# GW-263

Corrective Action Work Plan for Soil Impacted by C. Station

# Work Plan

# **YEAR(S):** 2008

#### Lowe, Leonard, EMNRD

From: Lowe, Leonard, EMNRD

Sent: Tuesday, October 14, 2008 12:56 PM

To: 'Horn, Claudette'

Cc: Griswold, Jim, EMNRD

Subject: RE: Work Plan for Starlake compressor station

Claudette Horn,

Your work plan has been approved.

Hopefully you do not have any more contaminated findings in the future, but if so, please pay attention to staging your waste intermediately.

llowe

#### Leonard Lowe

Environmental Engineer Oil Conservation Division/EMNRD 1220 S. St. Francis Drive Santa Fe, N.M. 87505 Office: 505-476-3492 Fax: 505-476-3462 E-mail: <u>leonard.lowe@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>

From: Horn, Claudette [mailto:Claudette.Horn@pnmresources.com]
Sent: Monday, October 13, 2008 9:57 AM
To: Horn, Claudette; Lowe, Leonard, EMNRD
Cc: Griswold, Jim, EMNRD
Subject: RE: Work Plan for Starlake compressor station

Hi Leonard, We've addressed the two items of concern noted below.

1. The stockpiled soil has been covered with plastic.

2. Both Envirotech and Schmitz Construction/TNT Environmental have confirmed that they can accept the contaminated soil with the stated amount of metals. We have not yet determined which facility will receive the waste as we are soliciting cost estimates for the earth work, transport, and disposal.

Please let me know if we now have approval to proceed with our corrective actions. Thanks, Claudette

From: Horn, Claudette
Sent: Wednesday, October 08, 2008 9:08 AM
To: 'Lowe, Leonard, EMNRD'
Cc: Griswold, Jim, EMNRD
Subject: RE: Work Plan for Starlake compressor station

Hi Leonard,

I've followed up on item #1. The grandchildren of one employee are living in the house in the background of photo #4. We will have the stockpiled soil covered by the end of the week. We are still working on #2. Thanks, Claudette

------

Claudette Horn Environmental Manager PNM Resources Alvarado Square, Albuquerque, NM 87158-2104 505-241-2019 505-269-3862 (m) claudette.horn@pnmresources.com

From: Lowe, Leonard, EMNRD [mailto:Leonard.Lowe@state.nm.us]
Sent: Tuesday, October 07, 2008 4:26 PM
To: Horn, Claudette
Cc: Griswold, Jim, EMNRD
Subject: Work Plan for Starlake compressor station
Importance: High

Ms. Claudette Horn,

As per our conversation this afternoon, October 7, 2008, Jim Griswold had discussed with you a few areas of concern in your submitted plan.

- 1. Immediately find out if there are any children in the adjacent home as indicated in photograph # 4, dated June 17. Or if there is anyone living there.
- 2. Verify with your proposed land fills that they can receive the contaminated soil with the stated amount of metals.

Also, I forgot to mention during the tele-call, when excavating contaminated soils, in this case, please allocate the "waste" on a non permeable padding/liner to prevent the spreading of the waste.

Jim and I will be waiting on your input.

Thank you for your attention.

llowe

#### Leonard Lowe

Environmental Engineer Oil Conservation Division/EMNRD 1220 S. St. Francis Drive Santa Fe, N.M. 87505 Office: 505-476-3492 Fax: 505-476-3462 E-mail: <u>leonard.lowe@state.nm.us</u> Website: http://www.emnrd.state.nm.us/ocd/

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PNM Resources Alvarado Square Albuquerque, NM 87158-2104 www.pnmresources.com 505.241.2031 Fax: 505.241.2384

# RECEIVED

2008 AUG 19 PM 2 48



CERTIFIED MAIL

August 18, 2008

Leonard Lowe Environmental Engineer Oil Conservation Division, EMNRD 1220 S. St. Francis Dr. Santa Fe, NM 87505

Carl Chavezs

<u>RE: PNM Star Lake Natural Gas Compressor Station (GW-263) – Corrective Action Work Plan for</u> <u>Soil Impacted by Compressor Oil; McKinley County, NM;</u>

Dear Mr. Lowe,

With this letter, PNM is submitting the Corrective Action Work Plan for the historic release of compressor oil at the Star Lake Compressor Station for OCD review and approval. PNM is proposing to excavate impacted soil and haul it to an OCD-permitted facility. The attached Work Plan describes the site assessment conducted, analytical results, and the proposed corrective action.

