone, indicating communication of groundwater between all zones. Monitoring well 31152-MW-01 was subsequently constructed with the screened interval across this uppermost zone, and following development, the water level corresponded to the elevation of that zone.

Analysis of the potentiometric surface, as measured within the completed piezometers, show groundwater flow at the Malpais Site to the south-southeast (see Figure 6-1). Hydraulic gradient estimates range from 0.028 to 0.032. Based upon this analysis, the upgradient monitoring well location was chosen at a point approximately halfway between northern piezometer (31152-SB-01) and the western piezometer (31152-SB-04).

### **6.3 Estimated Extent of Contamination**

Diesel contamination at the site is generally located beneath the former tank location and beneath the north end of the product lines. Figures 6-2 through 6-5 present an estimated horizontal and vertical extent of contamination based on the results of soil and groundwater samples collected from the subsurface. Most of the diesel contamination in the soil was determined to be located between the ground surface and approximately 17.5-ft (5.3-m) bgs. A low detection of diesel was noted in the groundwater beneath the tank. Although no significant concentrations of diesel were detected in the soil beneath 17.5-ft (5.3-m) bgs, the diesel may have migrated horizontally along impermeable layers and eventually down to groundwater through more permeable layers.

## **7.0 DISCUSSION OF POTENTIAL PATHWAYS**

### **7.1 Soil**

The soil exposure pathway assesses the threat to human health and the environment by direct exposure to the diesel contamination. All surface contamination was removed during tank removal and clean backfill was placed over the release area following the tank removal. Additionally, Malpais Site is an abandoned missile tracking station, located approximately 3-mi (4.8-km) from the nearest major road on a military installation that is closed off from the general public. Although a source exists, no receptors are in imminent danger from the diesel contaminated soil; therefore, this pathway is considered incomplete.

### **7.2 Groundwater**

The groundwater pathway is based on the local groundwater quality and the populations served by the groundwater supply. The TDS concentration of the groundwater at the site is in excess of 10,000 mg/L. Additionally, there are no drinking water supply wells located within approximately 14-mi (22-km) of the site. The nearest White Sands drinking water supply wells are located approximately 50-mi (80-km) to the south-southwest. There is no potential exposure pathway considered from groundwater.

### **7.3 Surface Water**

The surface water pathway considers the ability for surface water to migrate the diesel offsite. The ground surface tends to pool run-off water at and near the release site even though the topography shows a surface water flow gradient to the southwest (see Figure 4-1). Generally, surface water runoff associated with this site is minimal and only appears following periods of intense rainfall, typically June-August. Therefore, this pathway is considered incomplete.

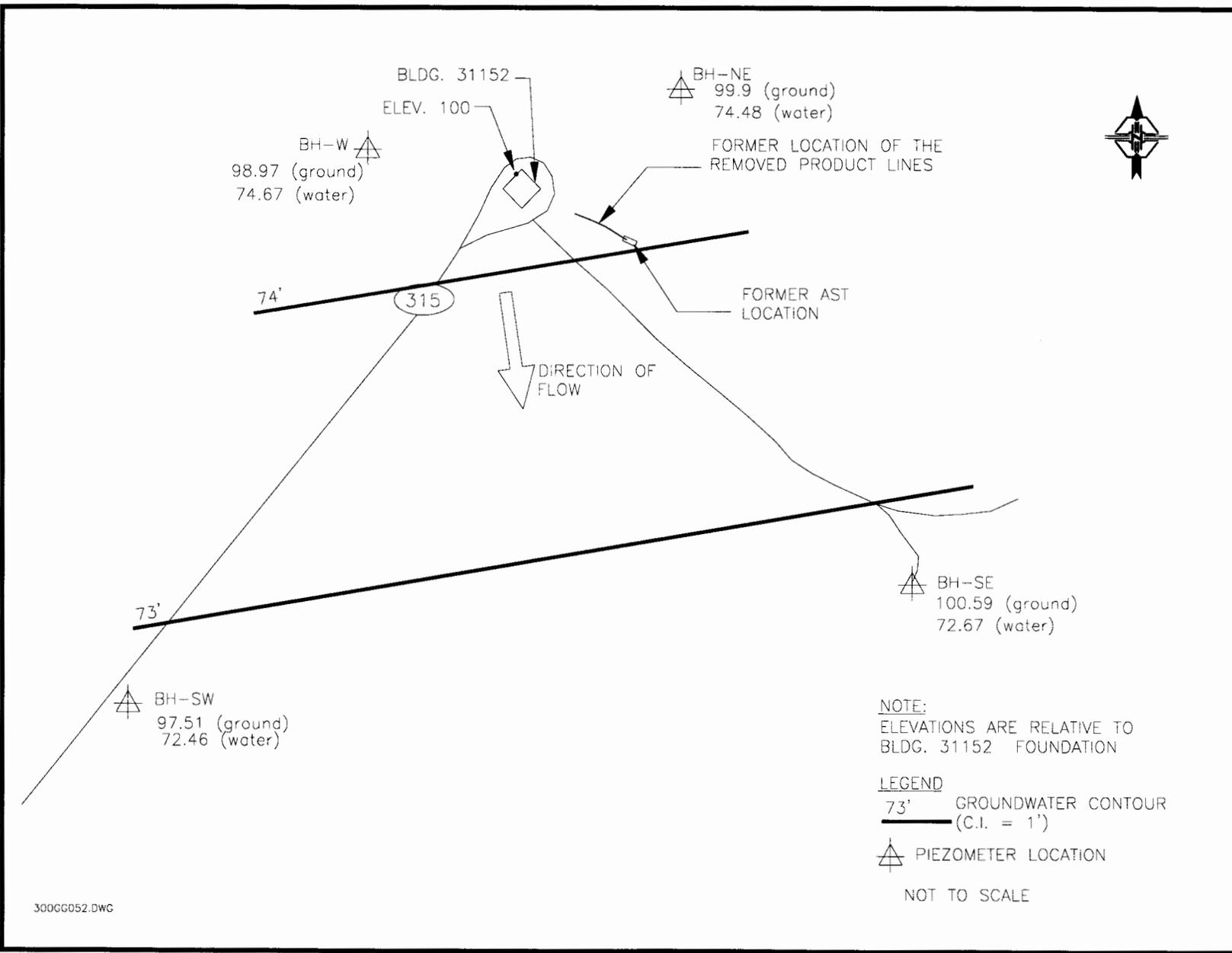


Figure 6-1. Potentiometric Surface Map

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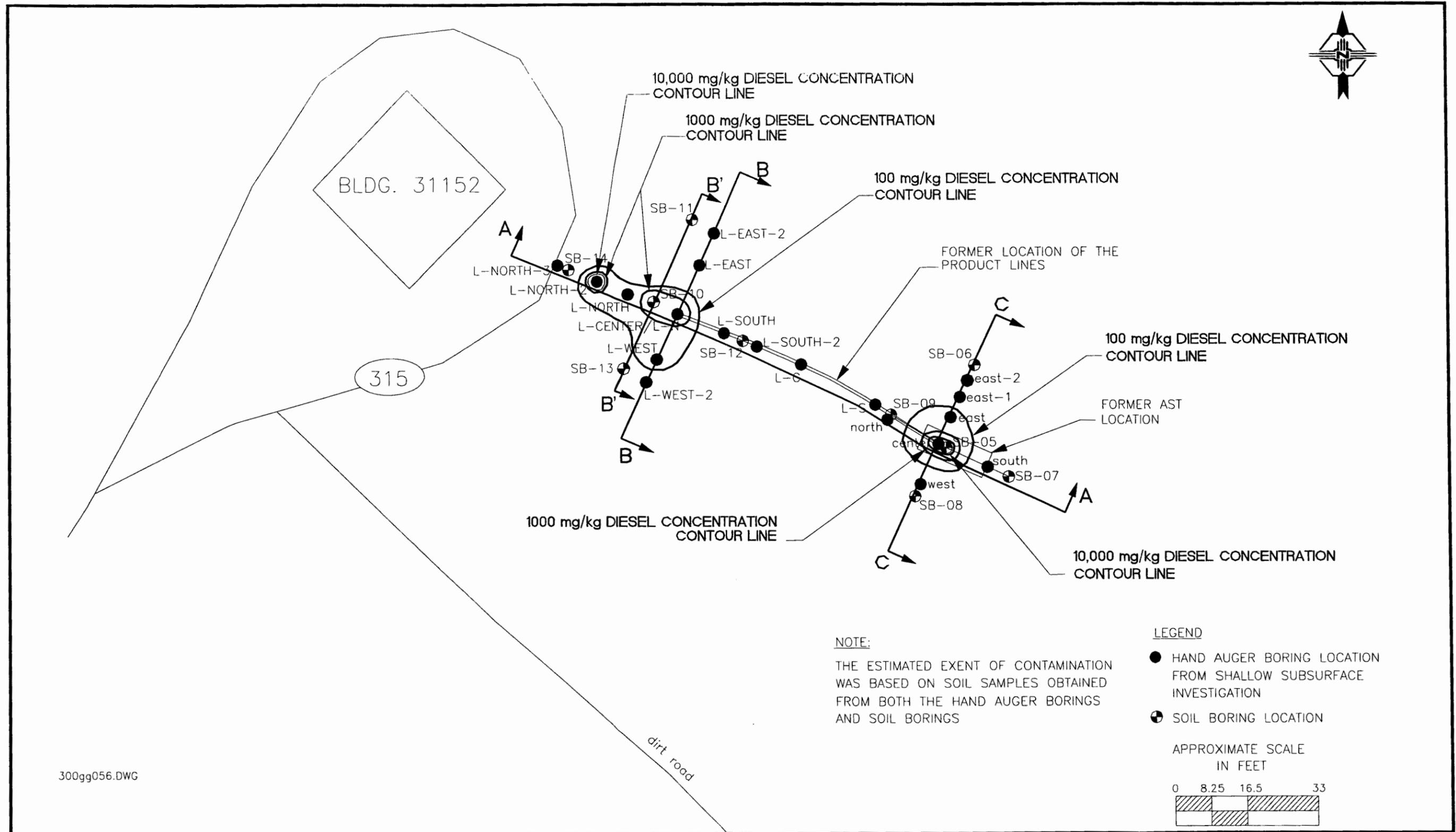


Figure 6-2. Estimated Horizontal Extent of Contamination

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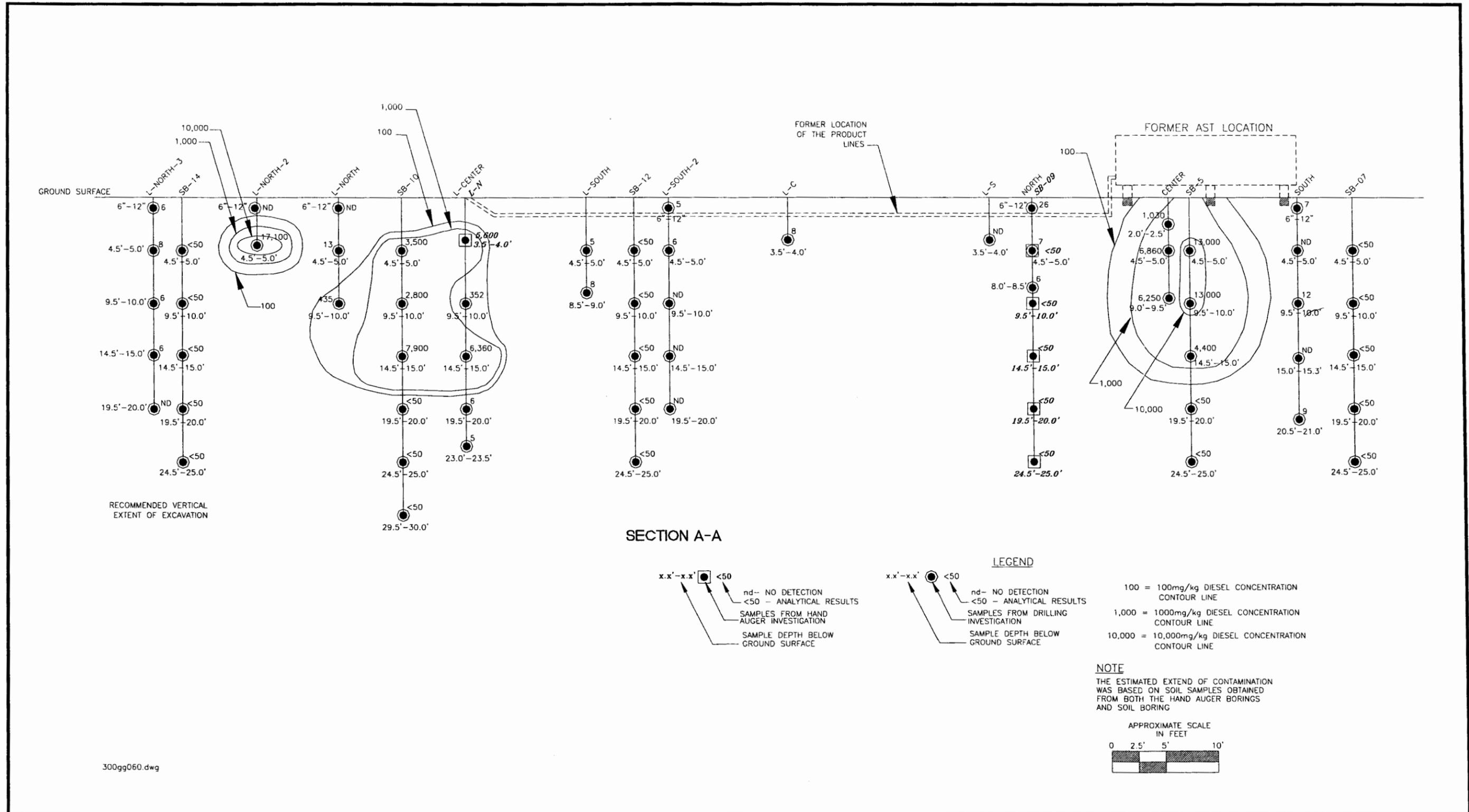


Figure 6-3. Estimated Vertical Extent of Contamination At Cross Section A-A

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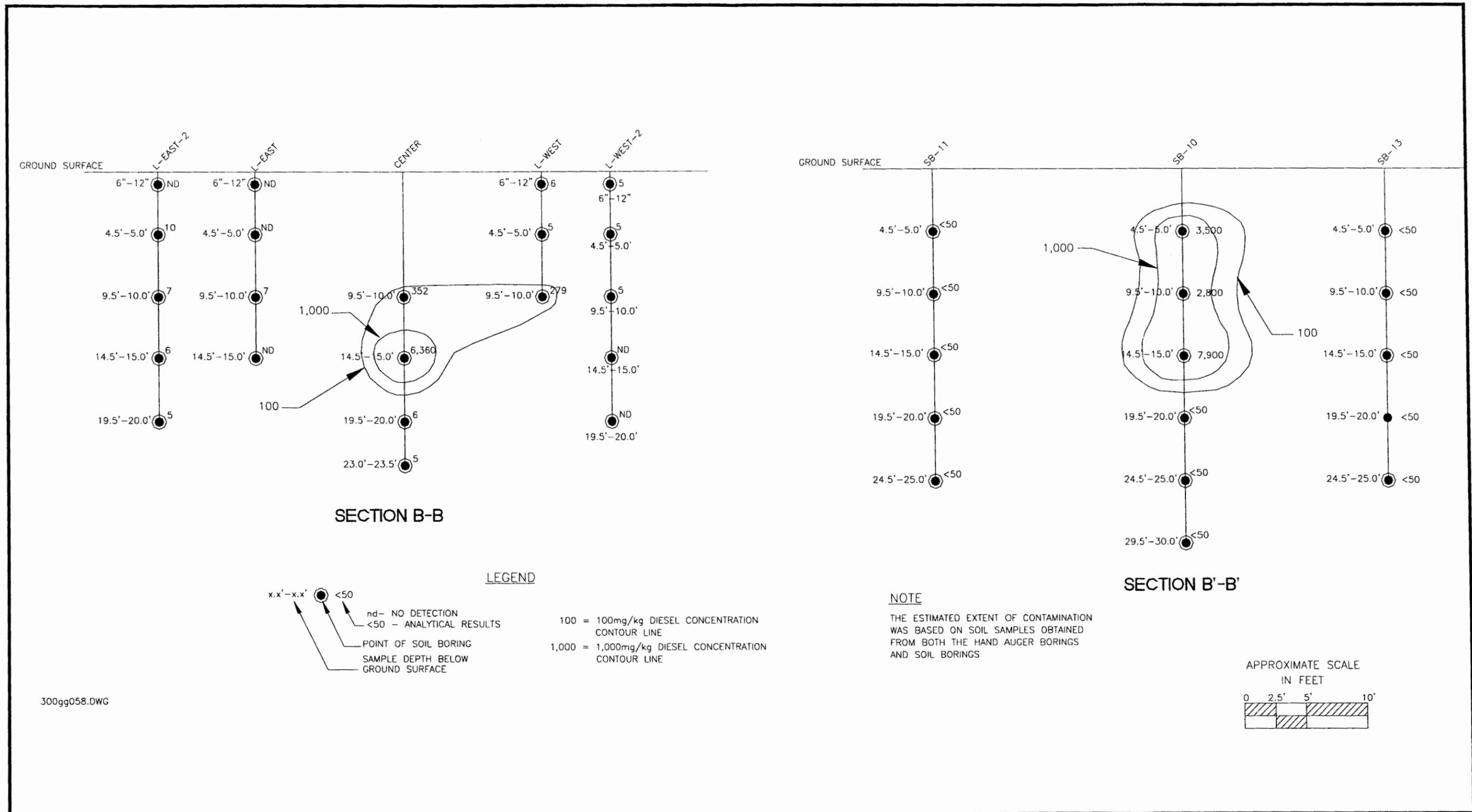
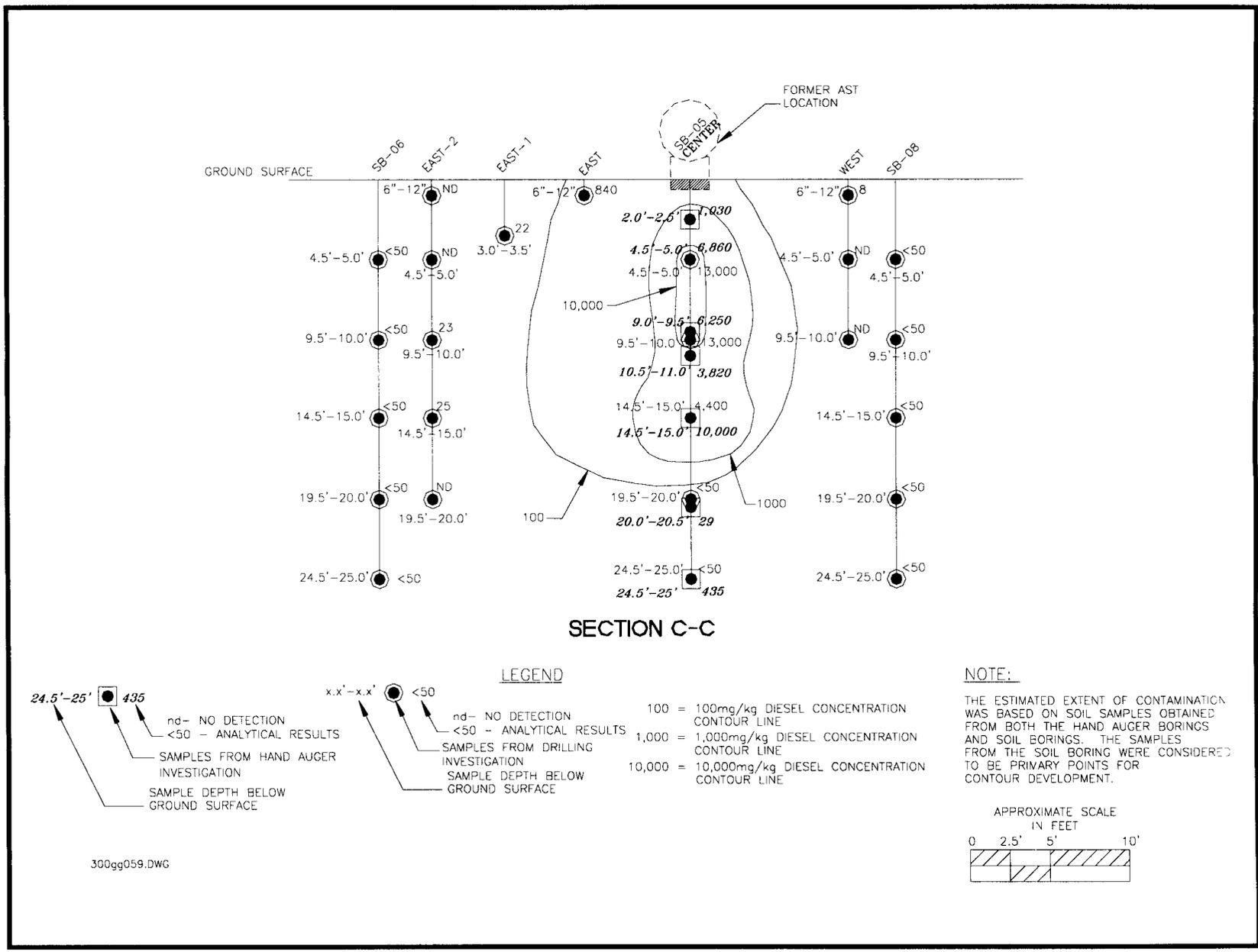


Figure 6-4. Estimated Vertical Extent of Contamination at Cross Sections B-B and B'-B'

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Figure 6-5. Estimated Vertical Extent of Contamination at Cross Section C-C.



## **7.4 Air**

The principal air pathway is the airborne release of diesel vapors from the site. The likelihood of a release to the air pathway is evaluated based on site and pathway conditions, and considers whether a release of contamination to the air could be detected. As previously stated, a field PID was used to monitor the breathing zone when drilling soil borings located inside the exclusion zone. No hydrocarbons were detected in the breathing zone during the first 2.5-ft (0.76-m) of each boring, and the PID never exceeded 10 ppm within the breathing zone during the investigation. Therefore, this pathway is considered incomplete.

## **8.0 REMEDIAL ALTERNATIVES**

Two possible alternatives were considered for remediation of this site: natural attenuation and source removal. The following sections describe each alternative.

### **8.1 Natural Attenuation**

This alternative consists of no removal of the source area. Although diesel will degrade over time in soil, a significant volume of soil containing diesel concentrations up to 13,000 mg/kg would remain in the soil. Additionally, Malpais Site is located in a low-lying area adjacent to the lava flow, which has high water runoff characteristics. Storm water tends to pool on the ground surface over the entire surface area at the release site. As water infiltrates through the contaminated subsurface, additional diesel will be transported through the vadose zone to groundwater. Over time, a significant amount of diesel could potentially enter the top of the saturated zone, located approximately 26.5-29.0 ft (8.0-8.8 m) bgs, which would increase the existing, low diesel concentration (0.7 ppm or 0.7 mg/L). Additionally, pooling surface water at the site would attract animals, which would in-turn ingest potentially diesel contaminated surface water. Installation of downgradient groundwater monitoring wells would likely be required to monitor the local groundwater for potential migration of the diesel contaminated groundwater. This alternative is not considered protective of the surrounding environment.

### **8.2 Source Removal**

This alternative consists of removal and proper disposal of the source of contamination. Due to the low mobility characteristics of diesel in soil, excavation of all contaminated soil with diesel concentrations above 1,000 mg/kg will serve an economical and rational removal of the source. Figures 8-1 through 8-4 identify the recommended extent of excavation. It is estimated that approximately 125 cu yd (96 cu m) of soil is contaminated with diesel at concentrations above 1,000 mg/kg. The soil will either be land farmed at a site approved by the NMED, or transported off-site and properly disposed at a certified facility. Confirmatory soil samples will be collected from the bottom and side walls of the excavations to ensure that all soil above 1,000 mg/kg was removed. Upon receipt of the analytical results, the excavation will be backfilled with clean soil and the ground surface will be graded to promote positive drainage away from the release area.



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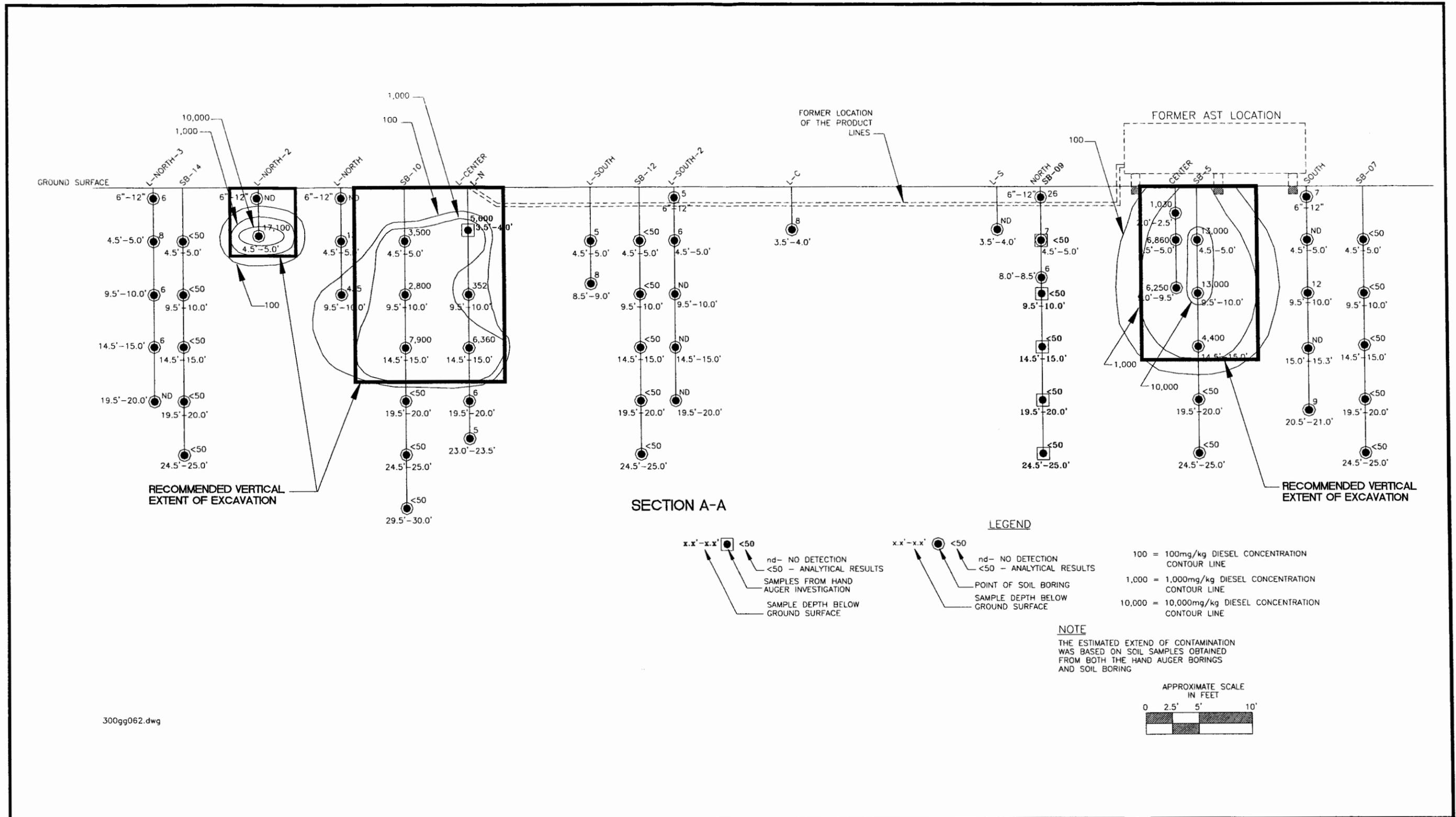


Figure 8-2. Recommended Vertical Extent of Excavation at Cross Section A-A

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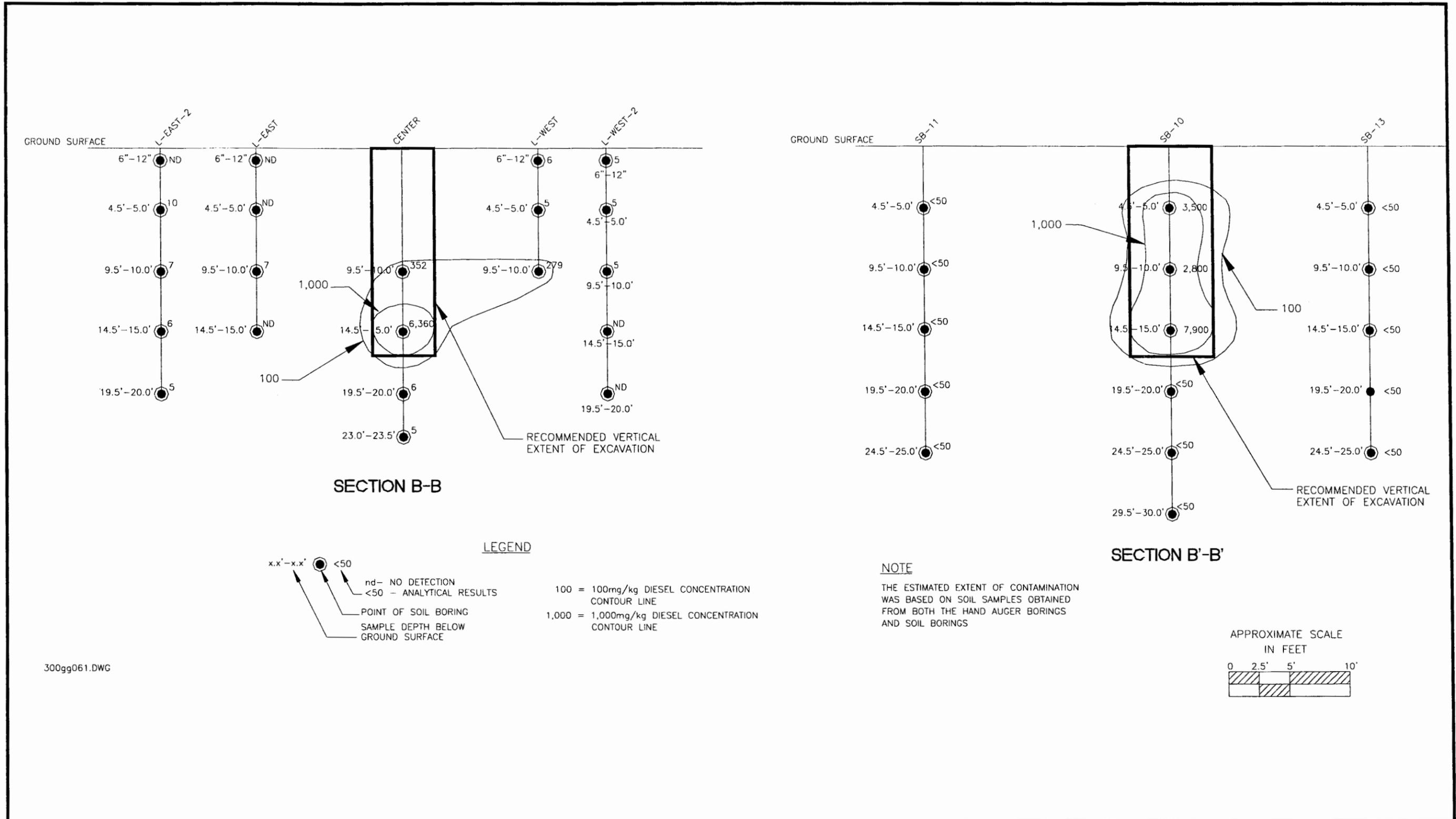


Figure 8-3. Recommended Vertical Extent of Excavation at Cross Sections B-B and B'-B'

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### **8.3 Proposed Remedial Action**

Based on the results of the soil investigation provided in this report, removal of the source area, as stated in Section 8.2, is the most feasible and rational alternative. This action is both economical and rational for remediation of this site. Following remedial action, the minor amount of diesel contaminants remaining will not be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property. As shown in the analytical results, groundwater located beneath the site has a TDS concentration of approximately 16,000 mg/L, which meets EPA's definition of Class-III aquifer. Removal of the source area, as stated in Section 8.2, meets the abatement requirements set forth in 20 NMAC, Chapter 6, Part 2, Section 4103 A & B. The vadose zone at Malpais Site will be abated such that the contaminants will not migrate to groundwater or surface water. Upon approval of this proposed remedial action by NMED, White Sands will develop and submit to the Chief of the Groundwater Protection and Remediation Bureau a Corrective Action Plan and proposed work schedule identifying the remedial workplan.

**REFERENCES**

Kelly, T.E., 1973. Summary of Groundwater Data, Post Headquarters and adjacent areas, White Sands Missile Range: U.S. Geological Survey Open File Report 72-308.

New Mexico Water Quality Control Commission, 1996. New Mexico Water Quality Control Commission Regulations, New Mexico Administrative Code 20, Chapter 6, Part 2. Santa Fe, New Mexico.

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**APPENDIX A**

**CORRESPONDANCE BETWEEN WHITE SANDS MISSILE RANGE  
AND THE NEW MEXICO ENVIRONMENT DEPARTMENT**



DEPARTMENT OF THE ARMY

U.S. ARMY WHITE SANDS MISSILE RANGE  
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-

REPLY TO  
ATTENTION OF

February 9, 1999

National Range Directorate of Environment and Safety

Ms. Julie Jacobs  
Groundwater Bureau  
New Mexico Environment Department  
2044 Galisteo  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Dear Ms. Jacobs:

In accordance with the telephone discussion between Mr. Gene Forsythe of our office and you on February 5, 1999, White Sands Missile Range is providing this as formal notification that we have identified two diesel-oil contaminated sites, which we will be remediating. One site is at an isolated remote facility called Malpais Instrumentation Site. This abandoned facility is just south of the Malpais Lava Flow, midrange, off of Range Road 315. The other site is at Denver Site. This site is approximately two miles from the Malpais Site on Range Road 316. Please see Tab A for map locations.

We have an on-going contract with our environmental services support contractor to locate, GPS, and photographically document all aboveground storage tanks (ASTs) on the range. While performing this task, the leaking AST at Malpais Site was identified and reported to us. There was an abandoned 2000-gallon diesel tank on site which was leaking from the drain valve, causing a stain approximately 6' x 9' under the tank. See photographs at Tab B.

Mr. Javier Mendoza, Environmental Engineer, Environmental Services Division, did an immediate site investigation. He removed approximately 1 cubic yard of contaminated soil and placed it in the Main Post Landfill designated for this type of remediation. Soil samples were taken to the White Sands Chemical Laboratory for analysis and we determined that additional site work was necessary to accurately characterize the site.

The tank was drained (approximately 450 gallons, including sludge and rust products from the interior of the tank) and the tank and its concrete footings were removed from the site. The preliminary results of the tests (Tab C) were received indicating hydrocarbon contamination. It was determined that this leak may have been occurring over an extended period of time, and a site investigation was initiated the following day. A verbal work statement was given to our environmental contractor to take soil samples in accordance with NM USTR, Chap. 5, Part 12, to

determine the horizontal and vertical extent of the contamination. At this point, we determined that the contamination extends downward about 9-10 feet, to a hard gypsum layer, and outward in excess of 15 feet from the center point. These samples have been taken to our laboratory for analysis and further characterization will take place to delineate the exact boundaries of the contamination once the sample analysis has been returned. We have determined that an underground feed line runs from the AST location to a concrete pad, and we will also be excavating, removing, and ground sampling to assure that all potential or actual contamination sources have been located and removed as part of this action.

Firm plans for the remediation of this site have not been determined at this time. They will be developed once the total extent of the contamination has been determined. At this time, however, we are tentatively considering complete removal of the contaminated soil to an approved site for wind-rowing and back-filling the resulting excavation with clean earth and gravel from a construction borrow pit.

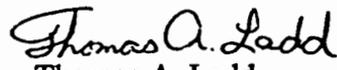
The estimated depth to groundwater at this site is definitely greater than 10 feet, being under the gypsum layer, and it may be less than 60 feet, with the TDS being 5,100 ppm. An U.S. Geological Survey on this area is at Tab D. There are no drinking water wells within five miles. However, we are concerned with this site, and reported it to you under section 1203 of the Ground Water Regulations, since it is upgradient (if it reached or reaches ground water) of both the Malpais Spring and the sources of the Salt Creek, which provides the habitat for our pupfish.

As we initiated work at the Malpais Site, a range employee indicated that the nearby Denver Site used to have an AST at an unknown time in the past. We made a visit to the Denver Site and determined that an AST had been located there, and that it had been removed. However, there is a stain located where the diesel tank was located, indicating the possibility of ground contamination (Tab E). Investigation is just beginning at this site with the taking of soil samples to determine if the horizontal and vertical extent of that potential contamination. There is also an underground feed line running from the AST location to an undetermined point. We will excavate and remove this line, and do soil sampling as part of our investigation. Since we are investigating this site as part of our overall action, we believe the most prudent course of action is to identify the Denver Site to you as a second action at this time.

We will provide our findings and updates on sample data and ground contamination to your office as soon as we are aware of them, and will submit the necessary remediation or abatement plans for your approval as soon as they are developed. If extended investigation or analysis is required to develop the plans we will notify you and request extensions within the required timeframes.

If you have any questions, please do not hesitate to call or contact Mr. Eugene Forsythe at (505) 678-8966, Ms. Glenda Wyatt, or Mr. Javier Mendoza, at (505) 678-2224.

Sincerely,



Thomas A. Ladd

Director, National Range Directorate of  
Environment and Safety

Enclosures





DEPARTMENT OF THE ARMY  
U.S. ARMY WHITE SANDS MISSILE RANGE  
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-

REPLY TO  
ATTENTION OF

March 1, 1999

National Range Directorate of Environment and Safety

Ms. Julie Jacobs  
Groundwater Bureau  
New Mexico Environment Department  
2044 Galisteo  
P.O. Box 26110  
Santa Fe, New Mexico 87502

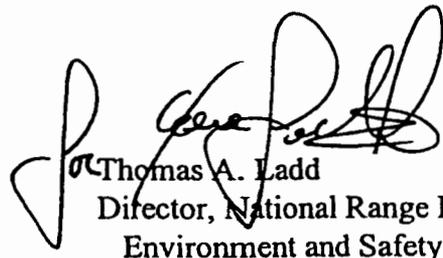
Dear Ms. Jacobs:

This letter is in response to the telephone conversation between Ms. Glenda Wyatt of our office and you on February 25, 1999 regarding the status of Malpais and Denver Sites. White Sands Missile Range is requesting a 30-day extension to the 15-day written report for corrective actions to remediate these two sites.

We have taken soil samples to determine the vertical and horizontal extent of the contamination. The results of these samples have not been completed. Once the total extent of the contamination has been determined, plans for remediation or abatement will be developed. These plans will be forwarded to your office for approval.

If you have any questions, please do not hesitate to call or contact Mr. Eugene Forsythe, (505) 678-8966, Ms. Glenda Wyatt, (505) 678-8615, or Mr. Javier Mendoza, (505) 678-2415, of our staff.

Sincerely,

  
Thomas A. Ladd  
Director, National Range Directorate of  
Environment and Safety

11K-ES-E  
Glendon



State of New Mexico  
**ENVIRONMENT DEPARTMENT**

Ground Water Quality Bureau  
Harold Runnels Building  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502



GARY E. JOHNSON  
GOVERNOR

(505) 827-2918 phone  
(505) 827-2965 fax

PETER MAGGIORE  
Secretary

March 10, 1999

Mr. Thomas A. Ladd, Director  
National Range Directorate of Environment and Safety  
U.S. Army White Sands Missile Range  
White Sands Missile Range, NM 88002

RE: Notification of Discharge of Diesel at Malpais Instrumentation Site and Denver Site, White Sands Missile Range, New Mexico

Dear Mr. Ladd:

The Ground Water Quality Bureau (GWQB) of the New Mexico Environment Department (NMED) has reviewed a notification of discharge report submitted by White Sands Missile Range on February 17, 1999. On March 5, 1999, GWQB received a written request from White Sands Missile Range to extend the due date for a Corrective Action Report to thirty days because the Missile Range would like to complete the investigation before proposing remedial actions. Pursuant to New Mexico Water Quality Control Commission Regulation, 20 NMAC 6.2, Section 1203.A.6, the extension of the due date for the Corrective Action Report is hereby granted. The Corrective Action Report should be submitted thirty days after receipt of this letter.

The diesel contamination referenced above is the result of leaks from two aboveground storage tanks (ASTs). The Malpais Instrumentation Site is located south of the Malpais Lava Flow, off of Range Road 315. The Denver Site is on Range Road 316, approximately two miles from the Malpais Site. At the Malpais Instrumentation Site, there is an approximately 6 foot by 9 foot diesel stain in soil directly below an abandoned 2000-gallon AST. The contamination extends to at least 10 feet below the ground surface and may be as wide as 15 feet. There is also an AST feed line that runs underground to a concrete pad at the site. The Denver Site is the site of a former AST. Stained soil is present and so is an AST feed line that extends from the AST to an unknown point. The depth to ground water is approximately 10-60 feet, and the total dissolved solids (TDS) concentration of the ground water

S: 30MAR-NR-ES  
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15 MAR 1999  
112-55

Mr. Ladd, Interim CAR Approval

March 10, 1999

Page 2

is less than 10,000 mg/L. There are no drinking water wells within 5 miles of the contamination, but the contaminated area is upgradient of the surface-water habitat of the pupfish (New Mexico threatened species).

At the Malpais Instrumentation Site, corrective actions to date consist of removing one cubic yard of soil and transporting that soil to the Main Post landfill for remediation, collecting soil samples and analyzing those samples for total petroleum hydrocarbons (TPH), and draining and removing the AST and its footings from the site. The concentrations of TPH reported to NMED range from 1980 to 48500 parts per million. Proposed plans for further corrective action at the Malpais Site include further sampling to determine the horizontal and vertical extent of contamination, excavation and removal of the AST feed line, sampling the area around the feed line, and determination of the extent of contamination. At the Denver Site, investigation is beginning with soil sampling to determine the horizontal and vertical extent of contamination. White Sands Missile Range will not formalize a proposal for final corrective action until the full extent of contamination is known.

In order to further evaluate the potential effects to the nearby surface water, please include the following items with your Corrective Action Report:

1. A topographic map of the affected area,
2. An erosion potential assessment.

Furthermore, your notification of discharge suggests that you may choose to landfarm the contaminated soil after it is excavated. If you choose to landfarm the soil at a site that is not already permitted to do so (i.e. at the site of contamination or elsewhere at White Sands Missile Range), then please file a Notice of Intent (NOI) with the Ground Water Pollution Prevention Section. A copy of the NOI form is enclosed for your use. In addition, if you choose to landfarm in the vicinity of a watercourse and/or if the disturbed area is going to be greater than 5 acres, then you must also file a stormwater pollution prevention plan with the Surface Water Quality Bureau at NMED. For further information about the surface-water issues, please call Barbara Hoditschek at (505) 827-0596.

Mr. Ladd, Interim CAR Approval  
March 10, 1999  
Page 3

NMED appreciates the corrective actions taken to date. If you have any questions about this letter, please call me at (505) 827-0523. Thank you for your cooperation in this matter.

Sincerely,

*Jennifer Parker*

Jennifer Parker  
Assessment and Abatement Section

encl: NOI form

cc: Barbara Hoditschek, NMED SWQB  
Ken Smith, NMED District 3 Office  
Julie Jacobs, GWQB  
Jennifer Parker, GWQB

NOTICE OF INTENT

1. Name and address of the person making the discharge. \_\_\_\_\_

Telephone: \_\_\_\_\_

Work No: \_\_\_\_\_

2. Location of the discharge (in township, range and section, 1/4, 1/4, 1/4, if available).  
\_\_\_\_\_  
\_\_\_\_\_

3. The means of discharge (to a lagoon, flowing stream, water course, arroyo, septic tank-leachfield, other) - specify.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. The estimated concentration of contaminants in the discharge.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. The type of operation from which the discharge is derived.  
\_\_\_\_\_  
\_\_\_\_\_

6. The estimated flow to be discharged per day.  
\_\_\_\_\_

7. The estimated depth to ground water.  
\_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Return this form to:

Phone: (505) 827-2900

FAX: (505) 827-2965

New Mexico Environment Department  
Ground Water Pollution Prevention Section  
P.O. Box 26110  
Santa Fe, NM 87502



## DEPARTMENT OF THE ARMY

U.S. ARMY WHITE SANDS MISSILE RANGE  
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-

REPLY TO  
ATTENTION OF

April 8, 1999

National Range Directorate of Environment and Safety

Ms. Julie Jacobs  
Groundwater Bureau  
New Mexico Environment Department  
2044 Galisteo  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Dear Ms. Jacobs:

This letter is to update you on our findings at the previously reported Malpais and Denver sites, and provide you with our current action plans to determine the total extent of the contamination. Final corrective action for remediation of these sites has not been determined at this time. Plans will be formalized once the total extent of the contamination has been determined. Per your request, a topographic map of the affected area is enclosed at Tab A. Also, an erosion potential assessment will be completed following an unexploded ordnance surface clearance of both sites. The clearance is required due to the fact that both sites are near a live ordnance impact area, and safety concerns related to this issue may impact our future actions and any required remediation work.

At the Malpais Instrumentation Site, the product lines from the aboveground storage tank (AST) have been removed. Soil samples collected at the north end of the product lines indicated hydrocarbon contamination up to 6,360 mg/kg at a depth of 15 feet. Beneath the AST, the horizontal extent of the contamination was determined from previous sampling; however, the vertical extent is still undefined. A hand auger boring was completed in the center of the highest known contamination to a depth of 25 feet, where a sample was taken. This sample result indicated hydrocarbon contamination of 435 mg/kg. Map and sampling results are at Tab B.