Initial notice of the release was provided via telephone on November 6, 2007. The initial C-141 report was submitted on November 9, 2007. With this submittal, an updated C-141 is attached. This update summarizes the site assessment and proposed corrective action.

PNM will begin remediation work upon receipt of OCD approval of the Work Plan. Please let me know if there are any questions. I may be contacted at 505-241-2019 or via e-mail at claudette.horn@pnmresources.com.

Sincerely,

Mandette Horn

Claudette Horn Environmental Manager

Enc.

Cc: Mark Sikelianos, Delphi, Inc. (w/o enc.) Curtis Winner, PNM Kevin Lawrence, PNM DCC

<u>District 1</u> 625 N. French Dr., Hobbs, NM 88240 <u>District II</u> 301 W. Grand Avenue, Artesia, NM 88210	State of New Mexico Energy Minerals and Natural Resources	Form C-141 Revised October 10, 2003
District III 000 Rio Brazos Road, Aztec, NM 87410 District IV 220 S. St. Francis Dr., Santa Fernix 87505	<ul> <li>V E Øil Conservation Division</li> <li>1220 South St. Francis Dr.</li> <li>9 PM 2 48 Santa Fe, NM 87505</li> </ul>	Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form
R	Release Notification and Corrective Action	

	OPERATOR	Initial Report	Final Report
Name of Company: PNM	Contact: Claudette Horn		
Address: Alvarado Square, Albuquerque, NM 87158-2104	Telephone No.: 505-241-2019		
Facility Name: Star Lake Compressor Station	Facility Type: Natural Gas Comp	pressor Station	

Surface Owner

Mineral Owner

## LOCATION OF RELEASE

Lease No.

Unit Letter	Section 34	Township 20N	Range 6W	Feet from the	North/South Line	Feet from the	East/West Line	County McKinley

Latitude:\_35.924851\_\_\_\_ Longitude:\_-107.466736\_\_\_\_\_

#### NATURE OF RELEASE

Type of Release: Compressor Oil	Volume of Release: unknown	Volume Recovered: none
Source of Release: unknown	Date and Hour of Occurrence	Date and Hour of Discovery
	Historic release	
Was Immediate Notice Given?	If YES, To Whom?	
🗌 Yes 🔲 No 🔀 Not Required		
By Whom?	Date and Hour	
Was a Watercourse Reached?	If YES, Volume Impacting the Wat	tercourse.
🗋 Yes 🖾 No		
If a Watercourse was Impacted, Describe Fully.*	<b>*</b>	

Describe Cause of Problem and Remedial Action Taken.\*

#### 11/27/07 C-141 Submittal (this revised initial 11/9/07 submittal)

During decommissioning activities for seven compressor engines and ancillary equipment installed in the 1940s, discolored soil was encountered. Two soil samples were collected and analyzed for: PCBs (non-detect), BTEX (non-detect), metals (none exceeded RCRA standards), chloride (12ppm and non-detect), and TPH (15,000 and 75,000 ppm). The OCD ranking score for the site is 20.

Most ancillary equipment has been removed; however, the compressor engines and concrete pad are still in-place. Given the extensive nature of the decommissioning activities, PNM will conduct site assessment and associated remediation activities in conjunction with the decommissioning schedule. At this time, PNM plans to conduct the site assessment to determine extent of contamination over the next several weeks.

Per phone discussion between L. Lowe (OCD) and C. Horn (PNM) on November 7, 2007, upon completion of the site assessment, PNM will submit a Corrective Action plan to the OCD. As discussed, PNM plans to initiate necessary remediation activities after removal of the compressor engines and concrete pad.

#### **Current Submittal – Site Investigation**

On March 18, 2008, a Phase II Investigation was performed utilizing a direct push geoprobe. A total of twenty-six (26) soil borings were performed with samples collected in four foot intervals. The investigation was conducted on the east and west sides of the former Clark Compressor building.

At the time of the investigation, the building shell had been removed with the concrete foundation and compressors still present. The borings were strategically placed to delineate the horizontal and vertical extent of petroleum contamination. The soils were screened in the field visually, and with a photo ionization detector (PID). Based upon these indications samples were submitted for laboratory analysis of the following: Total Petroleum Hydrocarbons (TPH) gas, diesel, and motor oil range modified Method 8015; ethylene glycol, modified Method 8015; PCBs, Method 8080; Total RCRA Metals, Method 6010.