At Denver Site, where the aboveground tank was, the horizontal and vertical extent of the contamination has been determined. The sampling for determining the horizontal extent, at 10 feet from the center of the contamination in all directions and 10 feet in depth, was non-detect. For the vertical extent, at five feet the contamination level was 14,500 mg/kg, but at 15 feet it was 71 mg/kg, and 25 feet it was non-detect. However, when we removed the product line and took samples, the results indicated contamination at the south end of the product line, the location of a former equipment rack. At the former equipment rack, the horizontal extent of the contamination was determined from the samples; however, the vertical extent is still undefined. A sample collected at 24 feet indicated hydrocarbon contamination of 9,640 mg/kg. Map and sampling results are at Tab C.

At this time we are extending our investigation to determine the vertical extent of contamination at both sites. Four boreholes will be drilled at both Malpais and Denver Sites to determine the depth to groundwater, groundwater flow direction, and groundwater characteristics. The boreholes will be placed approximately 100-200 yards from the release site at 90-degree angles from center. Additionally, one upgradient groundwater monitoring well will be installed at both sites. Water samples will be collected and analyzed for the parameters shown in the Table at Tab D.

A total of fifteen additional soil borings will be completed at Denver and Malpais Sites to confirm the horizontal extent and define the vertical extent of contamination. Five soil borings will be completed at each of the following locations: Denver Site – adjacent to the equipment rack, Malpais Site – former AST location, and Malpais Site – northern end of the product lines. At each location, one boring will be placed in the center of the highest known contamination. The four additional boring placements will be placed based on the known analytical results of the samples obtained from the hand auger borings. The boreholes will be advanced to a minimum depth of 10 feet below contamination. In the event that contamination extends to groundwater, a grab sample of groundwater will be collected and analyzed. All borings will be drilled using a continuous flight hollow-stem auger. All soil cuttings will be containerized in a double-lined roll-off container, all equipment will be decontaminated before and after each use, and the purge water will be containerized in 55-gallon drums. Upon completion of activities, the soil cuttings, decontamination water, and purge water will be characterized and properly disposed of.

The tentative schedule for this work to be completed is the 20-29 April 1999. If any representatives, from your office, wish to observe any or all activities pertaining to this investigation, please call to confirm the dates. We will be using a commercial certified laboratory to do the sample analysis, and anticipate that we will receive the results in the 5-15 May 1999 time frame. We will prepare and submit the necessary remediation or abatement plans for your approval once we have accomplished this work and fully delineated the contamination. If additional investigation or analysis is required we will notify you and request an extension as needed.

If you have any questions, please do not hesitate to call or contact Ms. Glenda Wyatt, Environmental Compliance Division, (505) 678-2224.

Sincerely,



Thomas A. Ladd  
Director, National Range Directorate of  
Environment and Safety

Enclosures

**APPENDIX B**  
**PHOTOGRAPHS**



**Photograph B-1. Tank prior to removal.**



**Photograph B-2. Dark stain beneath the tank.**



**Photograph B-3. Removal of the tank's remaining contents.**



**Photograph B-4. Typical surface condition and environment at Malpais Site.**



**Photograph B-5. Removal of concrete pedestals.**



**Photograph B-6. Site following removal of tank, pedestals, and approximately 1 cubic yard of contaminated soil.**



**Photograph B-7. Grading of site to promote positive drainage away from the contaminated zone.**



**Photograph B-8. Several hand auger boring locations from the preliminary subsurface investigation.**



**Photograph B-9. Conducting hand auger borings.**



**Photograph B-10. Conducting hand auger borings.**



**Photographs B-11. Backfilling hand auger borings with bentonite chips.**



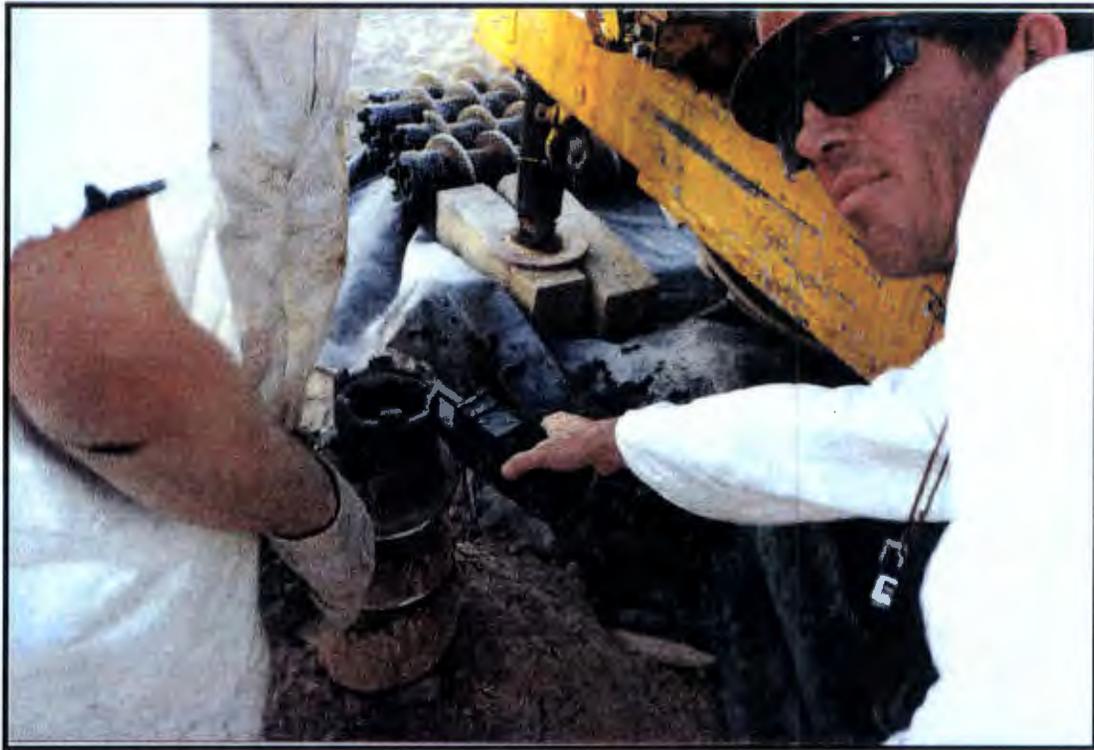
**Photograph B-12. Drilling Apparatus (CME 750 ATV Hollow Stem Auger).**



**Photograph B-13. Soil sampling with the split-barrel sampler.**



**Photograph B-14. Monitoring the breathing zone with the field PID.**



**Photograph B-15. Monitoring the soil boring with the field PID.**



**Photograph B-16. Equipment decontamination pad.**



**Photograph B-17. Decontamination of soil sampling equipment.**



**Photograph B-18. Soil sample collection.**



**Photograph B-19. Typical photograph of core samples.**



**Photograph B-20. Mixing bentonite-cement slurry.**



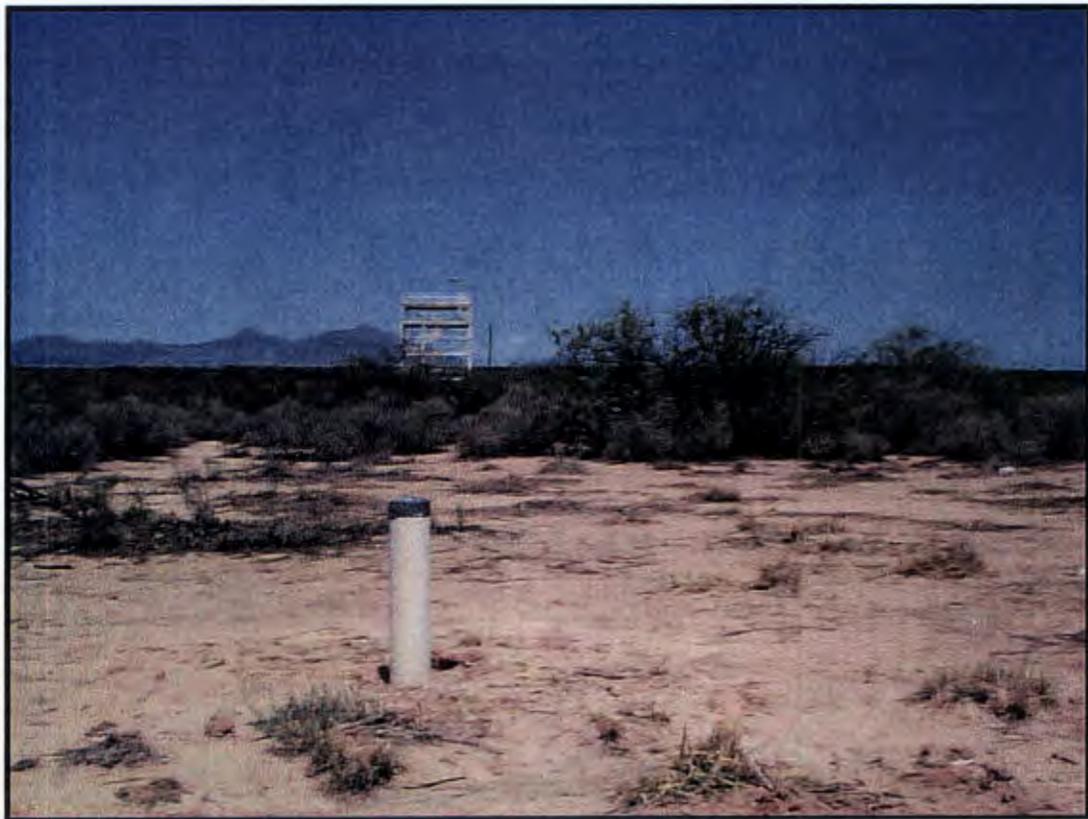
**Photograph B-21. Placement of bentonite-cement slurry in a soil boring.**



**Photograph B-22. Placement of filter pack material in the monitoring well.**



**Photograph B-23. Soil Boring 31152-SB-01 Piezometer**



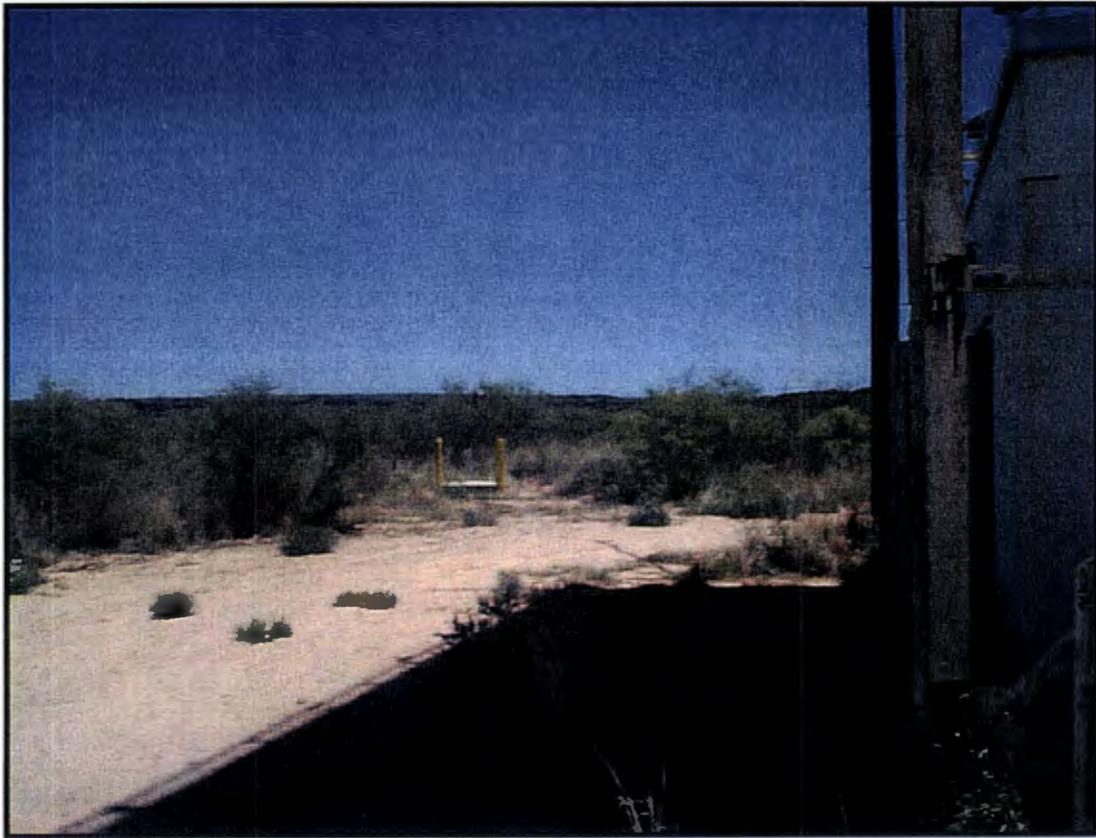
**Photograph B-24. Soil Boring 31152-SB-02 Piezometer**



**Photograph B-25. Soil Boring 31152-SB-03 Piezometer (damaged after construction)**



**Photograph B-26. Soil Boring 31152-SB-04 Piezometer**



**Photograph B-27. Monitoring Well 31152-MW-01**

**APPENDIX C**

**ANALYTICAL RESULTS FROM THE SHALLOW SUBSURFACE  
SOIL INVESTIGATION - WHITE SANDS NR-MT-AA CHEMISTRY  
LABORATORY**

STEWS-NR-MT-AA (70-10r)

11 Feb 99

MEMORANDUM FOR NRES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed 28 soil samples from two sites for Total Petroleum Hydrocarbons.
2. Results. The results are presented in Tables 1-2, Encl 1-2.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 8 Feb 99. The analyses were completed on 10 Feb 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.

2 Encls  
as



ANDRUS GARAY  
Chief, Applied Envr Test Branch

TABLE 1

## Total Petroleum Hydrocarbons (TPH)

## Malpais Station

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
Center, depth 2.0'-2.5'	1,030
Center, depth 4.5'-5.0'	6,860
Center, depth 9.0'-9.5'	6,250
West, depth 6"-12"	8
West, depth 4.5'-5.0'	ND*
West, depth 9.5'-10.0'	ND*
East, depth 6"-12"	840
East-1, depth 3.0'-3.5'	22
East-2, depth 6"-12"	ND*
East-2, depth 4.5'-5.0'	ND*
East-2, depth 9.5'-10.0'	23
East-2, depth 14.5'-15.0'	25
East-2, depth 19.8'-20.0'	ND*
South, depth 6"-12"	7
South, depth 4.5'-5.0'	ND*
South, depth 9.5'-10.0'	12
South, depth 15.0'-15.3'	ND*
South, depth 20.5'-21.0'	9
North, depth 6"-12"	26
North, depth 4.5'-5.0'	7
North, depth 8.0'-8.5'	6
Background, depth 18"-24"	ND*

\*ND = None Detected - detection limit = 5 parts per million (W/W)





STEWS-NR-MT-AA (70-10r)

25 FEB 1999

MEMORANDUM FOR NRES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed 26 soil samples from two sites for Total Petroleum Hydrocarbons.
2. Results. The results are presented in Tables 1-2, Encl 1-2.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 22 Feb 99. The analyses were completed on 24 Feb 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.

2 Encls  
as



ANDRUS GARAY  
Chief, Applied Envr Test Branch

TABLE 2  
 Total Petroleum Hydrocarbons (TPH)  
 Malpais Site

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
Center, depth 10.5'-11.0'	3,820
Center, depth 14.5'-15.0'	10,000
Center, depth 20.0'-20.5'	29
Center, depth 24.5'-25.0'	435
L-S, depth 3.5'-4.0'	ND*
L-C, depth 3.5'-4.0'	8
L-N, depth 3.5'-4.0'	5,600

\*ND = None Detected - detection limit = 5 parts per million (W/W)



**MEVATEC**  
CORPORATION

P.O. Box 399  
Bldg. 126  
WSMR, NM 88002  
(505) 678-0263

**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS		
30066		Malpais Site				18 Feb 99	/ / / / / / / / / / / / / / / /											
SAMPLER'S SIGNATURE:														NO. OF CONTAINERS	REMARKS			
<i>[Signature]</i>																		
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.														
18 Feb 99	0912	Center B.H. 10.5'-11.0'	Soil		1	X												
18 Feb 99	0948	Center 14.5'-15.0'	↓		1	X												
18 Feb 99	1035	Center 20.0'-20.5'			1	X												
18 Feb 99	1108	Center 24.5'-25.0'			1	X												
18 Feb 99	1030	L-S 3.5'-4.0'			1	X												
18 Feb 99	1032	L-C 3.5'-4.0'			1	X												
18 Feb 99	1039	L-N 3.5'-4.0'			1	X												

PROJECT INFORMATION		SAMPLES RECEIVED	1. RELINQUISHED BY: (SIGNATURE)	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY LABORATORY: (SIGNATURE)
PROJECT MANAGER	SHIPPING ID. NO.	TOTAL NO. OF CONTAINERS	(PRINTED NAME)	(PRINTED NAME)	(PRINTED NAME)
George Moon		CHAIN OF CUSTODY SEALS	GREG WATERSON		Michael Gonzalez
VIA:	GOOD CONDITION/CHILLED	CONFORMS TO RECORD	RECEIVED BY:	RECEIVED BY:	(COMPANY)
Hand Delivery			(TIME / DATE)	(TIME / DATE)	MTAA
			SPECIAL INSTRUCTIONS / COMMENTS:		

PLEASE USE BALL POINT PEN

DISTRIBUTION: WHITE - PROJECT FILES; YELLOW - LAB; PINK - FIELD COPY

STEWS-NR-MT-AA (70-10r)

22 MAR 1999

MEMORANDUM FOR NR-ES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed 38 soil samples for Total Petroleum Hydrocarbons.
2. Results. The results are presented in Table 1, Encl 1.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 15 Mar 99. The analyses were completed on 18 Mar 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.



ANDRUS GARAY  
Chief, Applied Envr Test Branch

Encl  
as

TABLE 1

## Total Petroleum Hydrocarbons (TPH)

## Malpais Site

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
L-East, depth 6"-12"	ND*
L-East, depth 4.5'-5.0'	ND*
L-East, depth 9.5'-10.0'	7
L-East, depth 14.5'-15.0'	ND*
L-East-2, depth 6"-12"	ND*
L-East-2, depth 4.5'-5.0'	10
L-East-2, depth 9.5'-10.0'	7
L-East-2, depth 14.5'-15.0'	6
L-East-2, depth 19.5'-20.0'	5
L-West, depth 6"-12"	6
L-West, depth 4.5'-5.0'	5
L-West, depth 9.5'-10.0'	279
L-West-2, depth 6"-12"	5
L-West-2, depth 4.5'-5.0'	5
L-West-2, depth 9.5'-10.0'	5
L-West-2, depth 14.5'-15.0'	ND*
L-West-2, depth 19.5'-20.0'	ND*
L-Center, depth 9.5'-10.0'	352
L-Center, depth 14.5'-15.0'	6,360
L-Center, depth 19.5'-20.0'	6
L-Center, depth 23.0'-23.5'	5
L-North, depth 6"-12"	ND*
L-North, depth 4.5'-5.0'	13
L-North, depth 9.5'-10.0'	435
L-North-2, depth 6"-12"	ND*
L-North-2, depth 4.0'-4.5'	17,100
L-North-3, depth 6"-12"	6
L-North-3, depth 4.5'-5.0'	8
L-North-3, depth 9.5'-10.0'	6
L-North-3, depth 14.5'-15.0'	6
L-North-3, depth 19.5'-20.0'	ND*
L-South, depth 4.5'-5.0'	5
L-South, depth 8.5'-9.0'	8
L-South-2, depth 6"-12"	5
L-South-2, depth 4.5'-5.0'	6
L-South-2, depth 9.5'-10.0'	ND*
L-South-2, depth 14.5'-15.0'	ND*
L-South-3, depth 19.5'-20.0'	ND*

\*ND = None Detected - detection limit = 5 parts per million (W/W)





# MEVATEC CORPORATION

P.O. Box 399  
Bldg. 126  
WSMR, NM 88002  
(505) 678-0263

## CHAIN OF CUSTODY RECORD

PAGE 2 OF 3

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS
300 55		Repairs Site (End of Product Lines)				30 15 / 120										
SAMPLER'S SIGNATURE:																
<i>[Signature]</i>																
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.												
3/11/99	1420	L-Center 7.5'-10.0'	Soil		1	X										
3/11/99	1434	L-Center 14.5'-15.0'			1	X										
3/12/99	0958	L-Center 17.5'-20.0'			1	X										
3/12/99	1122	L-Center 23.0'-23.5'			1	X										
3/11/99	1144	L-North 1'-12"			1	X										
3/11/99	1155	L-North 4.5'-5.0'			1	X										
3/11/99	1229	L-North 7.5'-10.0'			1	X										
3/11/99	1333	L-North-2 1'-12"			1	X										
3/11/99	1102	L-North-2 4.0'-4.5'			1	X										
3/12/99	1013	L-North-3 1'-12"			1	X										
	1011	L-North-3 4.5'-5.0'			1	X										
	1134	L-North-3 7.5'-10.0'			1	X										
	1304	L-North-3 14.5'-15.0'			1	X										
	1329	L-North-3 17.5'-20.0'			1	X										
3/11/99	1243	L-South 4.5'-5.0'			1	X										
3/11/99	1333	L-South 8.5'-9.0'			1	X										

PROJECT INFORMATION		SAMPLES RECEIVED		1. RELINQUISHED BY: (SIGNATURE)		2. RELINQUISHED BY: (SIGNATURE)		3. RECEIVED BY LABORATORY: (SIGNATURE)	
PROJECT MANAGER		TOTAL NO. OF CONTAINERS		(PRINTED NAME)		(PRINTED NAME)		(PRINTED NAME)	
SHIPPING ID. NO.		CHAIN OF CUSTODY SEALS		RECEIVED BY:		RECEIVED BY:		(COMPANY)	
GOOD CONDITION/CHILLED		CONFORMS TO RECORD		(TIME / DATE)		(TIME / DATE)		(TIME / DATE)	
SPECIAL INSTRUCTIONS / COMMENTS:									

PLEASE USE BALL POINT PEN

DISTRIBUTION: WHITE - PROJECT FILES; YELLOW - LAB; PINK - FIELD COPY



**APPENDIX D**  
**UTILITY CLEARANCES**

Date: 4/5/99

MEMORANDUM FOR UTILITIES SERVICES SECTIONS

SUBJECT: UTILITY CLEARANCES      Site Location: Malpais Site

1. Request that the individuals conducting the identification of existing utility lines at the construction site acknowledge identification of the utility by signing and dating by appropriate utility section listed below.