Describe Area Affected and Cleanup Action Taken.\*

#### Current Submittal - Area Affected and Proposed Corrective Action (see attached Corrective Action Work Plan)

The results of the investigation revealed petroleum contamination on the northern portion of the former Clark Compressor building. The contamination is primarily TPH in the diesel and motor oil range. The highest concentrations reported were in the 1000 ppm range for diesel range organics (DRO), and in the 8300 ppm range for motor oil range organics (MRO). The contamination appears to be located at a depth of 7-8 feet below ground surface, and continues to at least 12 feet below ground surface in a few isolated areas. Results for soil samples submitted for PCBs, and ethylene glycol were non-detect. Results for soil samples submitted for metals analysis did not reveal any concentrations above maximum allowed TCLP concentrations.

During the week of June 9<sup>th</sup> through June 17, the Clark compressor foundation was demolished and excavated. The foundation measuring 15' x 140' x 6' was removed. It was estimated that approximately 467 cubic yards of concrete were removed. At this time, further assessment of the soils beneath the foundation was performed. There was some evidence of discolored soils along the length of the trench. A front end loader was used to remove a 1- foot horizon of soil across the entire length of the excavation. The soils were staged on the northwest corner of the property. One sample was collected approximately 100 feet north of the Saturn building as a worst case sample to determine if the discolored soils were highly contaminated. An additional sample was collected 120 feet north of the Saturn building in the area defined by the geoprobe investigation as having the highest concentration. The sample was collected at a vertical depth of 12 feet below ground surface in the center of the trench. Based upon results of laboratory analysis and visual observation the contamination was not continuous and not present directly beneath the former slab. There appeared to be isolated areas of contamination along the side trenches of the former slab.

PNM proposes to excavate all of the grossly contaminated soils within the former foundation trench and haul them to an OCD approved land farm. The horizon directly beneath the former foundation was over excavated at least one foot across the entire trench. There are a few isolated areas along the northern portion of the excavation that may require additional soil remediation. Soils will be excavated and removed in the horizontal and vertical extent based upon laboratory results obtained during the geoprobe investigation. Additional soil samples will likely be collected and submitted for laboratory analysis in the vertical extent once final clean up has been performed for confirmation purposes.

The horizontal extent of the soil contamination has been adequately defined with a geoprobe. The vertical extent of the soil contamination has also been defined with a geoprobe and subsequently with a back hoe. The extent of the vertical contamination is not continuous and was observed in isolated pockets. The total volume of contaminated soil to be removed is estimated to be approximately 600 cubic yards.

The contaminant of concern is primarily Total Petroleum Hydrocarbon (TPH) in the diesel and motor oil range. No gasoline range hydrocarbons i.e. BTEX have been detected, and soils monitored with a PID for VOCS have shown no volatile organic compounds. Based on the OCD ranking criteria, a target cleanup value of 100 ppm TPH has been established. A C-138 form requesting approval to accept solid waste shall be submitted to the land farm facility detailing the non-exempt waste.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

May loft Hann	<u>OIL CONS</u>	ERVATION 1	DIVISION	
Signature: Clillaume 1700				
Printed Name: Claudette Horn	Approved by District Supervisor	: 		
Title: Environmental Manager Facility Compliance	Approval Date:	Expiration Date:		
E-mail Address: Claudette.horn@pnmresources.com	Conditions of Approval:		Attached	
Date:         August 18, 2008         Phone: 505 241-2019				

\* Attach Additional Sheets If Necessary

Prepared For

2008

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PNM

# CORRECTIVE ACTION WORK PLAN STAR LAKE COMPRESSOR STATION

NW <sup>1</sup>/<sub>4</sub> of SEC. 34, T 20N, R6W McKinley County, New Mexico



Date Issued: August 12, 2008

**Mark Sikelianos** 

DELPHI, INC. 101 EDELWEISS TIJERS, NEW MEXICO 87059

TEL (505) 281-1885 FAX (505) 281-0573 Email: <u>marksik@Delphiinc.net</u>

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#### 1.0 EXECUTIVE SUMMARY

During decommissioning activities for seven compressor engines and ancillary equipment installed in the 1940s, discolored soil was encountered. Two soil samples were collected and analyzed for: PCBs (non-detect), BTEX (non-detect), metals (none exceeded RCRA standards), chloride (12ppm and nondetect), and TPH (15,000 and 75,000 ppm). The OCD ranking score for the site is 20.

Delphi, Inc ("DELPHI") was requested by Ms. Claudette Horn of PNM to conduct an Environmental Site Assessment ("ESA") in association with the retirement of seven (7) "Clark" Compressors at the Star Lake Compressor Station (Star Lake).

On March 18, 2008, a Phase II Investigation was performed utilizing a direct push geoprobe. A total of twenty-six (26) soil borings were performed with samples collected in four foot intervals. The investigation was conducted on the east and west sides of the former Clark Compressor building.

At the time of the investigation, the building shell had been removed with the concrete foundation and compressors still present. The borings were strategically placed to delineate the horizontal and vertical extent of petroleum contamination. The soils were screened in the field visually, and with a photo ionization detector (PID). Based upon these indications samples were submitted for laboratory analysis of the following: Total Petroleum Hydrocarbons (TPH) gas, diesel, and motor oil range modified Method 8015; ethylene glycol, modified Method 8015; PCBs, Method 8080; Total RCRA Metals, Method 6010.

#### 1.1 Summary of Data

The results of the investigation revealed petroleum contamination on the northern portion of the former Clark Compressor building. The contamination is primarily TPH in the diesel and motor oil range. The highest concentrations reported were in the 1000 ppm range for diesel range organics (DRO), and in the 8300 ppm range for motor oil range organics (MRO). The contamination appears to be located at a depth of 7-8 feet below ground surface, and continues to at least 12 feet below ground surface in a few isolated areas. Results for soil samples submitted for PCBs, and ethylene glycol were non-detect. Results for soil samples submitted for metals analysis did not reveal any concentrations above maximum allowed TCLP concentrations.

#### 1.2 Conclusions

The results of the investigation revealed petroleum contamination on the northern portion of the former Clark Compressor building. The contamination is primarily TPH in the diesel and motor oil range. The highest concentrations reported were in the 1000 ppm range for diesel range organics (DRO), and in the 8300 ppm range for motor oil range organics (MRO). The contamination appears to be located at a depth of 7-8 feet below ground surface, and continues to at least 12 feet below ground surface in a few isolated areas where Clark units five and six previously existed. The horizontal extent is well defined, with vertical extent also defined, with areas of isolated contamination. Results for soil samples submitted for PCBs, and ethylene glycol were non-detect Results for soil samples submitted for metals analysis did not reveal any concentrations above maximum allowed TCLP concentrations. It is Delphi's opinion that petroleum contamination within the soils is limited primarily to the northern area of the former Clark compressor building.

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#### 1.3 Recommendations

Based on the conclusions of this assessment the limits of source contamination appear to be sufficiently defined in the horizontal extent. The vertical extent showed two isolated areas with relatively high concentrations of TPH at the 8-12 foot interval. With the data provided (Table 2 and Figure(s) 3 and 4) estimates can be made for contaminant removal and remediation. Delphi recommends gross source removal of the contamination within the defined areas to enhance natural attenuation of the petroleum contaminants. Viable options are to dig and haul to a nearby land farm. Confirmation samples should be collected in the vertical extent to verify that TPH contamination was sufficiently removed. The TPH concentrations revealed should be compared to applicable clean up standards for the New Mexico Oil Conservation Division (NMOCD).

#### 2.0 BACKGROUND

On November 13, 2007, an initial site visit was performed at Star Lake to make a preliminary assessment. The building surrounding the Clark compressors had been removed with the foundation and engines still in place. The existing foundation was measured to be approximately 15-feet wide and 140-feet in length. There appeared to be soil contamination surrounding the perimeter of the foundation, with the most visible areas along the southeastern side of the foundation where prior sampling revealed high concentrations of TPH. The soils showed slight petroleum hydrocarbon staining. Based upon the site observations and the previous sampling performed, a more detailed assessment of the area was recommended.

#### 2.1 Location

Star Lake is located at an elevation of 6,640 feet above mean sea level in Section 34, Township 20N, Range 6W. The facility is approximately 11 miles west/northwest of Torreon, NM in McKinley County. Figure 1 is a 1:100,000 topographic map showing the regional topography and general site location of the Star Lake Facility. Figure 2 is a USGS 7.5 minute topographic map showing the location of the facility and localized topographical features. Figure 3, is an aerial photo/map of Star Lake with the soil boring locations and analytical data posted. Figure 4 is a footprint map of the buildings, soil boring locations, and analytical data posted.