GAS	<u>Neil Hoffman</u>	Date: <u>4/9/99</u>
WATER/SEWER	<u>NO Hoffman</u>	Date: <u>2/19/99</u>
ELECTRICAL DEPT	<u>NO Hoffman</u>	Date: <u>2/19/99</u>
COMMO SECTION	<u>AS MARKED</u> <u>Michael O'Neil</u>	Date: <u>9-APRIL 99</u>
EOD SECTION	<u>SSgt Moore, John L</u> <u>EOD TEAM LEADER</u>	Date: <u>5 April 99</u>
FIRE DEPARTMENT	<u>Ernie Vega</u>	Date: <u>4/14/99</u>

2. Above clearance does not relieve the contractor of responsibility to use proper excavation methods and due care while working around the approximate location of utility services.

3. Attached is a site map identifying the location of the proposed drilling activities.

Requested by:

Greg Watterson  
Greg Watterson E.I.  
MEVATEC Corporation

Glenda Wyatt  
Glenda Wyatt  
NR-ES-E Technical Inspector



BH-NE

BH-W

31152

REMOVED  
PRODUCT LINES

315

FORMER AST  
LOCATION

BH-SE

BH-SW

PROPOSED PIEZOMETER  
LOCATION

PROPOSED SOIL BORING  
LOCATION

NOT TO SCALE

300GG038.DWG

UTILITY/EOD CLEARANCES  
MALPAIS SITE



WHITE SANDS MISSILE RANGE

**APPENDIX E**

**SOIL LOG SHEET AND PIEZOMETER CONSTRUCTION DIAGRAM  
FOR SOIL BORING 31152-SB-01**

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-01

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 35'

Total Depth of Hole: 35'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 25 April 1999

Date Completed: 25 April 1999

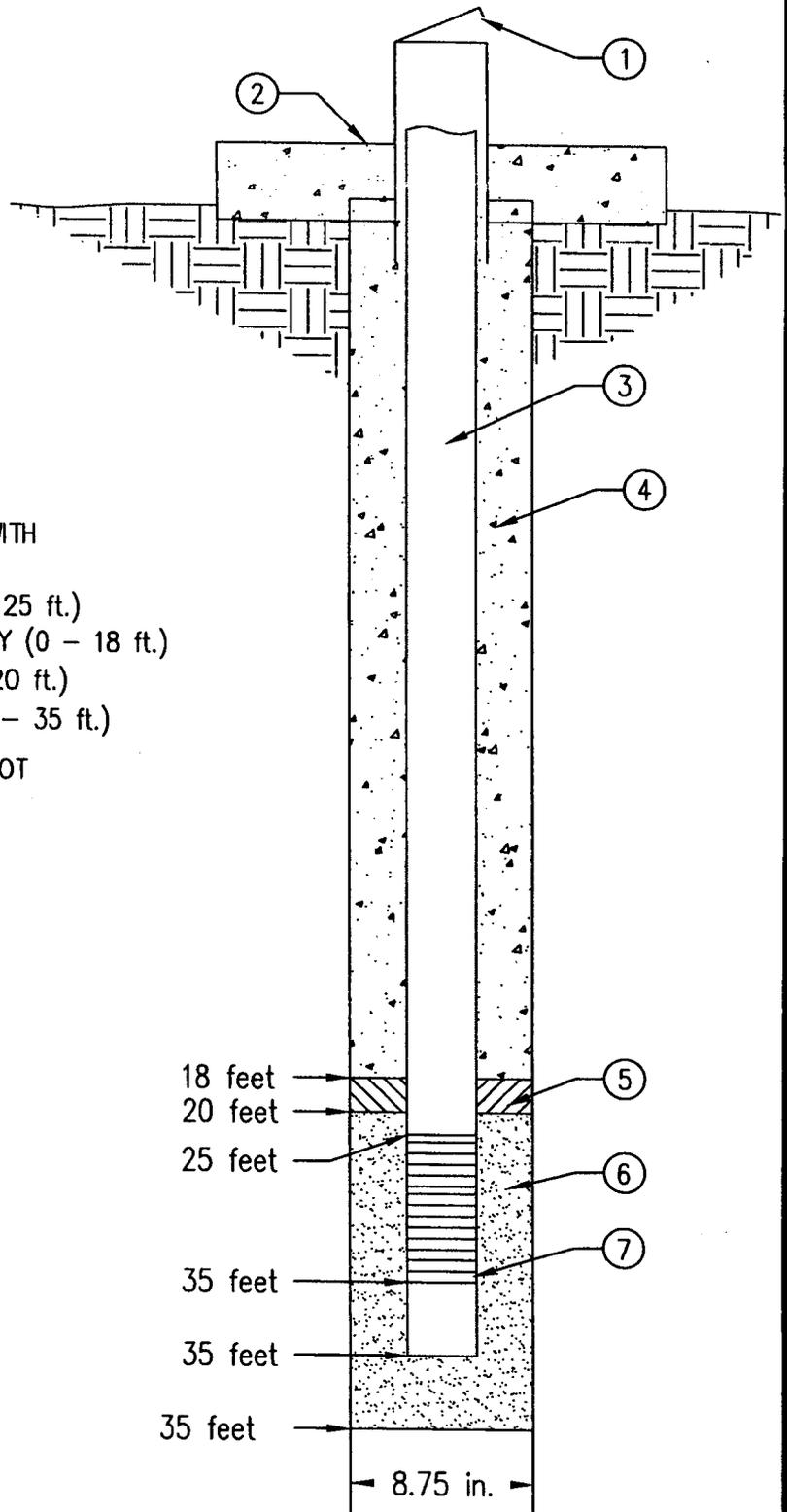
Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
	07:55	Sandy silt, loose, dry, poorly sorted ~15% gypsum, light brown-tan.	50%	0 - 2.5	Silt
5	08:00	Increasing gypsum, to 4', 50%, sandy silt, tan	100%	none	Silty sand, high gypsum, organic smell
	08:05	Silty sand, ~50% gypsum, light brown-tan, loose, dry, moderately sorted	60%	5 - 7.5	
10	08:10		80%	none	
	08:15	11' Silty sand, <10% gypsum, loose, moist, dark brown, moderately sorted	60%	11 - 12.5	Silty sand, 10% gypsum
15	08:20	14' Silty sand, <10% gypsum, loose, moist, red-brown, moderately sorted	70%	14 - 15	14' Silty sand, 10 % gypsum red-brown
	08:25	16' Silty sand, <15% gypsum, loose, moist, dark brown, poorly sorted	50%	16 - 17.5	16' Silt
	08:30		10%	none	
20	08:40	Increasing fines to 21.5' Sand, moderately fine, poorly sorted, dark brown, with clay rip-up clasts (2" dia.)	60%	20 - 21.5 21.5 - 22.5	21.5' Sand
25	08:45	24' Clayey silt, < 10% sand, ~15% gypsum, dark red-brown, stiff, moist	80%	24 - 25	24' Silt
	08:55	25' Silty sand, medium- to fine-grained, loose, moist to wet, dark brown, with 4" cobbles at 27'. Cobbles are fine sand, gypsum cement.	90%	25 - 27.5	25' Sand
30	09:05	Sand, medium- to fine-grained, moderately sorted, saturated, dark brown with 2 - 4" silt aquitards at 27.5' and 29'.	100%	27.5 - 29 29 - 30	27' 4" Cobble layer, sand, wet 27.5' 2" Silt aquitard sand, saturated 29' 4" Silt aquitard sand, saturated
	09:15	31' Sandy silt, stiff, moist, dark red-brown, 3" sand at 31.5'	100%	30 - 31 31 - 32.5	31' Silt
35	09:20	Total Depth Borehole at 0920, 35'	100%	32.5 - 35	

## WELL CONSTRUCTION DIAGRAM

WELL NUMBER: 31152-SB-01  
WELL NAME: Malpais Piezometer  
GEOLOGIST: K. Williams  
DATE STARTED:  
DATE COMPLETED:

### KEYED NOTES:

1. PROTECTIVE STEEL OUTER SURFACE CASING (5 ft.)
2. CONCRETE PAD (36 INCH X 36 INCH X 24 INCH) WITH EMBEDDED BRASS SURVEY MARKER
3. WELL CASING: 2 INCH DIAM. SCHED. 40 PVC (0 - 25 ft.)
4. ANNULUS BACKFILL: CEMENT/5% BENTONITE SLURRY (0 - 18 ft.)
5. UPPER SEAL: HYDRATED BENTONITE CHIPS (18 - 20 ft.)
6. FILTER PACK: 20-40 MESH SIZE SILICA SAND (20 - 35 ft.)
7. WELL SCREEN : 2 INCH DIAM. NO. 10 SIZE MILL SLOT SCHED. 40 PVC (25 - 35 ft.)



### GENERAL NOTES:

1. TOTAL BOREHOLE DEPTH: 35 ft.
2. BOREHOLE DIAMETER: 8.75 INCHES
3. ALL DEPTHS MEASURED FROM GROUND SURFACE.
4. DRAWING NOT TO SCALE.

**APPENDIX F**

**SOIL LOG SHEET AND PIEZOMETER CONSTRUCTION DIAGRAM  
FOR SOIL BORING 31152-SB-02**

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-02

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 75'

Total Depth of Hole: 75'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 20 April 1999

Date Completed: 20 April 1999

Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
5	11:50	Sandy silt, loose, dry, poorly sorted very fine- to fine-grained sand, ~10% clay	80%	0 - 1 1' - 2'	
	12:05	4' Caliche-gypsiferous silt, very fine-grained sand, hard, pink-white	85%	4' - 5'	sand silt hard "stringers"
	12:08	Increasing fines, silts, ~60% ~30% clay	85%	5 - 6	coarsening
	12:12	coarsening	0%		sand
10	12:18	11.5' Hard, silt clay, 2" gravel-sand, with silt, loose, poorly sorted weathered lava	80%	10 - 11.5 11.5 - 12.5	Silt, clay 2" gravel stringer
	12:25	13.5' - Clayey silt, <10% fine sand, "tight", dry, poorly sorted	90%	13.5 - 15	silt-clay
15	12:30	15' Sand, fine, well-sorted, rounded, 20% silt	100%	15 - 16	sand
	12:35	16' Silty clay, hard, moist, selenite inclusions to 19'	90%	16.5 - 17.5	silty clay
20	12:40	19' Sand, fine, moderately sorted, loose, moist	90%	17.5 - 19 19 - 20	Sand, fine, moderate sort
	12:45	21.5' Clay, hard, moist, same as 16' - 19', sand, medium- to fine-grained, poorly sorted, dry, loose, igneous	75%	21.5 - 22.0 22 - 22.5	clay sand
25	12:50	Clay, silty clay, hard, moist, selenite inclusions	85%	22.5 - 24 24.5 - 25	clay
	12:55	26.5' Sand, very fine- to medium-grained, poorly sorted, loose, moist, 30% silt	95%	26 - 27.5	sand
30	13:00	Gravel at 28' - 2" Sand, loose, poorly sorted, ~30% silt	90%	28 - 29	fining
	13:10	~30' Clayey sand, moist	90%	30 - 31 31 - 32.5	clay
35	13:10	31' Silty-clay, fining	100%	32.5 - 35	
	13:20	Silty clay, minor selenite (<5%)	90%	35 - 37.5	
40	13:30	Silty sand, medium- to fine-grained, poorly sorted, saturated	95%	37.5 - 39 39 - 40	sand saturated at 38' - 40'
	13:35	Sandy clay, hard, moist, selenite	60%	40 - 42.5	clay
45	13:45	Clay, hard, moist with dry inclusions, <20% silt	90%	42.5 - 45	
	13:55	Clay	100%	45 - 47.5	
	14:05	Gravel "stringers" in clay 48.5' Clay, <10% silt, hard, moist	100%	48 - 48.5 49 - 50	gravel clay

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-02

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 175'

Total Depth of Hole: 75'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 20 April 1999

Date Completed: 20 April 1999

Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
		Clay, minor silt, hard, slightly moist	90%	50 - 52.5	clay
55	15:10	54' Sand, silts (30%), saturated, medium- to fine-grained moderately sorted	30%	54 - 54.5	sand, saturated clay
	15:30	54.5 Clay 55' Sand, fine- to medium-grained, poorly sorted, wet to saturated, 20% silts	100%	56 - 57.5	sand, wet to saturated
60	15:50	Sand, fine- to medium-grained, poorly sorted, saturated, <20% silts, gypsum cemented clasts up to 3" diameter	90%	57.5 - 60	with gypsum cemented clasts
	16:10		100%	60 - 62.5	
65	16:30	62.5' Sandy clay, medium-grained sand, moist medium stiff, dark red-brown	100%	62.5 - 65	clay
	16:45		100%	65 - 67.5	sandy clay
70	17:00		69' Sandy clay, light greenish gray, stiff, moist	40%	69 - 70
	17:20	Sandy clay, dark red-brown, stiff, moist	100%	70 - 72.5	
75	17:30	Total depth borehole at 17:30, 75'	100%	72.5 - 75	

## WELL CONSTRUCTION DIAGRAM

WELL NUMBER: 31152-SB-02

WELL NAME: Malpais Piezometer

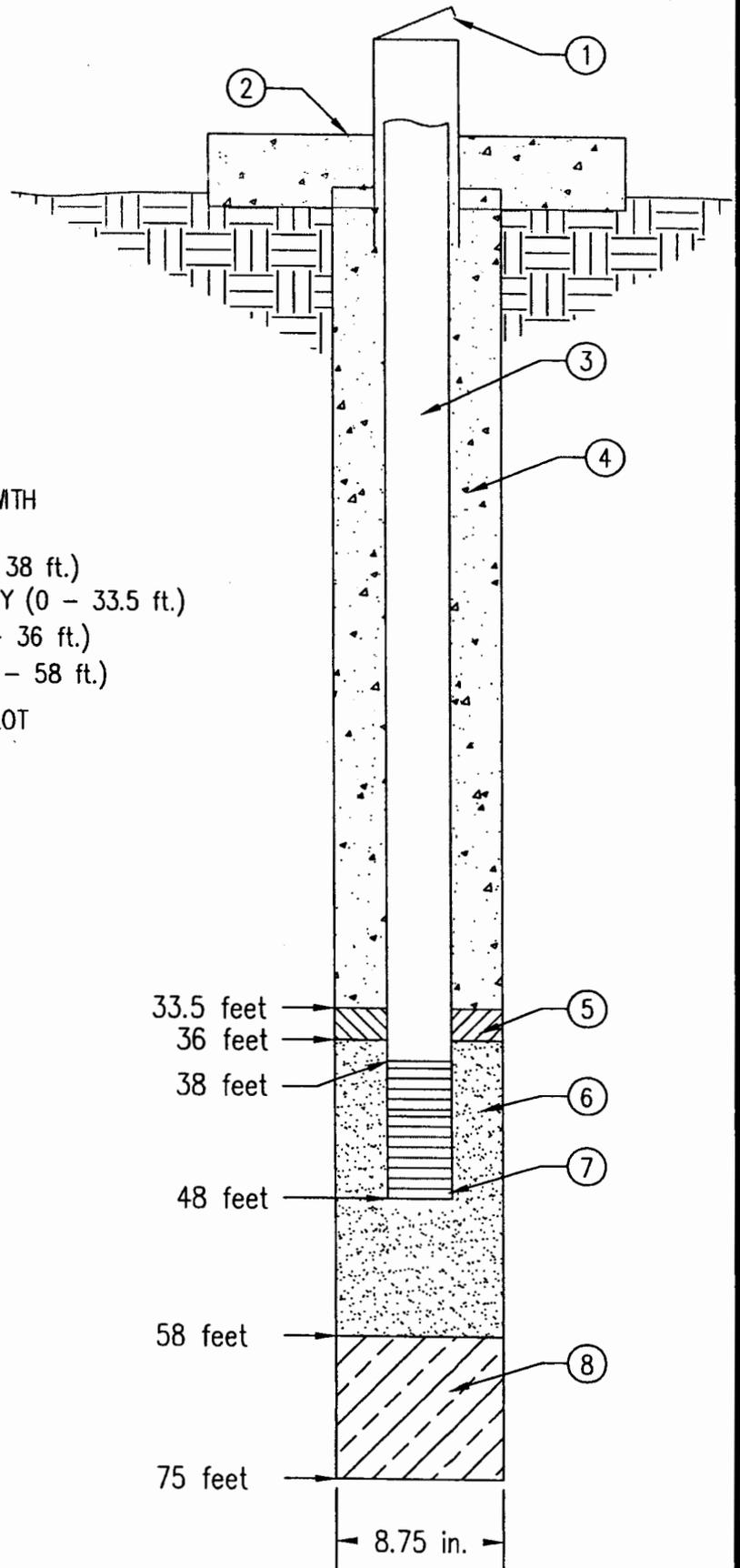
GEOLOGIST: K. Williams

DATE STARTED:

DATE COMPLETED:

### KEYED NOTES:

1. PROTECTIVE STEEL OUTER SURFACE CASING (5 ft.)
2. CONCRETE PAD (36 INCH X 36 INCH X 24 INCH) WITH EMBEDDED BRASS SURVEY MARKER
3. WELL CASING: 2 INCH DIAM. SCHED. 40 PVC (0 - 38 ft.)
4. ANNULUS BACKFILL: CEMENT/5% BENTONITE SLURRY (0 - 33.5 ft.)
5. UPPER SEAL: HYDRATED BENTONITE CHIPS (33.5 - 36 ft.)
6. FILTER PACK: 20-40 MESH SIZE SILICA SAND (36 - 58 ft.)
7. WELL SCREEN : 2 INCH DIAM. NO. 10 SIZE MILL SLOT SCHED. 40 PVC (38 - 48 FT.)
8. LOWER SEAL: BENTONITE CHIPS (58 - 75 ft.)



### GENERAL NOTES:

1. TOTAL BOREHOLE DEPTH: 75 ft.
2. BOREHOLE DIAMETER: 8.75 INCHES
3. ALL DEPTHS MEASURED FROM GROUND SURFACE.
4. DRAWING NOT TO SCALE.

**APPENDIX G**

**SOIL LOG SHEET AND PIEZOMETER CONSTRUCTION DIAGRAM  
FOR SOIL BORING 31152-SB-03**

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-88-03

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: >38'

Total Depth of Hole: 38'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit:

8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 21 April 1999

Date Completed: 21 April 1999

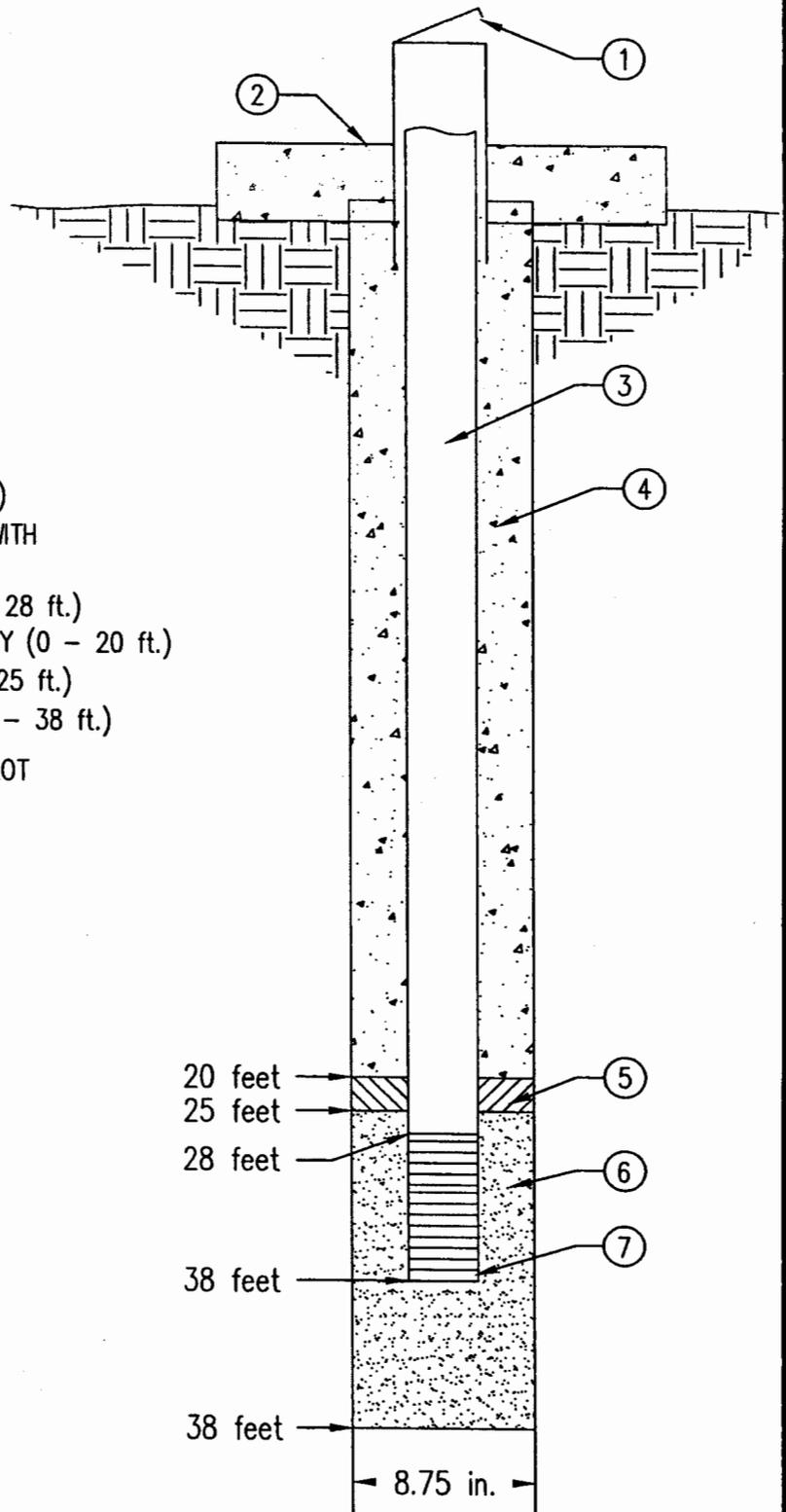
Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
5	12:50	Sandy silt, loose, dry, poorly sorted 1' Silt, high gypsum, with <10% sand, dry, fine laminae	85%	1 - 2.5	silt 1" gypsum-silt - caliche
	13:05	5' Silty sand, fine- to medium-grained, loose, dry, medium brown 6' Gypsiferous silt with fine sand, hard, tight, dry fine laminae	100%	2.5 - 5	"hard" sand silt-gypsum
10	13:10		95%	5 - 6 6 - 7.5	
	13:15		90%	7.5 - 10	
15	13:25	11.5' Silty sand, medium- to fine-grained, loose, dry, light brown-orange (12.5 - 15.0' No recovery)	90%	10 - 11.5 11.5 - 12.5	sand no recovery
	13:35	Silty sand, medium- to fine-grained, loose, dry, light tan-brown 16.5' Clayey silt, with ~20% gypsum, moist, medium stiff, red-brown	0%		sand
20	13:45		90%	15 - 16.5 16.5 - 17	silt-clay, gypsum
	13:50	19' Clayey silt, <5% gypsum, dry, hard, well lithified, tan 20.5' Silty sand, loose, moist, red-brown, medium- to fine-grained	70%	19 - 20	silt-clay
25	14:05	21.5' Sandy silt, with 20% gypsum, dry, stiff moist	90%	20 - 21.5 21.5 - 22.5	sand silt increasing moisture
	14:15	24' Clayey silt, fine laminae, dry, stiff, red-brown with tan	100%	22.5 - 24 24 - 25	clay-silt
30	14:25	26' Silty clay, stiff, moist, red-brown 27' Sand, fine- to medium-grained, loose, wet to saturated, brown	90%	26 - 27.5	silty clay sand-saturated
	14:30	29' Sand, fine- to medium-grained, loose, wet to saturated, brown, cemented with gypsum (3")	100%	27.5 - 29 29 - 29.2 29.2 - 30	perched water hard "stringer" sand, moist saturated
35	14:35	31.5' Silty layer, aquitard, sand medium- to fine-grained, saturated Silt, clay, saturated, soft, dry in lower 2"	95%	30 - 31.5 31.5 - 32	silt layer sand, saturated silt-clay
	14:40	34' Sand, medium- to fine-grained, saturated, dark brown-black	100%	none	sand - saturated
38	15:00	36' Gravel, sand, loose, saturated, dark brown-black 37' Sand, medium- to fine-grained, loose, red-brown, wet. Total Depth Borehole at 15:00 38'	100%	36 - 37 37 - 38	gravel sand T.D. 38'

## WELL CONSTRUCTION DIAGRAM

WELL NUMBER: 31152-SB-03  
WELL NAME: Malpais Piezometer  
GEOLOGIST: K. Williams  
DATE STARTED:  
DATE COMPLETED:

### KEYED NOTES:

1. PROTECTIVE STEEL OUTER SURFACE CASING (5 ft.)
2. CONCRETE PAD (36 INCH X 36 INCH X 24 INCH) WITH EMBEDDED BRASS SURVEY MARKER
3. WELL CASING: 2 INCH DIAM. SCHED. 40 PVC (0 - 28 ft.)
4. ANNULUS BACKFILL: CEMENT/5% BENTONITE SLURRY (0 - 20 ft.)
5. UPPER SEAL: HYDRATED BENTONITE CHIPS (20 - 25 ft.)
6. FILTER PACK: 20-40 MESH SIZE SILICA SAND (25 - 38 ft.)
7. WELL SCREEN : 2 INCH DIAM. NO. 10 SIZE MILL SLOT SCHED. 40 PVC (28 - 38 FT.)



### GENERAL NOTES:

1. TOTAL BOREHOLE DEPTH: 38 ft.
2. BOREHOLE DIAMETER: 8.75 INCHES
3. ALL DEPTHS MEASURED FROM GROUND SURFACE.
4. DRAWING NOT TO SCALE.

**APPENDIX H**

**SOIL LOG SHEET AND PIEZOMETER CONSTRUCTION DIAGRAM  
FOR SOIL BORING 31152-SB-04**

Project Number: 300-QG

Project Name: Malpais and Denver AST

Boring Number: 31152-6B-04

Drilled by: Stewart Bro. Drilling Co./ Stanley Johnson

Thickness of Overburden: 135'

Total Depth of Hole: 35'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 22 April 1999

Date Completed: 22 April 1999

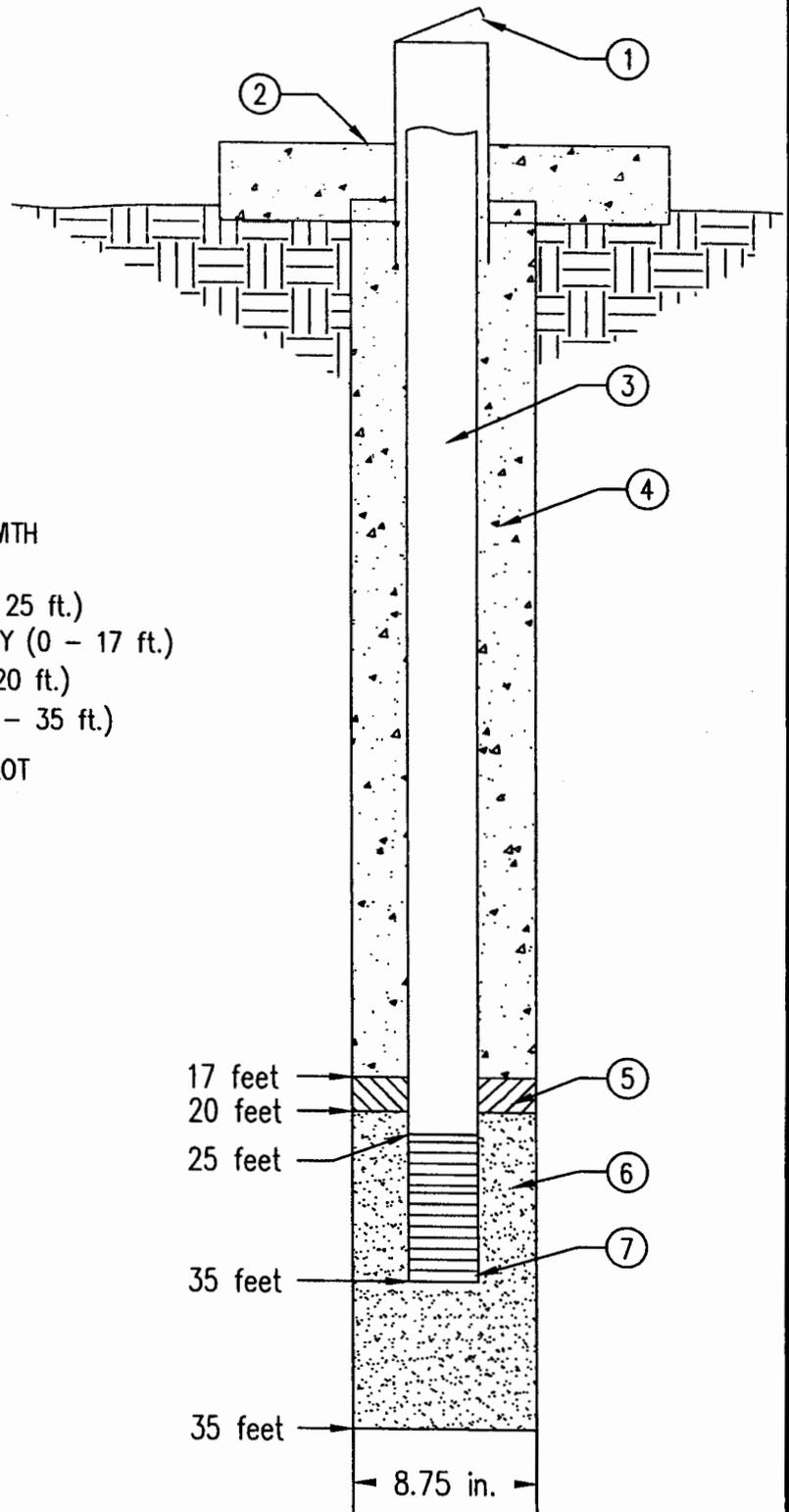
Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
5	12:20	Sandy silt, fine sand, poorly sorted, loose, dry, brown to red-brown, fining downward	75%	0 - 2.5	silt
	12:30	3' Sandy silt, ~50% gypsum, poorly sorted, dry, light brown with white	80%	3 - 5	gypsum-silt
	12:35		90%	none	coarsening down
10	12:40	9' Silty sand, ~50% gypsum, hard, slightly moist, moderately sorted, brown with white	100%	9 - 10	sand-gypsum
	12:45		100%	none	
15	12:50	14' Sandy silt, ~15% - 20% gypsum, moist, stiff, poorly sorted, red-brown	100%	14 - 15	silt-sandy
	12:55	16' Silt, <10% sand, ~10 - 15% gypsum, stiff, red-brown, moist	90%	16 - 17.5	silt
20	13:05	18' Silt, 30% sand, ~10 - 15% gypsum, stiff, red-brown, moist	75%	18 - 19	sandy silt
	13:10	19' Silty sand, fine- to very fine-grained, medium dense, moist, 22' 4" layer of well consolidated, coarse- to medium-grained sand, lava, gypsum, dry, gray-black	95%	19 - 20	sand
25	13:15	22.5' Sandy silt, <5% gypsum, stiff, moist, red-brown	100%	22 - 22.5	coarse, silty sand, hard silt
	13:25	26.5' Sand, 30% silt, loose, saturated, red-brown, with sand, stiff	90%	22.5 - 25	sandy silt
30	13:30	Gravelly sand, loose, saturated, red-brown, silty sand, loose, wet to saturated, medium dense, red-brown	100%	26 - 26.5	gravel
	13:40	30.5' Clayey silt, stiff, <5% sand, wet to saturated, red-brown	100%	26.5-27.5	
35	13:45	Total Depth Borehole at 13:45, 35'	100%	28 - 28.5	
			100%	29 - 30	T.D.

## WELL CONSTRUCTION DIAGRAM

WELL NUMBER: 31152-SB-04  
WELL NAME: Malpais Piezometer  
GEOLOGIST: K. Williams  
DATE STARTED: 22 Apr 99  
DATE COMPLETED: 22 Apr 99

### KEYED NOTES:

1. PROTECTIVE STEEL OUTER SURFACE CASING (5 ft.)
2. CONCRETE PAD (36 INCH X 36 INCH X 24 INCH) WITH EMBEDDED BRASS SURVEY MARKER
3. WELL CASING: 2 INCH DIAM. SCHED. 40 PVC (0 - 25 ft.)
4. ANNULUS BACKFILL: CEMENT/5% BENTONITE SLURRY (0 - 17 ft.)
5. UPPER SEAL: HYDRATED BENTONITE CHIPS (17 - 20 ft.)
6. FILTER PACK: 20-40 MESH SIZE SILICA SAND (20 - 35 ft.)
7. WELL SCREEN : 2 INCH DIAM. NO. 10 SIZE MILL SLOT SCHED. 40 PVC (25 - 35 FT.)



### GENERAL NOTES:

1. TOTAL BOREHOLE DEPTH: 35 ft.
2. BOREHOLE DIAMETER: 8.75 INCHES
3. ALL DEPTHS MEASURED FROM GROUND SURFACE.
4. DRAWING NOT TO SCALE.

**APPENDIX I**

**SOIL LOG SHEETS FOR SOIL BORINGS 31152-SB-05  
THROUGH 31152-SB-14**

Project Number: 300-GG Project Name: Malpele and Denver AST

Boring Number: 31152-SB-05 Drilled by: Stewart Eros Drilling Co./ Stanley Johnson

Thickness of Overburden: 130' Total Depth of Hole: 30'

Geologist: Kyle Williams/Greg Watterson Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV Date Started: 25 April 1999 Date Completed: 25 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	16:55	3' - 5' Silty sand, diesel odor, loose, dry, medium- to fine-grained sand, poorly sorted, red-brown	N/A	0.0	Spoon PID = s Breathing zone PID = bz
	17:00		N/A	0.4	
	17:07		N/A	1.5	
10	17:15	8' - 10' Sandy silt with 15% gypsum, dry, red-brown	N/A	0.2	s 2.3
	17:25		N/A	0.3	
15	17:30	14' - 15' Silt, moderately stiff, <10% sand, red-brown	N/A	1.8	bz 2.0 s 14.1
	17:40		N/A	1.5	
20	17:50	19' - 20' Sandy silt, with clay, 10% gypsum, stiff, moist, red-brown	N/A	1.4	s 0.0
	18:00		N/A	8.9	
25	18:05	24' - 25' Sand, medium- to fine-grained, poorly sorted, loose, moist	N/A	2.2	s 0.0
	18:10		N/A	0.8	
	18:15		N/A	0.0	
30					

Project Number: 300-GG

Project Name: Melba and Denver AST

Boring Number: 31152-SB-06

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 25 April 1999 Date Completed: 25 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	15:35	3' - 5' Silty sand, ~10% gypsum, loose, moist, light brown-tan, medium- to fine-grained	N/A	0.0	Spoon PID = s Breathing zone PID = bz bz 0.0
	15:45		N/A	0.0	bz 0.0 s 0.0
	15:49		N/A	0.0	bz 0.0
10	15:53	8' - 10' Silty sand, ~5% gypsum, loose, moist, light reddish-brown, medium- to fine-grained	N/A	0.0	bz 0.0 s 0.0
	15:58		N/A	0.0	bz 0.0
	16:02		N/A	0.0	bz 0.0 s 0.1
15	16:11	13' - 15' Sandy silt, fine-grained sand, 20% gypsum, soft, moist red-brown with green yellow stain	N/A	0.0	bz 0.0
	16:15		N/A	0.0	bz 0.0 s 0.1
	16:20		N/A	0.0	bz 0.0
20	16:30	18' - 20' Clayey silt, soft moist, <10% sand, red-brown with sand stringers < 1" thick	N/A	0.0	bz 0.0 s 0.1
			N/A	0.0	bz 0.0
			N/A	0.0	bz 0.0 s 0.0
25	16:30	23' - 25' Sand, medium-grained, well sorted, loose, moist black, brown, gray	N/A	0.0	bz 0.0 s 0.0

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-07

Drilled by: Stewart Bro. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 23 April 1999

Date Completed: 23 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
	13:05				Spoon PID = s
	13:10		N/A	0.0	Breathing zone PID = bz
5	13:15	3' - 5' Silty sand, fine- to very fine-grained, ~10% gypsum, light brown-tan, loose, moist	N/A	0.0	s 0.0
	13:22		N/A	0.0	bz 0.0
10	13:25	8' - 10' Sandy silt, gypsum crystals, sand, soft, moist, red-brown	N/A	0.0	s 0.0
	13:35		N/A	0.0	bz 0.0
15	13:37	13' - 15' Sand, medium- to fine-grained, well-sorted, black, gray, white, 10% gypsum, moist loose	N/A	0.0	s 0.0
	13:45		N/A	0.0	bz 0.0
20	13:50	18' - 20' Clayey silt, with 10% gypsum, stiff, moist, red-brown, with white	N/A	0.0	s 0.0
	14:05		N/A	0.0	bz 0.0
25	14:10	23' - 25' Sand, medium- to fine-grained, moderately sorted, loose, moist, black, gray, white Total Depth Borehole 25' at 14:10	N/A	0.0	s 0.0

Project Number: 300-GG

Project Name: Malpais and Denver AST

page 1 of 1

Boring Number: 31152-8B-08

Drilled by: Stewart Broa. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 24 April 1999

Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
	07:25	0' at 07:25, 24 Apr 99	N/A	0.0	Spoon PID = s Breathing zone PID = bz bz 0.0
5	07:30	3' - 5' Silty sand, loose, dry, ~10% gypsum, light brown to tan	N/A	0.0	bz 0.0 s 0.0
	07:35		N/A	0.0	bz 0.0
10	07:37	8'-10' Silty sand, loose, dry, 15% gypsum, red-brown	N/A	0.0	bz 0.0 s 0.0
	07:42		N/A	0.0	bz 0.0
15	07:45	13' - 15' Silty sand, moderately sorted, loose, moist < 5% gypsum, red-brown	N/A	0.0	bz 0.0 s 0.0
	07:50		N/A	0.0	bz 0.0
20	07:52	18' - 20' Sandy silt, soft, moist, 5% gypsum, red-brown	N/A	0.0	bz 0.0 s 0.0
	08:02		N/A	0.0	bz 0.0
25	08:05	23' - 25' medium- to fine-grained, well sorted, loose moist, dark brown, 10% gypsum Total Depth Borehole 25' at 08:05	N/A	0.0	bz 0.0 s 0.0

Project Number: 300-GG Project Name: Malpais and Denver AST

Boring Number: 31152-8B-09 Drilled by: Stewart Bro. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125' Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV Date Started: 24 April 1999 Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
	09:07	0' at 09:05, 24 April 99	N/A	0.0	Spoon PID = s Breathing zone PID = bz bz 0.0
5	09:12	3' - 5' Caliche, sandy silt, hard, dry, light tan	N/A	0.0	bz 0.0 s 0.0
	09:20		N/A	0.0	bz 0.0
10	09:23	8' - 10' Silty sand, fine- to medium-grained gypsum, cemented, dense, moderately sorted, red-brown	N/A	0.0	bz 0.0 s 0.0
	09:30		N/A	0.0	bz 0.0
15	09:33	13' - 15' Silty sand, poorly sorted, 10% gypsum, medium dense brown with yellow-green staining (QA)	N/A	0.0	bz 0.0 s 0.0
	09:40		N/A	0.0	bz 0.0
20	09:45	18' - 19' Silty sand, loose, dry, 10% gypsum, light brown-tan 19' - 20' Sandy silt, stiff, moist, red-brown	N/A	0.0	bz 0.0 s 0.0
	09:58		N/A	0.0	bz 0.0
25	10:00	Sand, medium-grained, loose, moist to wet, well-sorted, black, gray, brown Total Depth Borehole 25' at 10:00	N/A	0.0	bz 0.0 s 0.0

Project Number: 300-GG

Project Name: Mabel and Denver AST

Boring Number: 31152-SB-10

Drilled by: Stewart Broa. Drilling Co./ Stanley Johnson

Thickness of Overburden: 30'

Total Depth of Hole: 30'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 24 April 1999

Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	11:05	3' - 5' Silty sand, loose, dry, light tan-brown	N/A	0.0	Spoon PID = s Breathing zone PID = bz bz 0.0
	11:10		N/A	0.0	
	11:15		N/A	0.0	bz 0.0 s 3.6
10	11:20	8' - 10' Sandy silt, stiff, moist, 10% gypsum red-brown with gray-green stain at 9'	N/A	0.0	bz 0.0
	11:25		N/A	0.0	bz 0.0 s 34.0
	11:28		N/A	0.0	bz 0.0
15	11:32	13' - 15' Silty sand, medium dense, medium- to fine-grained, moist, light tan-brown	N/A	0.0	bz 0.0 s 22.4
	11:37		N/A	0.9	bz 0.3
	11:44		N/A	1.6	bz 0.0 s 0.3
20	11:50	18' - 20' Sandy silt, soft, moist, 10% gypsum, red-brown	N/A	5.8	bz 0.2
	11:54		N/A	0.4	bz 0.0 s 2.5
	12:00		N/A	0.3	bz 0.0
25	12:05	23' - 25' Sand, moderate to well-sorted, moist, wet, dark brown, black	N/A	0.7	bz 0.0 s 0.1
30	12:05	28' - 30' Sandy silt, medium- to fine-grained, dense, saturated, medium brown Total Depth Borehole 30' at 12:05	N/A	0.7	

Project Number: 300-GG

Project Name: Meibels and Denver AST

Boring Number: 31152-SB-11

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 25 April 1999

Date Completed: 25 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
	08:15	0' at 08:10, 25 April 99	N/A	0.0	Spoon PID = s Breathing zone PID = bz
5	08:23	3' - 5' Sandy silt, high gypsum, caliche, dry, hard, moderately sorted, tan	N/A	0.1	bz 0.0
	08:30		N/A	0.0	bz 0.1 s 0.1
	08:35		N/A	0.0	bz 0.0
10	08:38	8' - 10' Silty sand, medium dense, poorly sorted, moist, red-brown	N/A	0.0	bz 0.0 s 0.1
	08:45		N/A	0.0	bz 0.0
	08:48		N/A	0.1	bz 0.1 s 0.1
15	08:53	14.5' - 15' Silty sand, loose, wet, poorly sorted, medium- to very fine-grained, black, gray	N/A	0.0	bz 0.0
	09:10		N/A	0.0	bz 0.0 s 0.1
	09:14		N/A	0.0	bz 0.0
20		18' - 20' Sandy, clayey silt, stiff, moist, red-brown	N/A	0.0	bz 0.0 s 0.1
25		23' - 25' Sandy silt, soft, wet, dark red-brown, minor gypsum	N/A	0.0	bz 0.0
		Total Depth Borehole 25' at 09:14			s 0.0

Project Number: 300-GG

Project Name: Melvale and Denver AST

Boring Number: 31152-SB-12

Drilled by: Stewart Bro. Drilling Co./ Stanley Johnson

Thickness of Overburden: 25'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit:

8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 24 April 1999

Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	16:45	3' - 5' Silty sand, medium- to fine-grained, 40% silts, loose moist, light brown, minor gypsum	N/A	0.0	Spoon PID = s
	16:48		N/A	0.0	Breathing zone PID = bz bz 0.0
	16:50		N/A	0.0	bz 0.0 s 0.1
10	16:55	9' - 10' Silty sand, medium- to fine-grained, loose, moist, red-brown	N/A	0.0	bz 0.0
	17:00		N/A	0.0	bz 0.0 s 0.1
	17:05		N/A	0.0	bz 0.0
15	17:10	13' - 15' Silty sand, medium- to fine-grained, loose, moist, red-brown	N/A	0.0	bz 0.0 s 0.0
	17:15		N/A	0.0	bz 0.0
	17:20		N/A	0.0	bz 0.0 s 0.0
20	17:25	19' - 20' Sandy silt, loose, soft, 10% gypsum, red-brown	N/A	0.0	bz 0.0
	17:30		N/A	0.0	bz 0.0
	17:30		N/A	0.0	bz 0.0 s no reading
25		23.5' - 25' Sandy silt, with clay, stiff, moist, red-brown Total Depth Borehole 25' at 17:30, 24 Apr 99			

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-13

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 24 April 1999

Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	14:40	3' - 5' Caliche, silty sand, high gypsum (60%), loose, dry, light tan	N/A	0.0	Spoon PID = s
	14:45				Breathing zone PID = bz
	14:50		N/A	0.0	bz 0.0
	14:55		N/A	0.0	s 0.0
10	15:00	8' - 10' Silty sand, medium dense, medium- to fine-grained, dry to moist, red-brown with white	N/A	0.0	bz 0.0
	15:20		N/A	0.0	s 0.0
	15:25		N/A	0.0	bz 0.0
15	15:30	13' - 15' Sandy silt, stiff, 15% gypsum, moist, red-brown	N/A	0.0	s 0.0
	15:35		N/A	0.0	bz 0.0
20	15:40	18' - 20' Clayey silt, stiff, moist, 15% gypsum, red-brown with pink	N/A	0.0	s 0.0
	15:45		N/A	0.0	bz 0.0
	15:45		N/A	0.0	s 0.1
25	15:45	24' - 25' Sand, medium-grained, well-sorted, wet, red-brown, black, minor white Total Depth Borehole 25' at 15:45 on 24 Apr 99			

Project Number: 300-GG

Project Name: Malpais and Denver AST

Boring Number: 31152-SB-14

Drilled by: Stewart Bros. Drilling Co./ Stanley Johnson

Thickness of Overburden: 125'

Total Depth of Hole: 25'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit: 8.75 HSA