#### 2.2 Site History

The Star Lake Compressor Station (Star Lake) is a natural gas compressor station. The facility is owned by the Public Service Company of New Mexico and has been operating since approximately 1945. The facility was originally constructed in 1945 and consisted of two Clark RA6 compressor engines. Three additional Clark RA6 engines were installed, two in 1946 and one in 1949. In 1952, two additional Clark HRA6 engines were installed. PNM is in the process of retiring the seven (7) "Clark" internal gas combustion compression engines.

#### 2.3 Chronology of Events

During decommissioning activities for seven compressor engines and ancillary equipment installed in the 1940s, discolored soil was encountered. Two soil samples were collected and analyzed for: PCBs (non-detect), BTEX (non-detect), metals (none exceeded RCCRA standards), chloride (12ppm and non-detect), and TPH (15,000 and 75,000 ppm).

On November 7, 2007, a C-141 release form was submitted providing notification of the release by Ms. Claudette Horn, Environmental Manager with PNM, to Mr. Leonard Lowe, Environmental Engineer with the OCD.

On November 13, 2007, an initial site visit was performed at Star Lake to make a preliminary assessment. The building surrounding the Clark compressors had been removed with the foundation and engines still in place. The existing foundation was measured to be approximately 15-feet wide and 140-feet in length. There appeared to be soil contamination surrounding the perimeter of the foundation, with the most visible areas along the southeastern side of the foundation where prior sampling revealed high concentrations of TPH. The soils showed slight petroleum hydrocarbon staining.

On March 18, 2007, a Phase II Investigation was performed utilizing a direct push geoprobe. A total of twenty six (26) soil borings were performed with samples collected in four foot intervals.

The investigation was conducted on the east and west sides of the former Clark Compressor building.

During the week of June 9<sup>th</sup> through June 17, the Clark compressor foundation was demolished and excavated. The foundation measuring 15' x 140' x 6' was removed. It was estimated that approximately 467 cubic yards of concrete were removed. At this time, further assessment of the soils beneath the foundation was performed. There was some evidence of discolored soils along the length of the trench. A front end loader was used to remove a 1- foot horizon of soil across the entire length of the excavation. The soils were staged on the northwest corner of the property. One sample was collected approximately 100 feet north of the Saturn building as a worst case sample to determine if the discolored soils were highly contaminated. An additional sample was collected 120 feet north of the Saturn building in the area defined by the geoprobe investigation as having the highest concentration. The sample was collected at a vertical depth of 12 feet below ground surface in the center of the trench. Based upon results of laboratory analysis and visual observation the contamination was not continuous and not present directly beneath the former slab. There appeared to be isolated areas of contamination along the side trenches of the former slab.

#### 3.0 SITE SETTINGS

#### 3.1 Soils/Geology

The Facility is located within McKinley County, New Mexico. Soils data from the NRCS were acquired for McKinley County. The soils were identified as Calladito-Elias association (see Appendix C).

Description Category: SOI Map Unit: 12-Calladito-Elias association, 1 to 6 percent slopes

**Calladito soils** make up 55 percent of the map unit. The runoff class is negligible. The depth to a restrictive feature is greater than 60 inches. This soil is excessively drained. The slowest soil permeability within a depth of 60 inches is rapid. Available water capacity to a depth of 60 inches is low, and shrink swell potential is low. Annual flooding is none, and annual ponding is none. The minimum depth to a water table is greater than 6 feet. The maximum calcium carbonate equivalent within a depth of 40 inches is 1 percent. The assigned Kw erodibility factor is .20. It is nonirrigated land capability subclass 7e. This component is not a hydric soil. Typical Profile: A - 0 to 2 inches; loamy fine sand; slightly alkaline. C1 - 2 to 26 inches; loamy fine sand; moderately alkaline. C2 - 26 to 65 inches; loamy fine sand; moderately alkaline.

Elias soils make up 30 percent of the map unit. The runoff class is medium. The depth to a restrictive feature is greater than 60 inches. This soil is well drained. The slowest soil permeability within a depth of 60 inches is slow. Available water capacity to a depth of 60 inches is moderate, and shrink swell potential is moderate. Annual flooding is none, and annual ponding is none. The minimum depth to a water table is greater than 6 feet. The maximum calcium carbonate equivalent within a depth of 40 inches is 15 percent. The assigned Kw erodibility factor is .32. It is non irrigated land capability subclass 7s. This component is not a hydric soil. Typical Profile: E - 0 to 1 inches; fine sandy loam; strongly alkaline. Btn1 - 1 to 3 inches; sandy clay loam; very strongly alkaline. Btn2 - 3 to10 inches; sandy clay loam; very strongly alkaline. Bkn2 - 18 to 33 inches; sandy clay loam; moderately alkaline. Bkn3 - 33 to 65 inches; clay loam; very strongly alkaline.

#### 3.2 Hydrology

The regional hydraulic gradient in the alluvial aquifer is believed to follow the topography to the south. The localized groundwater gradient in the vicinity of the Property is also believed to be to the south. This may be altered or influenced by localized pumping of local wells. Depth to groundwater in the vicinity of the facility is reported to range from 80 to 100 feet below the ground surface (depth to ground water – ranking score 10).

There are no washes or ephemeral streams located within 1000 feet of the compressor facility (distance to surface water body > 1000 horizontal feet – ranking score 0)

#### 3.3 **Potential Receptors**

There are two water wells located on site along the north property boundary. Well #1 is a deeper well with depth to water reported at approximately 490 feet below ground surface (bgs), total depth at approximately 1080 feet bgs, and the pump set at approximately 830 feet bgs. The reported perforations or screened interval is believed to be from 775 to 785 feet bgs. Well # 2 is a shallow well with depth to water reported at approximately 70 feet bgs, total depth at approximately 180 feet bgs and the pump set at approximately 70 feet below ground surface. Both of these wells are believed to be located up gradient of the facility. Recent results of groundwater samples collected and submitted for laboratory analysis showed no petroleum hydrocarbon contamination (wellhead protection area <200 feet from private domestic water source – ranking score 20).

#### 4.0 METHODS OF INVESTIGATION

#### 4.1 GeoProbe Direct Push Investigation

In order to evaluate and delineate both the horizontal and vertical extent of the petroleum hydrocarbon contamination at the site, twenty-six (26) soil borings were performed utilizing a direct push hydraulic auger system. The borings (SB1 through SB26) were performed in and around the vicinity of the former Clark compressor building at shallow depths ranging from zero to sixteen feet below ground surface. The direct push geoprobe continuously advanced a clear polycarbonate core sampler into the undisturbed soil. Soil samples were collected in 4-foot intervals with field personnel providing screening and recording lithologic descriptions of the soils. In addition to these samples, two discrete samples were collected directly below the former "New" oil tank. The samples were submitted for laboratory analysis of TPH in the gasoline, diesel, and motor oil range (GRO, DRO, MRO) utilizing modified EPA Method 8015.

In all, thirty four (34) soil samples were collected and submitted for laboratory analysis. The soils were screened in the field visually, and with a photo ionization detector (PID). Based upon these indications samples were submitted for laboratory analysis of the following: Total Petroleum Hydrocarbons (TPH) gas, diesel, and motor oil range by modified Method 8015; ethylene glycol, modified Method 8015; PCBs, Method 8080; Total RCRA Metals, Method 6010.

After collecting the soil samples using the appropriate method, field personnel logged the lithology for all soil-sampling locations on a lithologic description form. The lithologic descriptions include soil type (according to the Unified Soil Classification System (USCS)). Copies of the soil borings are provided in Appendix D.

#### 4.2 Removal of Concrete Foundation

During the week of June  $9^{th}$  thru June  $17^{th}$ , the Clark compressor foundation was demolished and excavated. The foundation measured approximately 15' x 140' x 6' and was estimated to contain approximately 467 cubic yards of concrete. The concrete was broken up and removed from the site for rip rap and storm water erosion use.

#### 4.4 Follow-up Subsurface Investigation

Once the concrete was removed further assessment of the soils beneath the foundation was performed. There was some evidence discolored soils along the length of the trench. A front end loader was used to excavate approximately 1' of soil across the entire length of the trench. The soils were staged on the northwest corner of the property. One sample was collected approximately 100 feet north of the Saturn building as a worst case sample to determine if the discolored soils were highly contaminated. An additional sample was collected 120 feet north of the Saturn building in the area previously defined by the geoprobe investigation as having the highest TPH concentrations. The sample was collected at a vertical depth of 12 feet below ground surface. Both visual and laboratory analysis were non-detect for the presence of TPH. It was apparent that the contamination was not continuous and not present directly beneath the former slab. There appeared to be isolated areas of contamination along the side trenches of the former foundation.