Drilling Method: CME 750 ATV

Date Started: 24 April 1999

Date Completed: 24 April 1999

Depth	Time	Classification of Materials	% Rec	Borehole PID	Remarks
5	18:00	3' - 5' Sandy silt, soft, dry, 20% gypsum, red-brown, with white	N/A	0.0	Spoon PID = s Breathing zone PID = bz
	18:05				bz 0.0
	18:10				bz 0.0 s 0.0
10	18:13	9' - 10' Silty sand, fine-grained, moderately sorted, loose, moist, red-brown	N/A	0.0	bz 0.0
	18:15				bz 0.0 s 0.0
	18:22				bz 0.0
15	18:25	13' -15' Silty sand, fine-grained, moderately sorted, medium dense, moist, red-brown	N/A	0.0	bz 0.0 s 0.0
	18:30				bz 0.0
	18:34				bz 0.0 s 0.1
20	18:37	18' - 20' Sandy silt, stiff, moist, 10% gypsum, red-brown	N/A	0.0	bz 0.0
	18:43				bz 0.0 s 0.0
	18:43				bz 0.0 s 0.0
25	18:43	23' -25' Sand, sandstone, cemented with gypsum, 20% silt, wet, dark brown Total Depth Borehole 25' at 18:43 on 24 Apr 99	N/A	0.0	

**APPENDIX J**

**SOIL LOG SHEET AND WELL CONSTRUCTION DIAGRAM FOR  
MONITORING WELL 31152-MW-01**

Project Number: 300-GG

Project Name: Melpale and Denver AST

Boring Number: 31152-MW-01

Drilled by: Stewart Broa. Drilling Co./ Stanley Johnson

Thickness of Overburden: 145'

Total Depth of Hole: 45'

Geologist: Kyle Williams/Greg Watterson

Size and Type of Bit:

11.75"  
925-HSA

Drilling Method: CME 750 ATV

Date Started: 25 April 1999 Date Completed: 25 April 1999

Depth	Time	Classification of Materials	% Rec	Box or Sample No.	Remarks
	12:05	Sandy silt, loose, dry, red-brown	n/a	n/a	silt Pulldown nominal
5	12:16	Silty sand, loose, dry, poorly sorted, light brown-tan	n/a	n/a	sand
10	12:25	10' - 10.5' Cobbles	n/a	n/a	cobbles, sand
	12:30	Silty sand, loose, moist, 10% gypsum, dark brown	n/a	n/a	
15	12:35	15' - 15.5' Sandy, clayey silt, stiff, red-brown, silty sand, same as 10' - 15'	n/a	n/a	sand, silt
	12:40		n/a	n/a	
20		19.5' Sandy silt, 10% gypsum, soft, wet, red-brown	n/a	n/a	silt Pulldown 450-500
	12:50	Increasing clay to 24'	n/a	n/a	Lunch: 12:50-13:20, 22.5'
25			n/a	n/a	
	13:30	27' Sand, (no cuttings), "soft" drilling, probable saturation	n/a	n/a	sand Pulldown nominal
30	13:39	30' "Hard" drilling, clayey silt with 15% sand, gypsum, red-brown, saturated with 4"-1.5" sand stringers every 2' - 5' to 37'	n/a	n/a	silt-clay Pulldown 600
35			n/a	n/a	
	13:58	39.5' Sand, "soft" drilling	n/a	n/a	sand
40		40.5' Clayey silt, same as 30' - 39.5'	n/a	n/a	clay-silt Pulldown 500-600
	14:00		n/a	n/a	
45	14:10	45' Total Depth Borehole at 14:10, 25 April 1999			TD 45'

## WELL CONSTRUCTION DIAGRAM

WELL NUMBER: 31152-MW-01

WELL NAME: Malpais Upgradient MW

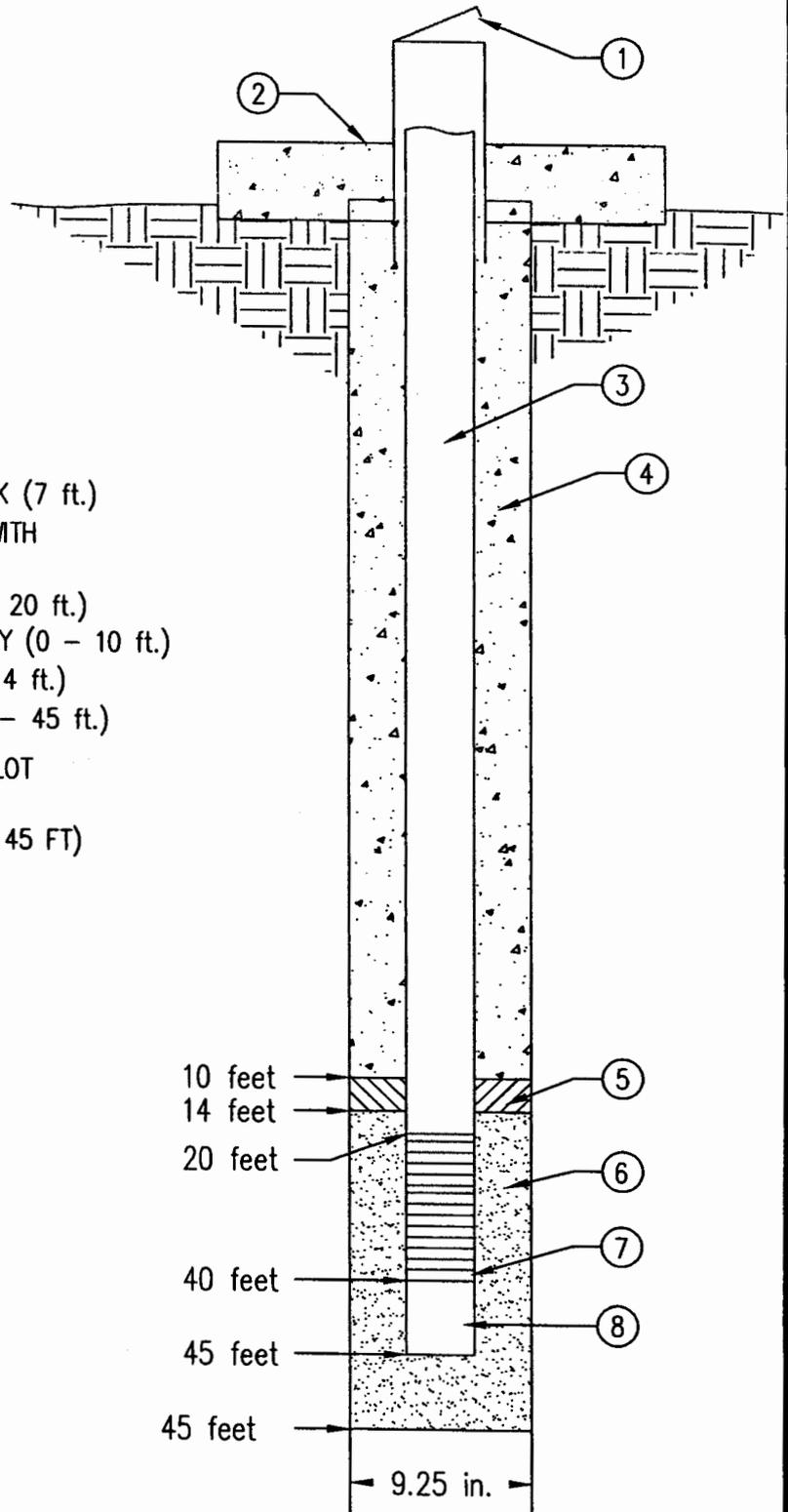
GEOLOGIST: K. Williams

DATE STARTED: 25 Apr 99

DATE COMPLETED: 25 Apr 99

### KEYED NOTES:

1. PROTECTIVE STEEL OUTER SURFACE CASING W/LOCK (7 ft.)
2. CONCRETE PAD (36 INCH X 36 INCH X 24 INCH) WITH EMBEDDED BRASS SURVEY MARKER
3. WELL CASING: 4-INCH DIAM. SCHED. 40 PVC (0 - 20 ft.)
4. ANNULUS BACKFILL: CEMENT/5% BENTONITE SLURRY (0 - 10 ft.)
5. UPPER SEAL: HYDRATED BENTONITE CHIPS (10 - 14 ft.)
6. FILTER PACK: 20-40 MESH SIZE SILICA SAND (14 - 45 ft.)
7. WELL SCREEN : 4-INCH DIAM. NO. 10 SIZE MILL SLOT SCHED. 40 PVC (20 - 40 FT.)
8. WELL SUMP: 4-INCH DIAM. SCHED. 40 PVC (40 - 45 FT)



### GENERAL NOTES:

1. TOTAL BOREHOLE DEPTH: 45 ft.
2. BOREHOLE DIAMETER: ~~9.25~~ INCHES 11.75 inches
3. ALL DEPTHS MEASURED FROM GROUND SURFACE.
4. DRAWING NOT TO SCALE.

**APPENDIX K**

**ANALYTICAL RESULTS – TRACE ANALYSIS INCORPORATED**



# TRACE ANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9  
4725 Ripley Avenue, Suite A

Lubbock, Texas 79424 800•378•1296  
El Paso, Texas 79922 888•588•3443  
E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298  
915•585•3443 FAX 915•585•4944

## REPORT SUMMARY

May 3, 1999

**CLIENT:** MEVATEC CORPORATION  
P.O. BOX 399, BLDG 126  
WSMR, NM 88002

**SAMPLE DATES:** 04-22-99 – 04-25-99

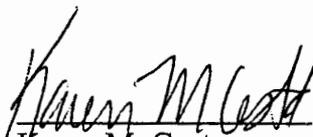
**PROJECT ID:** 300GG; Malpais, Denver, & LC-32

**ANALYSES REQUESTED:** Mod 8015-DRO

**TEMPERATURE UPON RECEIPT:** 2 Degrees Celsius  
Temperature acceptance range for most analysis is 2 – 6 degrees Celsius.

There were no unusual occurrences during these analyses,

Laboratory analyses were performed on samples utilizing procedures published in Standards Methods for the Examination of Water and Wastewater, 18<sup>th</sup> Edition 1992; EPA Test Methods for Evaluating Solid Waste 3<sup>rd</sup> Edition, through December 1996 revisions; or EPA Methods for the Chemical Analysis of Water and Wastes[EPA-600/4-79-020], March 1983, and the latest promulgated updates. This is an integral part of the report and must be included with all copies.



Karen M. Costa  
Technical Director



**MEVATEC**  
CORPORATION

P.O. Box 399  
Bldg. 126  
WSMR, NM 88002  
(505) 678-0263

**CHAIN OF CUSTODY RECORD**

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS
30066		Melpis, Demerit LC-32				18	/ / / / / / / / / / / / / / / /									
SAMPLER'S SIGNATURE:																
<i>[Signature]</i>																
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.												
4/22/99	1710	31152-SB-05-(4.5-5.0)	Soil	991817	1	X										
4/22/99	1715	31152-SB-05-(9.5-10.0)	Soil	991818	1	X										
4/22/99	1730	31152-SB-05-(14.5-15.0)	Soil	991819	1	X										
4/22/99	1750	31152-SB-05-(19.5-20.0)	Soil	991820	1	X										
4/22/99	1805	31152-SB-05-(24.5-25.0)	Soil	991821	1	X										
4/23/99	1315	31152-SB-07-(4.5-5.0)	Soil	991822	1	X										
4/23/99	1325	31152-SB-07-(9.5-10.0)	Soil	991823	1	X										
4/23/99	1337	31152-SB-07-(14.5-15.0)	Soil	991824	1	X										
4/23/99	1350	31152-SB-07-(19.5-20.0)	Soil	991825	1	X										
4/23/99	1410	31152-SB-07-(24.5-25.0)	Soil	991826	1	X										
4/23/99	1545	31152-SB-06-(4.5-5.0)	Soil	991827	1	X										
4/23/99	1553	31152-SB-06-(9.5-10.0)	Soil	991828	1	X										
4/23/99	1602	31152-SB-06-(14.5-15.0)	Soil	991829	1	X										
4/23/99	1615	31152-SB-06-(19.5-20.0)	Soil	991830	1	X										
4/23/99	1630	31152-SB-06-(24.5-25.0)	Soil	991831	1	X										
4/24/99	0730	31152-SB-08-(4.5-5.0)	Soil	991832	1	X										
4/24/99	0737	31152-SB-08-(9.5-10.0)	Soil	991833	1	X										
4/24/99	0745	31152-SB-08-(14.5-15)	Soil	991834	1	X										

PROJECT INFORMATION		SAMPLES RECEIVED	18	1. RELINQUISHED BY: (SIGNATURE)	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY LABORATORY: (SIGNATURE)
PROJECT MANAGER		TOTAL NO. OF CONTAINERS	18	<i>[Signature]</i>		<i>[Signature]</i>
PROJECT MANAGER	Dana Downs	CHAIN OF CUSTODY SEALS	✓	(PRINTED NAME)		(PRINTED NAME)
SHIPPING ID. NO.		GOOD CONDITION/CHILLED	2	RECEIVED BY:		RECEIVED BY:
VIA:	Hand Delivery	CONFORMS TO RECORD	✓	(TIME / DATE)		(TIME / DATE)
				SPECIAL INSTRUCTIONS / COMMENTS:		

PLEASE USE BALL POINT PEN

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(505) 678-0263

**CHAIN OF CUSTODY RECORD**

PAGE 2 OF 3

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS
300 GG		Malpais DENVER, LLC-32				8015 Moel DRO										
SAMPLER'S SIGNATURE:																
<i>[Signature]</i>																
DATE COLLECTED	TIME	SAMPLE ID	MATRIX	LAB NO.												
4/24/99	0752	31152-SB-08-(19.5-20)	Soil	991835	1	X										
4/24/99	0805	31152-SB-08-(24.5-25.0)	soil	991836	1	X										
4/24/99	0920	31152-SB-09-(4.5-5.0)	Soil	991837	1	X										
4/24/99	0923	31152-SB-09-(9.5-10.0)	Soil	991838	1	X										
4/24/99	0933	31152-SB-09-(14.5-15.0)	Soil	991839	1	X										
4/24/99	0945	31152-SB-09-(19.5-20.0)	Soil	991840	1	X										
4/24/99	1000	31152-SB-09-(24.5-25.0)	Soil	991841	2	X										
4/24/99	1115	31152-SB-010-(4.5-5.0)	Soil	991842	1	X										
4/24/99	1125	31152-SB-010-(9.5-10.0)	Soil	991843	1	X										
4/24/99	1132	31152-SB-010-(14.5-15.0)	Soil	991844	1	X										
4/24/99	1144	31152-SB-010-(19.5-20.0)	Soil	991845	1	X										
4/24/99	1154	31152-SB-010-(24.5-25.0)	Soil	991846	1	X										
4/24/99	1205	31152-SB-010-(29.5-30.0)	Soil	991847	1	X										
4/24/99	1450	31152-SB-13-(4.5-5.0)	Soil	991848	1	X										
4/24/99	1500	31152-SB-13-(9.5-10.0)	Soil	991849	1	X										
4/24/99	1525	31152-SB-13-(14.5-15.0)	Soil	991850	1	X										
4/24/99	1535	31152-SB-13-(19.5-20.0)	Soil	991851	1	X										
4/24/99	1545	31152-SB-13-(24.5-25.0)	Soil	991852	1	X										

PROJECT INFORMATION		SAMPLES RECEIVED	18	1. RELINQUISHED BY: (SIGNATURE)	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY LABORATORY: (SIGNATURE)
PROJECT MANAGER	<i>[Signature]</i>	TOTAL NO. OF CONTAINERS	18	(PRINTED NAME)	(PRINTED NAME)	(PRINTED NAME)
SHIPPING ID. NO.		CHAIN OF CUSTODY SEALS	✓	RECEIVED BY:	RECEIVED BY:	(COMPANY)
VIA:	Hard Delivery	GOOD CONDITION/CHILLED	✓	(TIME / DATE)	(TIME / DATE)	(TIME / DATE)
		CONFORMS TO RECORD	✓	SPECIAL INSTRUCTIONS / COMMENTS:		

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**CHAIN OF CUSTODY RECORD**

PAGE 3 OF 3

PROJECT NO. <u>30099</u>		PROJECT NAME <u>Malpais DEMUER LC-32</u>			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS		
SAMPLER'S SIGNATURE: <i>[Signature]</i>						8015 M&H DPO												
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.														
4/24/99	1650	31152-SB-12-(4.5-5.0)	Soil	991853	✓	X												
4/24/99	1700	31152-SB-12-(9.5-10.0)	Soil	991854	1	X												
4/24/99	1710	31152-SB-12-(14.5-15.0)	Soil	991855	1	X												
4/24/99	1720	31152-SB-12-(19.5-20.0)	Soil	991856	1	X												
4/24/99	1730	31152-SB-12-(23.5-24.0)	Soil	991857	1	X												
4/24/99	1810	31152-SB-14-(4.5-5.0)	Soil	991858	1	X												
4/22/99	1815	31152-SB-14-(9.5-10.0)	Soil	991859	1	X												
4/22/99	1825	31152-SB-14-(14.5-15.0)	Soil	991860	1	X												
4/22/99	1834	31152-SB-14-(19.5-20.0)	Soil	991861	1	X												
4/22/99	1843	31152-SB-14-(24.5-25.0)	Soil	991862	1	X												
4/25/99	0823	31152-SB-11-(4.5-5.0)	Soil	991863	1	X												
4/25/99	0825	31152-SB-11-(9.5-10.0)	Soil	991864	1	X												
4/25/99	0845	31152-SB-11-(14.5-15.0)	Soil	991865	1	X												
4/25/99	0853	31152-SB-11-(19.5-20.0)	Soil	991866	1	X												
4/25/99	0914	31152-SB-11-(24.5-25.0)	Soil	991867	1	X												

PROJECT INFORMATION	SAMPLES RECEIVED	15	1. RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY: LABORATORY: (SIGNATURE) <i>[Signature]</i>
PROJECT MANAGER <i>[Signature]</i>	TOTAL NO. OF CONTAINERS	15	(PRINTED NAME) David L. Overhoff	(PRINTED NAME)	(PRINTED NAME) NATHY SAUCEDO
SHIPPING ID. NO.	CHAIN OF CUSTODY SEALS	✓	RECEIVED BY: <i>[Signature]</i>	RECEIVED BY:	(COMPANY) Trace Analysis
VIA: <i>[Signature]</i>	GOOD CONDITION/CHILLED	✓	(TIME / DATE) 8:30 4-26-99	(TIME / DATE)	(TIME / DATE) 10:15 4/26
	CONFORMS TO RECORD	✓	SPECIAL INSTRUCTIONS / COMMENTS:		

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# TRACE ANALYSIS, INC.

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**CLIENT MEVATEC CORPORATION**  
 P.O. BOX 399 BLDG. 126  
 WSMR, NM 88002

**SAMPLE NO.:** 991817  
**INVOICE NO.:** 22104036  
**REPORT DATE:** 04-30-99  
**REVIEWED BY:** ✓  
**PAGE:** 1 OF 2

**CLIENT SAMPLE ID :** 31152-SB-05 (4.5-5.0)  
**SAMPLE TYPE .....**: soil  
**SAMPLED BY .....**: --  
**SUBMITTED BY .....**: D. Overhoff  
**SAMPLE SOURCE ...:** Melpias Denver & LC-32  
**ANALYST .....**: D. Guzman

**AUTHORIZED BY :** D. Overhoff  
**CLIENT P.O. :** --  
**SAMPLE DATE ...:** 04-22-99  
**SUBMITTAL DATE :** 04-26-99  
**EXTRACTION DATE:** 04-28-99  
**ANALYSIS DATE .:** 04-28-99

Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	13000	mg/Kg	500

(1) Copy to Client

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*Karen Costy*  
 \_\_\_\_\_  
 MANAGING DIRECTOR

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**WSMR, NM 88002**  
E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298  
915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991817**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	86.8	59-128

**ANALYTICAL REPORT**

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WSMR, NM 88002

**SAMPLE NO. : 991818**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-05 (9.5-10.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE .: 04-28-99**

Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	13000	mg/Kg	500

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*Karen Costa*  
MANAGING DIRECTOR

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E-Mail: lab@traceanalysis.com

SAMPLE NO.: 991818  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	66.4	59-128

**ANALYTICAL REPORT**

**TRACE ANALYSIS, INC.**

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1735 Riley Avenue, Suite A Ft. Paso, Texas 79922 888•588•3443 915•585•3443  
E-Mail: lab@traceanalysis.com  
SAMPLE NO.: 991819  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: *[Signature]*  
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-05 (14.5-15.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-22-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE ..: 04-26-99

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	4400	mg/Kg	50.

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ANALYTICAL RESULTS REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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MANAGING DIRECTOR



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**SAMPLE NO. : 991819**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### D A T A T A B L E (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	90.4	59-128



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**SAMPLE NO. : 991820**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-05 (19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE ..: 04-26-99**

Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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E-Mail: lab@traceanalysis.com

SAMPLE NO. : 991820  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	82.4	59-128



**ANALYTICAL REPORT**

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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991821**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-05 (24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE .: 04-26-99**

Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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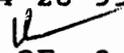
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SAMPLE NO.: 991821  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE

(Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	80.4	59-128

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E-Mail: lab@traceanalysis.com

SAMPLE NO. : 991822  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-07 (4.5-5.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY ....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-23-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE .: 04-26-99

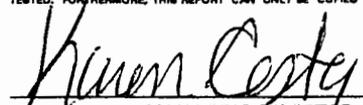
Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

(1) Copy to Client

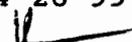
ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

  
MANAGING DIRECTOR

# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

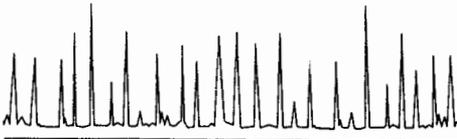
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4725 Ripley Avenue, Suite A El Paso, Texas 79922 888•588•3443  
**CLIENT MEVATEC CORPORATION** E-Mail: lab@traceanalysis.com  
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WSMR, NM 88002

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915•585•3443 FAX 915•585•4944  
SAMPLE NO. : 991822  
INVOICE NO. : 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	78.8	59-128



# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

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806•794•1296 FAX 806•794•1298  
 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991823**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-07 (9.5-10.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-23-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE .: 04-26-99**

### Modified Method 8015- Petroleum Contaminants

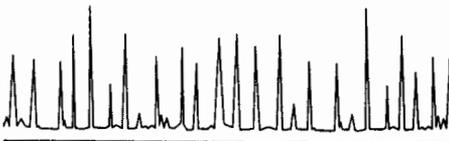
#### D A T A T A B L E

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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*Karen Carter*  
 \_\_\_\_\_  
 MANAGING DIRECTOR



# TRACE ANALYSIS, INC.

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**P.O. BOX 399 BLDG. 126**  
**WSMR, NM 88002**

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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991823**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

### D A T A T A B L E (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	78.8	59-128

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P.O. BOX 399 BLDG. 126  
WSMR, NM 88002 E-Mail: lab@traceanalysis.comSAMPLE NO.: 991824  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: ✓  
PAGE : 1 OF 2CLIENT SAMPLE ID : 31152-SB-07 (14.5-15.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY ....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. GuzmanAUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-23-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE .: 04-26-99Modified Method 8015- Petroleum Contaminants

## D A T A T A B L E

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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MANAGING DIRECTOR

# TRACE ANALYSIS, INC.

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**SAMPLE NO. : 991824**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY:**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	76.8	59-128

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E-Mail: lab@traceanalysis.com

SAMPLE NO.: 991825  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: *[Signature]*  
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-07 (19.5-20.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY ....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-23-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE .: 04-26-99

### Modified Method 8015- Petroleum Contaminants

#### D A T A T A B L E

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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*[Signature]*  
MANAGING DIRECTOR



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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991825**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

## DATA TABLE (Cont.)

### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	92.4	59-128

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SAMPLE NO.: 991826  
 INVOICE NO.: 22104036  
 REPORT DATE: 04-28-99  
 REVIEWED BY:   
 PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-07 (24.5-25.0)  
 SAMPLE TYPE .....: soil  
 SAMPLED BY .....: --  
 SUBMITTED BY ....: D. Overhoff  
 SAMPLE SOURCE ...: Melpias Denver & LC-32  
 ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
 CLIENT P.O. : --  
 SAMPLE DATE ...: 04-23-99  
 SUBMITTAL DATE : 04-26-99  
 EXTRACTION DATE: 04-26-99  
 ANALYSIS DATE ..: 04-26-99

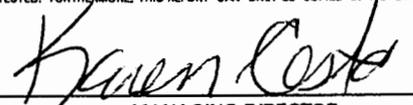
Modified Method 8015- Petroleum Contaminants

## D A T A T A B L E

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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SAMPLE NO. : 991826  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

D A T A T A B L E (Cont.)

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	76.4	59-128



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**SAMPLE NO. : 991827**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-06 (4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-23-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE .: 04-26-99**

Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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*Karen Coster*  
MANAGING DIRECTOR

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SAMPLE NO.: 991827

INVOICE NO.: 22104036

REPORT DATE: 04-28-99

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PAGE : 2 OF 2

### DATA TABLE

(Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	75.2	59-128

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SAMPLE NO.: 991828  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: *[Signature]*  
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-06 (9.5-10.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-23-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE .: 04-26-99

### Modified Method 8015- Petroleum Contaminants

#### D A T A T A B L E

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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SAMPLE NO. : 991828  
INVOICE NO. : 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	78.8	59-128

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SAMPLE NO. : 991829  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-06 (14.5-15.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-23-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE ..: 04-26-99

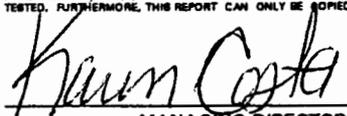
Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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WSMR, NM 88002

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915•585•3443  
SAMPLE NO.: 991829  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: ✓  
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	74.4	59-128

**ANALYTICAL REPORT**

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E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991830**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-06 (19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-23-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE ..: 04-26-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*[Signature]*  
MANAGING DIRECTOR

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**SAMPLE NO. : 991830**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	73.6	59-128

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SAMPLE NO.: 991831  
 INVOICE NO.: 22104036  
 REPORT DATE: 04-28-99  
 REVIEWED BY: *[Signature]*  
 PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-06 (24.5-25.0)  
 SAMPLE TYPE .....: soil  
 SAMPLED BY .....: --  
 SUBMITTED BY .....: D. Overhoff  
 SAMPLE SOURCE ....: Melpias Denver & LC-32  
 ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
 CLIENT P.O. : --  
 SAMPLE DATE ...: 04-23-99  
 SUBMITTAL DATE : 04-26-99  
 EXTRACTION DATE: 04-26-99  
 ANALYSIS DATE ..: 04-26-99

Modified Method 8015- Petroleum Contaminants

## D A T A T A B L E

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S)  
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SAMPLE NO. : 991831  
INVOICE NO. : 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	74.8	59-128

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**SAMPLE NO. : 991832**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-08 (4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE ..: 04-26-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULTS REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*[Signature]*  
MANAGING DIRECTOR

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SAMPLE NO. : 991832  
INVOICE NO. : 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	73.2	59-128



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**WSMR, NM 88002**

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**SAMPLE NO. : 991833**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-08 (9.5-10.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE .: 04-26-99**

Modified Method 8015- Petroleum Contaminants

**D A T A      T A B L E**

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

*Karen Costa*  
 \_\_\_\_\_  
 MANAGING DIRECTOR

# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

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**CLIENT MEVATEC CORPORATION**  
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915•585•3443 FAX 915•585•4944

**SAMPLE NO. :** 991833  
**INVOICE NO. :** 22104036  
**REPORT DATE:** 04-28-99  
**REVIEWED BY:**  
**PAGE :** 2 OF 2

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	73.2	59-128

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P.O. BOX 399 BLDG. 126

WSMR, NM 88002

E-Mail: lab@traceanalysis.com

SAMPLE NO. : 991834

INVOICE NO. : 22104036

REPORT DATE: 04-28-99

REVIEWED BY: *[Signature]*

PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-08 (14.5-15)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-24-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-26-99  
ANALYSIS DATE ..: 04-26-99

### Modified Method 8015- Petroleum Contaminants

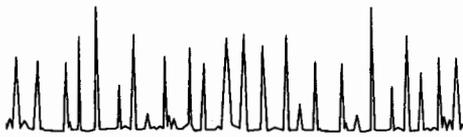
#### D A T A T A B L E

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*Karen Costa*  
ANALYTICAL DIRECTOR



# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

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 4725 Ringley Avenue, Suite A El Paso, Texas 79922 888•588•3443  
**CLIENT MEVATEC CORPORATION** E-Mail: lab@traceanalysis.com  
 P.O. BOX 399 BLDG. 126  
 WSMR, NM 88002

806•794•1296 FAX 806•794•1298  
 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991834**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

DATA TABLE (Cont.)		
<u>Surrogate Information -</u>		
	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	71.6	59-128



# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

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806•794•1296 FAX 806•794•1298  
 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991835**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-08 (19.5-20)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE ..: 04-26-99**

### Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

*[Signature]*

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P.O. BOX 399 BLDG. 126  
WSMR, NM 88002

**SAMPLE NO. : 991835**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY: *[Signature]***  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	71.2	59-128

**ANALYTICAL REPORT**

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**CLIENT MEVATEC CORPORATION**  
P.O. BOX 399 BLDG. 126  
WSMR, NM 88002

E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991836**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-28-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-08 (24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-26-99**  
**ANALYSIS DATE ..: 04-26-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*Karen Costy*

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915•585•3443 FAX 915•585•4944  
SAMPLE NO.: 991836  
INVOICE NO.: 22104036  
REPORT DATE: 04-28-99  
REVIEWED BY: *IL*  
PAGE : 2 OF 2

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	72.4	59-128

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**CLIENT MEVATEC CORPORATION** E-Mail: lab@traceanalysis.com  
**P.O. BOX 399**  
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**SAMPLE NO. : 991837**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-09 (4.5-5.0)** **AUTHORIZED BY : D. Overhoff**  
**SAMPLE TYPE .....: soil** **CLIENT P.O. : --**  
**SAMPLED BY .....: --** **SAMPLE DATE ...: 04-24-99**  
**SUBMITTED BY .....: D. Overhoff** **SUBMITTAL DATE : 04-26-99**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32** **EXTRACTION DATE: 04-27-99**  
**ANALYST .....: D. Guzman** **ANALYSIS DATE .: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

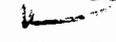
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*[Handwritten Signature]*

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915•585•3443 FAX 915•585•4944  
SAMPLE NO.: : 991837  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	68.8	59-128

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**SAMPLE NO. : 991838**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-09 (9.5-10.0)** **AUTHORIZED BY : D. Overhoff**  
**SAMPLE TYPE .....: soil** **CLIENT P.O. : --**  
**SAMPLED BY .....: --** **SAMPLE DATE ...: 04-24-99**  
**SUBMITTED BY .....: D. Overhoff** **SUBMITTAL DATE : 04-26-99**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32** **EXTRACTION DATE: 04-27-99**  
**ANALYST .....: D. Guzman** **ANALYSIS DATE ..: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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*Haven Costa*



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**SAMPLE NO. : 991838**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	69.6	59-128

**ANALYTICAL REPORT**

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**WSMR, NM 88002**  
E-Mail: lab@traceanalysis.com

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO.: 991839**  
**INVOICE NO.: 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-09 (14.5-15.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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 915•585•3443 FAX 915•585•4944

SAMPLE NO.: 991839  
 INVOICE NO.: 22104036  
 REPORT DATE: 04-30-99  
 REVIEWED BY:   
 PAGE : 2 OF 2

### D A T A      T A B L E      (Cont.)

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	68.4	59-128

**ANALYTICAL REPORT**

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WSMR, NM 88002  
E-Mail: lab@traceanalysis.com

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**SAMPLE NO. : 991840**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-09 (19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE .: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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WSMR, NM 88002

SAMPLE NO.: 991840

INVOICE NO.: 22104036

REPORT DATE: 04-30-99

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PAGE : 2 OF 2

DATA TABLE (Cont.)

Surrogate Information -

Percent Recovery

Range

Hexacosane .....: 68.8 59-128

**ANALYTICAL REPORT**

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**SAMPLE NO. 991841**  
**INVOICE NO.: 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-09 (24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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ANALYTICAL RESULTS REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

*Karen Costa*  
MANAGING DIRECTOR

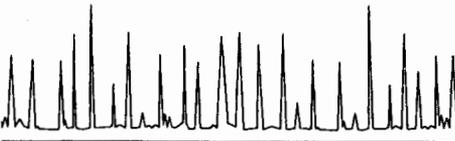
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## ANALYTICAL REPORT

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WSMR, NM 88002  
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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991841**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

D A T A T A B L E (Cont.)		
<u>Surrogate Information -</u>		
Hexacosane .....	<u>Percent Recovery</u>	<u>Range</u>
	70.0	59-128



# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

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 BLDG. 126  
 WSMR, NM 88002  
 E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298  
 915•585•3442 FAX 915•585•4944  
**SAMPLE NO. : 991842**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-010(4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

### Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	3500	mg/Kg	50.

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*Karen Costa*



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**TRACE ANALYSIS, INC**

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915•585•3443 FAX 915•585•4944

SAMPLE NO. : 991843  
INVOICE NO. : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *[Signature]*  
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-010(9.5-10.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-24-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-27-99  
ANALYSIS DATE .: 04-27-99

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	2800	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*[Handwritten Signature]*

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991843**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

### D A T A T A B L E (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	104.4	59-128

**ANALYTICAL REPORT**

**TRACE ANALYSIS, INC.**

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WSMR, NM 88002**

E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991844  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:  
PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-010(14.5-15.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-24-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-28-99  
ANALYSIS DATE ..: 04-27-99**

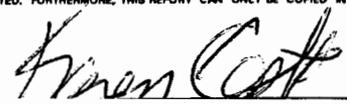
**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	7900	mg/Kg	500

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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**CLIENT MEVATEC CORPORATION**  
**P.O. BOX 399 BLDG. 126**  
**WSMR, NM 88002**  
 E-Mail: lab@traceanalysis.com

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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991844**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

**D A T A      T A B L E                      (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	60.0	59-128

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BLDG. 126  
WSMR, NM 88002  
E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298  
915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991845**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-010(19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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E-Mail: lab@traceanalysis.com

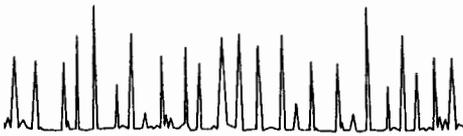
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915•585•3443 FAX 915•585•4944

SAMPLE NO. : 991845  
INVOICE NO. : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *[Signature]*  
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	76.0	59-128



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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991846**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-010(24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE .: 04-27-99**

### Modified Method 8015- Petroleum Contaminants

D A T A T A B L E			
<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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SAMPLE NO.: 991846  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *[Signature]*  
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	72.0	59-128

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**SAMPLE NO. : 991847**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:** *[Signature]*  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-010(29.5-30.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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**SAMPLE NO.:** 991847  
**INVOICE NO.:** 22104036  
**REPORT DATE:** 04-30-99  
**REVIEWED BY:** *[Signature]*  
**PAGE** : 2 OF 2

D A T A T A B L E			(Cont.)
<u>Surrogate Information -</u>			
	<u>Percent Recovery</u>	<u>Range</u>	
Hexacosane .....	73.6	59-128	

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991848**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-13(4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE .: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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**SAMPLE NO. : 991848**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

**D A T A T A B L E (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	73.2	59-128

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WSMR, NM 88002  
E-Mail: lab@traceanalysis.com

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991849**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-13(9.5-10.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE .: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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SAMPLE NO.: 991849  
 INVOICE NO.: 22104036  
 REPORT DATE: 04-30-99  
 REVIEWED BY: *[Signature]*  
 PAGE : 2 OF 2

DATA TABLE (Cont.)		
<u>Surrogate Information -</u>		
	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	70.4	59-128

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**CLIENT MEVATEC CORPORATION**  
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BLDG. 126  
WSMR, NM 88002  
E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991850**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-13(14.5-15.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE .: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

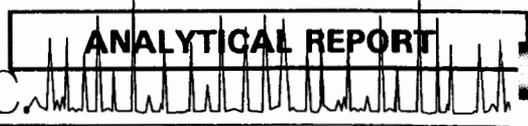
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SAMPLE NO. : 991850  
 INVOICE NO. : 22104036  
 REPORT DATE: 04-30-99  
 REVIEWED BY:   
 PAGE : 2 OF 2

D A T A      T A B L E      (Cont.)

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	69.6	59-128

**ANALYTICAL REPORT**

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**WSMR, NM 88002**

**SAMPLE NO. : 991851**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-13(19.5-20.0)** **AUTHORIZED BY : D. Overhoff**  
**SAMPLE TYPE .....: soil** **CLIENT P.O. : --**  
**SAMPLED BY .....: --** **SAMPLE DATE ...: 04-24-99**  
**SUBMITTED BY .....: D. Overhoff** **SUBMITTAL DATE : 04-26-99**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32** **EXTRACTION DATE: 04-27-99**  
**ANALYST .....: D. Guzman** **ANALYSIS DATE ..: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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 SAMPLE NO.: 991851  
 INVOICE NO.: 22104036  
 REPORT DATE: 04-30-99  
 REVIEWED BY:   
 PAGE : 2 OF 2

DATA TABLE (Cont.)		
<u>Surrogate Information -</u>		
	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	70.4	59-128



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915•585•3443 FAX 915•585•4944  
SAMPLE NO. : 991852  
INVOICE NO. : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *[Signature]*  
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-13(24.5-25.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY ....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-24-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-27-99  
ANALYSIS DATE .: 04-27-99

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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SAMPLE NO.: 991852  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	70.8	59-128

**ANALYTICAL REPORT**

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BLDG. 126  
WSMR, NM 88002

**SAMPLE NO. : 991853**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-12(4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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**CLIENT MEVATEC CORPORATION**  
 P.O. BOX 399  
 BLDG. 126  
 WSMR, NM 88002  
 E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298  
 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991853**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	71.6	59-128

**ANALYTICAL REPORT**

**TRACE ANALYSIS, INC.**

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 4725 Bingley Avenue, Suite A El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944  
**CLIENT MEVATEC CORPORATION** E-Mail: lab@traceanalysis.com **SAMPLE NO. : 991854**  
**P.O. BOX 399** **INVOICE NO.: 22104036**  
**BLDG. 126** **REPORT DATE: 04-30-99**  
**WSMR, NM 88002** **REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-12(9.5-10.0)** **AUTHORIZED BY : D. Overhoff**  
**SAMPLE TYPE .....: soil** **CLIENT P.O. : --**  
**SAMPLED BY .....: --** **SAMPLE DATE ...: 04-24-99**  
**SUBMITTED BY ....: D. Overhoff** **SUBMITTAL DATE : 04-26-99**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32** **EXTRACTION DATE: 04-27-99**  
**ANALYST .....: D. Guzman** **ANALYSIS DATE ..: 04-27-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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SAMPLE NO. : 991854  
 INVOICE NO. : 22104036  
 REPORT DATE: 04-30-99  
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 PAGE : 2 OF 2

D A T A T A B L E (Cont.)		
<u>Surrogate Information -</u>		
	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	70.0	59-128

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SAMPLE NO. : 991855  
INVOICE NO. : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 1 OF 2

CLIENT SAMPLE ID : 31152-SB-12(14.5-15.0)  
SAMPLE TYPE .....: soil  
SAMPLED BY .....: --  
SUBMITTED BY .....: D. Overhoff  
SAMPLE SOURCE ...: Melpias Denver & LC-32  
ANALYST .....: D. Guzman

AUTHORIZED BY : D. Overhoff  
CLIENT P.O. : --  
SAMPLE DATE ...: 04-24-99  
SUBMITTAL DATE : 04-26-99  
EXTRACTION DATE: 04-27-99  
ANALYSIS DATE .: 04-27-99

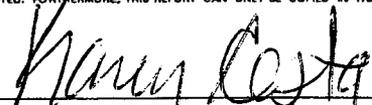
Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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SAMPLE NO.: : 991855  
INVOICE NO.: : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

D A T A T A B L E (Cont.)		
<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	68.4	59-128

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991856**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-12(19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-27-99**  
**ANALYSIS DATE ..: 04-27-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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915•585•3443 FAX 915•585•1944  
**SAMPLE NO. : 991856**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

#### Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	68.0	59-128



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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991857**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

**D A T A T A B L E (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	77.6	59-128



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 WSMR, NM 88002  
 E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991858**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-14(4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-24-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE ..: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

Parameter	Result	Unit	Detection Limit
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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**SAMPLE NO. : 991858  
INVOICE NO. : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *L*  
PAGE : 2 OF 2**

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	64.0	59-128

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**SAMPLE NO. : 991859**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-14(9.5-10.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE .: 04-28-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULTS REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991859**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	66.0	59-128

**ANALYTICAL REPORT**

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E-Mail: lab@traceanalysis.com

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**WSMR, NM 88002**

**SAMPLE NO. : 991860**

**INVOICE NO. : 22104036**

**REPORT DATE: 04-30-99**

**REVIEWED BY:** *[Signature]*

**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-14(14.5-15.0)**

**SAMPLE TYPE .....: soil**

**SAMPLED BY .....: --**

**SUBMITTED BY ....: D. Overhoff**

**SAMPLE SOURCE ...: Melpias Denver & LC-32**

**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**

**CLIENT P.O. : --**

**SAMPLE DATE ...: 04-22-99**

**SUBMITTAL DATE : 04-26-99**

**EXTRACTION DATE: 04-28-99**

**ANALYSIS DATE .: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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**SAMPLE NO. : 991860**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	66.0	59-128

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E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991861**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-14(19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE ..: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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SAMPLE NO.: 991861  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

<u>Surrogate Information</u> -	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	64.0	59-128

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**CLIENT MEVATEC CORPORATION**  
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WSMR, NM 88002

**SAMPLE NO. : 991862**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-14(24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-22-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE .: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

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915•585•3443 FAX 915•585•4944  
SAMPLE NO.: 991862  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: *U*  
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	66.0	59-128

**ANALYTICAL REPORT**

**TRACE ANALYSIS, INC.**

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991863**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-11(4.5-5.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-25-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE .: 04-28-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*[Handwritten Signature: Karen Costa]*

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**CLIENT MEVATEC CORPORATION**  
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WSMR, NM 88002

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915•585•3443 FAX 915•585•4944  
SAMPLE NO.: 991863  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	65.6	59-128

**ANALYTICAL REPORT**

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**P.O. BOX 399 BLDG. 126**

**WSMR, NM 88002**

E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991864**

**INVOICE NO. : 22104036**

**REPORT DATE: 04-30-99**

**REVIEWED BY: [Signature]**

**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-11(9.5-10.0)**

**SAMPLE TYPE .....: soil**

**SAMPLED BY .....: --**

**SUBMITTED BY ....: D. Overhoff**

**SAMPLE SOURCE ...: Melpias Denver & LC-32**

**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**

**CLIENT P.O. : --**

**SAMPLE DATE ...: 04-25-99**

**SUBMITTAL DATE : 04-26-99**

**EXTRACTION DATE: 04-28-99**

**ANALYSIS DATE .: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*Karen Costa*

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WSMR, NM 88002

806•794•1296 FAX 806•794•1298  
915•585•3443 FAX 915•585•4944  
SAMPLE NO.: 991864  
INVOICE NO.: 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY: ✓  
PAGE : 2 OF 2

**D A T A T A B L E (Cont.)**

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	62.8	59-128

**ANALYTICAL REPORT**

**TRACE ANALYSIS, INC.**

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**CLIENT MEVATEC CORPORATION**  
P.O. BOX 399 BLDG. 126  
WSMR, NM 88002

E-Mail: lab@traceanalysis.com

**SAMPLE NO. : 991865**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY:** ✓  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-11(14.5-15.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY ....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-25-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE ..: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*Karen Coster*

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915•585•3443 FAX 915•585•4944

SAMPLE NO.: : 991865  
INVOICE NO.: : 22104036  
REPORT DATE: 04-30-99  
REVIEWED BY:   
PAGE : 2 OF 2

### DATA TABLE (Cont.)

<u>Surrogate Information -</u>	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	64.8	59-128

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**SAMPLE NO.: 991866**

**INVOICE NO.: 22104036**

**REPORT DATE: 04-30-99**

**REVIEWED BY:** ✓

**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-11(19.5-20.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-25-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE ..: 04-28-99**

**Modified Method 8015- Petroleum Contaminants**

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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*[Handwritten Signature]*

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**SAMPLE NO. : 991866**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: ✓**  
**PAGE : 2 OF 2**

**D A T A T A B L E (Cont.)**

Surrogate Information -

	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	64.0	59-128

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915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991867**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 1 OF 2**

**CLIENT SAMPLE ID : 31152-SB-11(24.5-25.0)**  
**SAMPLE TYPE .....: soil**  
**SAMPLED BY .....: --**  
**SUBMITTED BY .....: D. Overhoff**  
**SAMPLE SOURCE ...: Melpias Denver & LC-32**  
**ANALYST .....: D. Guzman**

**AUTHORIZED BY : D. Overhoff**  
**CLIENT P.O. : --**  
**SAMPLE DATE ...: 04-25-99**  
**SUBMITTAL DATE : 04-26-99**  
**EXTRACTION DATE: 04-28-99**  
**ANALYSIS DATE .: 04-28-99**

Modified Method 8015- Petroleum Contaminants

**D A T A T A B L E**

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Detection Limit</u>
TPH Diesel by Mod 8015 .....	<50.	mg/Kg	50.

ANALYTICAL RESULT(S) REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.

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 915•585•3443 FAX 915•585•4944  
**SAMPLE NO. : 991867**  
**INVOICE NO. : 22104036**  
**REPORT DATE: 04-30-99**  
**REVIEWED BY: [Signature]**  
**PAGE : 2 OF 2**

### DATA TABLE (Cont.)

<u>Surrogate Information</u> -	<u>Percent Recovery</u>	<u>Range</u>
Hexacosane .....	63.2	59-128



**MEVATEC CORPORATION**

P.O. Box 399  
Bldg. 126  
WSMR, NM 88002  
(505) 678-0263

**CHAIN OF CUSTODY RECORD**

Nitrile 2.5 M

PAGE 1 OF 1

PROJECT NO. 300 G-6		PROJECT NAME Denver & Malpais LTM			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS
SAMPLER'S SIGNATURE: <i>George Espuola</i>						Mod DRO	Phys Chem	Diss Metals	Diss Phosphate	Diss Ammonia	Carbonates	TCLP VOL	TEEP SUGG	6	GLU	
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.												
5/18/99	0933	31010-MW01-0599	Water	992351	5	X	X	X	X	X						
5/18/99	1250	31152-MW01-0599	Water	992352	5	X	X	X	X	X						
5/18/99	1220	31152-R#840-0599	Soil	992353	2						X	X				
5/18/99	1142	31152-SR- <del>0599</del> <sup>0599</sup>	Water	992354	1	X										
5/18/99	1152	31152-Decon Water-0599	Water	992355	1	X										
5/18/99	1250	31152-MW01-0599-TB	Water	992356	1	X									Trip blank	

PROJECT INFORMATION		SAMPLES RECEIVED	✓	1. RELINQUISHED BY: (SIGNATURE) <i>George Espuola</i>	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY LABORATORY: (SIGNATURE) <i>Amanda Heekathorn</i>
PROJECT MANAGER	Dana Downs	TOTAL NO. OF CONTAINERS	15	(PRINTED NAME) George Espuola	(PRINTED NAME)	(PRINTED NAME) Amanda Heekathorn
SHIPPING ID. NO.		CHAIN OF CUSTODY SEALS	✓	RECEIVED BY: <i>Dana Downs</i>	RECEIVED BY:	(COMPANY) Trace Analysis
GOOD CONDITION/CHILLED	30C	GOOD CONDITION/CHILLED	30C	(TIME / DATE) 5:25am 5/19/99	(TIME / DATE)	(TIME / DATE) 5/19/99 10:08
VIA: Lab Courier		CONFORMS TO RECORD	✓	SPECIAL INSTRUCTIONS / COMMENTS: All dissolved analytes were field filtered today		

PLEASE USE BALL POINT PEN

DISTRIBUTION: WHITE - PROJECT FILES; YELLOW - LAB; PINK - FIELD COPY

# ATEL

Aqua Tech Environmental Laboratories, Inc.

## - CERTIFICATE OF ANALYSIS -

Client #: I2178

Report Date: 03-Jun-99

Trace Analysis

4725 Ripley Dr. Suite A

El Paso, TX 79922-1028

Phone: 9155853443

Ext:

Attn: Bill Weigart

FAX:

Our Lab#: MEL99-07881

Your Sample ID: 992352

Date Logged In: 5/24/99

Sample Source: RCRA

Sample Type: Water

Client Project #:

Project #:

Date Submitted to Lab: 5/21/99

PO#:

### - COLLECTION INFORMATION -

Date/Time/By: 5/18/99

EPA Method	Analyst	Prep Date	Analysis Date	Result	Typical Report Limit
8015 DRO	DRA	5/24/99	5/25/99	< 50 ug/l	50

CAS Number

Parameter

Diesel Range Organics

### --- Surrogate Recoveries ---

QC Lab#	EPA Method	Surrogate Name	Percent Recovery	Lower Limit	Upper Limit
MEL99-07881	8015 DRO	2-Fluorobiphenyl (Surr)	82 %R	70	130

End of Report

Report Approved By:

*Wade E. Bayer*

Wade E. Bayer

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Your Sample ID: 992352

Lab Number MEL99-07881



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El Paso, Texas 79922

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915•585•3443

FAX 806•794•1298  
FAX 915•585•4944

E-Mail: lab@traceanalysis.com

## ANALYTICAL RESULTS FOR MEVATEC CORPORATION

Attention: Dana Downs

P. O. Box 399

Bldg. S-146W

WSMR, NM 88002

May 25, 1999

Receiving Date: 05/19/99

Sample Type: Water

Project No: 300 GG

Project Location: NA

Sampling Date: 05/18/99

Sample Condition: I & C

Sample Received by: AH

Project Name: Denver & Malpais

TA#	FIELD CODE	SPECIFIC CONDUCTANCE (uMHOs/cm)
T125352/992351	31010-MW01-599	22,000
T125353/992352	31152-MW01-599	10,000
ICV		304
CCV		1,296
REPORTING LIMIT		8.4
RPD		1
% Extraction Accuracy		92
% Instrument Accuracy		92
PREP DATE		05/24/99
ANALYSIS DATE		05/24/99
METHODS: EPA 120.1		
CHEMIST: SA		



Director, Dr. Blair Leftwich

5-25-99

DATE

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 E-Mail: lab@traceanalysis.com

## ANALYTICAL RESULTS FOR MEVATEC CORPORATION

May 27, 1999

Receiving Date: 05/9/99

Sample Type: Water

Project No: 300 GG

Project Name: Denver & Malpais LTM

Attention: Dana Downs

P. O. Box 399

Bldg. 126

WSMR, NM 88002

Sampling Date: 05/18/99

Sample Condition: I & C

Sample Received by: AH

Project Loc:

TA#	FIELD CODE	DISSOLVED Ba (mg/L)	DISSOLVED B (mg/L)	DISSOLVED Fe (mg/L)	DISSOLVED Li (mg/L)	DISSOLVED Mn (mg/L)	DISSOLVED Sr (mg/L)	DISSOLVED P (mg/L)
T125142/992351	31010-MW-01-0599	<0.02	1.6	<0.003	0.15	<0.001	18	<0.01
T125143/992352	31152-MW-01-0599	<0.02	0.27	<0.003	<0.01	<0.001	52	<0.01
ICV		1.00	1.03	1.00	0.209	1.01	0.967	0.976
CCV		1.03	0.995	1.04	0.217	1.03	0.992	1.01
REPORTING LIMIT		0.02	0.01	0.003	0.01	0.001	0.20	0.01
RPD		0*	1*	1*	1*	0*	1*	0*
% Extraction Accuracy		98*	102*	102*	115*	99*	103*	90*
% Instrument Accuracy		102	101	102	106	102	98	99
<b>*Used LCS/LCSD for EA/RPD due to matrix problems.</b>								
PREP DATE		05/25/99	05/25/99	05/25/99	05/25/99	05/25/99	05/25/99	05/25/99
ANALYSIS DATE		05/26/99	05/26/99	05/26/99	05/26/99	05/26/99	05/26/99	05/26/99

METHODS: EPA SW 846-6010B, 3015

CHEMIST: Dissolved Metals: RR

DISSOLVED METALS SPIKE: 0.20 mg/L Ba, B, Fe, Li, Mn, Sr, P

DISSOLVED METALS CV: 1.0 mg/L Ba, B, Fe, Li, Mn, Sr, P

  
Director, Dr. Blair Leftwich

5-27-99  
Date



1726 Wooddale Court • Baton Rouge, Louisiana 70806

1 (800) 401-4277 • Fax (225) 927-6822

ARS Tracking Number: ARS-99-0446 P.O. Number: N/A  
 Client I.D.: 992352-31152-MW01-0599 ARS Sample I.D.: ARS-99-1720  
 Date Sampled: 5/18/99 Date Received: 5/25/99  
 Time Sampled: 1250 Time Received: 0720  
 Type of Sample: Liquid Date of Report: 6/10/99

Analysis Description	Analysis Result	Analysis Error $\pm 2\sigma$	Detection Limit	Analysis Units	Analysis Test Method	Analysis Date & Time	Analysis Technician
Total Uranium	23.78	3.93	0.95	pCi/L	EPA 908	6/7/99 1557	KK
Total Uranium	0.0355	0.0029	0.0007	mg/L	EPA 908	6/7/99 1557	KK

  
 Quality Assurance Review

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**CLIENT MEVATEC CORPORATION**  
 PO BOX 399  
 BLDG 126  
 WSMR NM 88002

**SAMPLE NO. :** 992352  
**INVOICE NO.:** 22104144  
**REPORT DATE:** 06-01-99  
**REVIEWED BY:** *[Signature]*  
**PAGE :** 1 OF 1

**CLIENT SAMPLE ID :** 31152-MW01-0599  
**SAMPLE TYPE .....** water  
**SAMPLED BY .....** G.E.  
**SUBMITTED BY .....** G.E.  
**SAMPLE SOURCE ....:** Denver & Malpais

**AUTHORIZED BY :** D. Dana  
**CLIENT P.O. :** --  
**SAMPLE DATE ...:** 05-18-99  
**SUBMITTAL DATE :** 05-19-99  
**EXTRACTION DATE:** --

### Inorganic Non-Metals

#### D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date	Test Method	Analyst
Alkalinity, Total .....	190	mg/L	5.0	05-20-99	STD METH 2320 B	A. Myers
Bicarbonate .....	190	mg/L	5.0	05-20-99	STD METH 2320 B	A. Myers
Carbonate .....	<5.0	mg/L	5.0	05-20-99	STD METH 2320 B	A. Myers
Chloride .....	24000	mg/L	2.0	05-19-99	EPA 300.0	A. Myers
Fluoride .....	6.2	mg/L	0.2	05-19-99	EPA 300.0	A. Myers
Nitrate Nitrogen .....	28.	mg/L	0.1	05-19-99	EPA 300.0	A. Myers
pH-performed in laboratory .....	7.6	S.U.		05-19-99	STD METH 4500-H+	R Yglecias
Temp, C: at time of pH .....	23.7	degrees C		05-19-99		R Yglecias
Sulfate .....	9600	mg/L	2.0	05-19-99	EPA 300.0	A. Myers
Total Dissolved Solids .....	16000	mg/L	50.	05-19-99	STD METH 2540 C	A. Myers

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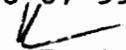
*[Handwritten Signature]*

# TRACE ANALYSIS, INC.

## ANALYTICAL REPORT

CLIENT MEVATEC CORPORATION  
P.O. BOX 399 BLDG. 126  
WSMR, NM 88002

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E-Mail: lab@traceanalysis.com

SAMPLE NO. : 992352  
INVOICE NO.: 22104144  
REPORT DATE: 06-07-99  
REVIEWED BY:   
PAGE : 1 OF 1

CLIENT SAMPLE ID : 31152-MW01-0599  
SAMPLE TYPE .....: water  
SAMPLED BY .....: G.E.  
SUBMITTED BY .....: G.E.  
SAMPLE SOURCE ...: Denver & Malpais

AUTHORIZED BY : D. Downs  
CLIENT P.O. : --  
SAMPLE DATE ...: 05-18-99  
SUBMITTAL DATE : 05-19-99  
EXTRACTION DATE: --

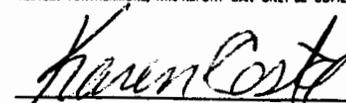
### Inorganic Chemistry - Dissolved Metals

#### D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date	Test Method	Analyst
Dissolved Calcium .....	850	mg/L	1.0	06-02-99	6010B	N. Munir
Dissolved Magnesium .....	2900	mg/L	1.0	06-02-99	6010B	N. Munir
Dissolved Potassium .....	120	mg/L	1.0	06-02-99	6010B	N. Munir
Dissolved Sodium .....	13000	mg/L	1.0	06-02-99	6010B	N. Munir

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ANALYTICAL RESULTS REPORTED HEREIN APPLY ONLY TO THE SAMPLE(S) TESTED. FURTHERMORE, THIS REPORT CAN ONLY BE COPIED IN ITS ENTIRETY.





### Notes:

#### Comments:

- 1.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 2.0) The data in this report are within the limits of uncertainty specified in the reference method unless specified.
- 3.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix.
- 4.0) Derived Air Concentrations and Effluent Release Concentrations are obtained from 10 CFR 20 Appendix B
- 5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
- 6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228. (Gamma Spectroscopy only)
- 7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234. (Gamma Spectroscopy only)
- 8.0) All Gamma spectroscopy was performed utilizing high purity germanium detectors (HPGE).

#### Method References:

- 1.0) EPA 600/4-80-032, Prescribed Procedures for the Measurement of Radioactivity in Drinking Water, August 1980.
- 2.0) Standard Methods for the Examination of Water and Waste Water, 18th, 1992
- 3.0) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, (9/86). (Updated through 1995)
- 4.0) EPA 600/4/79-020, Methods for Chemical Analysis of Water and Waste, March 1983.
- 5.0) HASL 300

#### Definitions:

- 1.0) BDL Analyte not detected because the value was below the detection limit.
- 2.0) ND Not detected above the detection limit.
- 3.0) Detection Limit The minimum amount of the analyte that ARS can detect utilizing the specific analysis.
- 4.0) B Method Blank
- 5.0) D Method Duplicate
- 6.0) MS Matrix Spike
- 7.0) S Spike
- 8.0) RS Reference Spike
- 9.0) \*SC Subcontracted out to another qualified laboratory
- 10.0) NR Not Referenced

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**APPENDIX L**

**ANALYTICAL RESULTS – WHITE SANDS NR-MT-AA CHEMISTRY LABORATORY**

STEWS-NR-MT-AA (70-10r)

03 MAY 1999

MEMORANDUM FOR NR-ES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed three samples for their Total Petroleum Hydrocarbon (TPH) content and one sample for its corrosivity, conductivity and total dissolved solids.
2. Results. The results are presented in Table 1, Encl 1.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 26 Apr 99. The analyses were completed on 28 Apr 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.

Encl  
as



ANDRUS GARAY  
Chief, Applied Envr Test Branch

TABLE 1

A. Total Petroleum Hydrocarbons (TPH) - SOIL

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
31152-SB-05-(14.5'-15.0')	9,230

B. Total Petroleum Hydrocarbons (TPH) - WATER

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
31152-SB-05-GB	0.7
31152-SB-05-TB	ND*

\* ND = None Detected - detection limit = 0.1 ppm (W/W)

C. Corrosivity, Conductivity, Total Dissolved Solids (TDS)

<u>Sample Identification</u>	<u>pH</u>	<u>Conductivity (Micromhos/cm)</u>	<u>TDS (mg/liter)</u>
31152-SB-05-GB	6.3	40,000	26,700



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**CHAIN OF CUSTODY RECORD**

*Yermina Gonzalez, 114 K-78 121,  
X-8615*

PAGE 1 OF 1

PROJECT NO. 30066		PROJECT NAME <i>Repair Denver + LC32 Investigation</i>			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS			
SAMPLER'S SIGNATURE: <i>[Signature]</i>						POIS	Metal	DRD	PH	Conductivity	TDS								
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.															
4/23/99	1730	31152-SB-01-(148-15.8)	Soil	CL 11	1	X													
4/23/99	1140	31152-SB-02-6B	Water	CL 11	1		X	X	X										
4/23/99	1140	31152-SB-05-6B	Water	CL 11	3	X													<i>Preserved w/ HCl</i>
4/23/99	1140	31152-SB-05-7B	Water	CL 11	1	X													

PROJECT INFORMATION		SAMPLES RECEIVED		1. RELINQUISHED BY: (SIGNATURE)		2. RELINQUISHED BY: (SIGNATURE)		3. RECEIVED BY LABORATORY: (SIGNATURE)	
PROJECT MANAGER <i>Dana De...</i>	TOTAL NO. OF CONTAINERS			(PRINTED NAME)		(PRINTED NAME)		(PRINTED NAME)	
SHIPPING ID. NO.	CHAIN OF CUSTODY SEALS			RECEIVED BY:		RECEIVED BY:		(COMPANY)	
VIA: <i>[Signature]</i>	GOOD CONDITION/CHILLED			(TIME / DATE)		(TIME / DATE)		(TIME / DATE)	
	CONFORMS TO RECORD	SPECIAL INSTRUCTIONS / COMMENTS:							

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STEWS-NR-MT-AA (70-10r)

03 MAY 1999

MEMORANDUM FOR NR-ES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed seven samples for their Total Petroleum Hydrocarbon (TPH) content and one sample for its corrosivity, conductivity and total dissolved solids.
2. Results. The results are presented in Table 1; Encl 1.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 26 Apr 99. The analyses were completed on 28 Apr 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.



ANDRUS GARAY  
Chief, Applied Envr Test Branch

Encl  
as

TABLE 1

A. Total Petroleum Hydrocarbons (TPH) - SOIL

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
31152-SB-06-(14.5'-15.0')	ND*
31152-SB-09-(14.5'-15.0')	ND*
31152-SB-10-(19.5'-20.0')	ND*
31152-SB-12-(9.5'-10.0')	ND*
31152-SB-14-(14.5'-15.0')	ND*

\* ND = None Detected - detection limit = 5ppm (W/W)

B. Total Petroleum Hydrocarbons (TPH) - WATER

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
31152-SB-10-GB	ND*
31152-SB-10-TB	ND*

\* ND = None Detected - detection limit = 0.1 ppm (W/W)

C. Corrosivity, Conductivity, Total Dissolved Solids (TDS)

<u>Sample Identification</u>	<u>pH</u>	<u>Conductivity (Micromhos/cm)</u>	<u>TDS (mg/liter)</u>
31152-SB-10-GB	6.3	32,000	21,200



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**CHAIN OF CUSTODY RECORD**

Glenn Wyatt (NR D.F.)  
3-8615

PAGE 1 OF 1

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED										REMARKS	
SAMPLER'S SIGNATURE:						DOE	Metals	PH	Conductivity	TDS							
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.													
4/23/99	1602	31152-SB-06-(14.5-15.0)	Soil	CL 18	1	X											
4/24/99	0923	31152-SB-C9-(14.5-15.0)	Soil	CL 19	1	X											
4/24/99	1144	31152-SB-11-(14.5-20.0)	Soil	CL 20	1	X											
4/24/99	1320	31152-SB-12-GB	Water	CL 21	3	X											Pres. with HCC
4/24/99	1320	31152-SB-12-GB	Water	CL 22	1		X	X	X								
4/24/99	1700	31152-SB-12-(9.5-10)	Soil	CL 23	1	X											
4/24/99	1825	31152-SB-14-(14.5-15.0)	Soil	CL 24	1	X											
4/24/99	1320	31152-SB-14-TB	Water	CL 25	1	X											Pres. with HCC

PROJECT INFORMATION		SAMPLES RECEIVED		1. RELINQUISHED BY: (SIGNATURE)		2. RELINQUISHED BY: (SIGNATURE)		3. RECEIVED BY LABORATORY: (SIGNATURE)	
PROJECT MANAGER		TOTAL NO. OF CONTAINERS		(PRINTED NAME)		(PRINTED NAME)		(PRINTED NAME)	
SHIPPING ID. NO.		CHAIN OF CUSTODY SEALS		RECEIVED BY:		RECEIVED BY:		(COMPANY)	
VIA:		GOOD CONDITION/CHILLED		(TIME / DATE)		(TIME / DATE)		(TIME / DATE)	
		CONFORMS TO RECORD		SPECIAL INSTRUCTIONS / COMMENTS:					

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STEWS-NR-MT-AA (70-10r)

01 JUN 1999

MEMORANDUM FOR NR-ES-E, ATTN: Ms. Wyatt

SUBJECT: Analysis Support

1. In response to your verbal request, the Applied Environments Test Branch (NR-MT-AA) Chemistry Laboratory analyzed two water samples for their Total Petroleum Hydrocarbon (TPH) content and one water sample for its corrosivity, conductivity, total dissolved solids, anions and specified metals.
2. Results. The results are presented in Table 1, Encl 1.
3. The samples were obtained by Mevatec personnel and were delivered to the laboratory on 19 May 99. The analyses were completed on 25 May 99.
4. Point of contact is Dr. Joseph E. Gomez, 678-2992.

Encl  
as



ANDRUS GARAY  
Chief, Applied Envr Test Branch

TABLE 1

A. Total Petroleum Hydrocarbons (TPH) - WATER

<u>Sample Identification</u>	<u>TPH (parts per million)</u>
31152-MW-01-0599	ND*
31152-MW-01-0599-TB	ND

\* ND = None Detected - detection limit = 0.10 ppm (W/W)

B. Corrosivity, Conductivity, Total Dissolved Solids (TDS)

<u>Sample Identification</u>	<u>pH</u>	<u>Conductivity (Micromhos/cm)</u>	<u>TDS (mg/liter)</u>
31152-MW-01-0599	6.7	26,500	14,400

C. Metals

<u>Sample Identification</u>	<u>Concentration, parts per million</u>				
	<u>M(1)</u>	<u>M(2)</u>	<u>M(3)</u>	<u>M(4)</u>	<u>M(5)</u>
31152-MW-01-0599	2,100	8	370	2,400	ND
Detection Limit	1	1	1	1	0.5

M(1) = Sodium  
 M(2) = Potassium  
 M(3) = Magnesium  
 M(4) = Calcium  
 M(5) = Barium  
 ND = None Detected

D. Anions

<u>Sample Identification</u>	<u>Concentration, parts per million</u>		
	<u>Chloride</u>	<u>Sulfate</u>	<u>Nitrate</u>
31152-MW-01-0599	7,100	2,100	ND*

\* ND = None Detected - detection limit = 1ppm



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**CHAIN OF CUSTODY RECORD**

PAGE 1 OF 1

*White as N*

PROJECT NO.		PROJECT NAME			NO. OF CONTAINERS	ANALYSIS REQUESTED						REMARKS
30066		Denver & Malpais LTM				Fe	Mn	DRD	Phys Chem	Diss Metals	Diss Phosphate	
DATE COLLECTED	TIME COLLECTED	SAMPLE ID	MATRIX	LAB NO.								
5/18/99	1250	3153 MW01-0599	Water		7	X	X	X	X	X		
5/18/99	1250	3153 MW01-0599-TB	Water		1	X						

PROJECT INFORMATION		SAMPLES RECEIVED	1. RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	2. RELINQUISHED BY: (SIGNATURE)	3. RECEIVED BY LABORATORY: (SIGNATURE) <i>[Signature]</i>
PROJECT MANAGER <i>[Signature]</i>	TOTAL NO. OF CONTAINERS	CHAIN OF CUSTODY SEALS	(PRINTED NAME) <i>Greg Wattersen</i>	(PRINTED NAME)	(PRINTED NAME)
SHIPPING ID. NO.	GOOD CONDITION/CHILLED		RECEIVED BY:	RECEIVED BY:	(COMPANY)
VIA: <i>[Signature]</i>	CONFORMS TO RECORD		(TIME / DATE)	(TIME / DATE)	(TIME / DATE)
			SPECIAL INSTRUCTIONS / COMMENTS:		

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