#### 4.0 SAMPLING AND ANALYSIS RESULTS

#### 4.1 Soil

The results of the investigation revealed petroleum contamination on the northern portion of the former Clark Compressor building. The contamination is primarily TPH in the diesel range and motor oil range. The highest concentrations reported were in the 1000 ppm range for diesel range organics (DRO), and in the 8300 ppm range for motor oil range organics (MRO). The contamination appears to be located at a depth of 7-8 feet below ground surface, and continues to at least 12 feet below ground surface. Results for soil samples submitted for PCBs, and ethylene glycol were non detect Results for soil samples submitted for metals analysis did not reveal any high concentrations, with the exception of barium which is still below maximum allowed TCLP concentrations. Soils field screened with a PID did not reveal any Volatile Organic compounds. The highest reading encountered was seven (7) ppm. The soils with visual hydrocarbon contamination observed were degraded petroleum hydrocarbons with low hydrocarbon odors. A request to Hall Environmental was made to review the GRO analysis of the four hottest samples submitted for analysis to determine if any benzene, toluene, ethyl benzene, or xylenes (BTEX) compounds existed in the GRO range gas chromatograph. No BTEX components were detected. Figure(s) 3, 4, and Table 1 provide an accurate representation of the soil borings and analytical data collected.

Additional assessment and follow-up sampling was performed after the removal of the concrete foundation. The excavation did not reveal any grossly contaminated soil. Soils that had a black or gray discoloration were excavated and stockpiled on the northwest corner of the property.

#### 4.2 Groundwater

Impacts or impairment to groundwater are not believed to have occurred. The on site wells to the north (believed to be upgradient) were recently sampled. Results of the analysis did not reveal any hydrocarbon contamination.

#### 5.0 REMEDIATION

#### 5.1 Dig and Haul

PNM proposes to excavate all of the grossly contaminated soils within the former foundation trench and haul them to an OCD approved land farm. The horizon directly beneath the former foundation was over excavated at least one foot across the entire trench. There are a few isolated areas along the northern portion of the excavation that may require additional soil remediation. Soils will be excavated and removed in the horizontal and vertical extent based upon laboratory results obtained during the geoprobe investigation. Additional soil samples will likely be collected and submitted for laboratory analysis in the vertical extent once final clean up has been performed for confirmation purposes.

The horizontal extent of the soil contamination has been adequately defined with a geoprobe. The vertical extent of the soil contamination has also been defined with a geoprobe and subsequently with a back hoe. The extent of the vertical contamination is not continuous and was observed in isolated pockets. The total volume of contaminated soil to be removed is estimated to be approximately 600 cubic yards.

The contaminant of concern is primarily Total Petroleum Hydrocarbon (TPH) in the diesel and motor oil range. No gasoline range hydrocarbons i.e. BTEX have been detected, and soils monitored with a PID for VOCS have shown no volatile organic compounds. Based on the OCD ranking criteria, a target cleanup value of 100 ppm TPH has been established. A C-138 form requesting approval to accept solid waste shall be submitted to the land farm facility detailing the non-exempt waste.

#### 5.0 CONCLUSIONS AND RECOMENDATIONS

#### 5.1 Conclusions

The results of the investigation revealed petroleum contamination on the northern portion of the former Clark Compressor building. The contamination is primarily TPH in the diesel and motor oil range. The highest concentrations reported were in the 1000 ppm range for diesel range organics (DRO), and in the 8300 ppm range for motor oil range organics (MRO). The contamination appears to be located at a depth of 7-8 feet below ground surface, and continues to at least 12 feet below ground surface in a few isolated areas where Clark units five and six previously existed. The horizontal extent is well defined, with vertical extent also defined, with areas of isolated contamination. Results for soil samples submitted for PCBs, and ethylene glycol were non-detect Results for soil samples submitted for metals analysis did not reveal any concentrations above maximum allowed TCLP concentrations. It is Delphi's opinion that petroleum contamination within the soils is limited primarily to the northern area of the former Clark compressor building.

#### 5.2 Recommendations

Based on the conclusions of this assessment the limits of source contamination appear to be sufficiently defined in the horizontal extent. The vertical extent showed two isolated areas with relatively high concentrations of TPH at the 8-12 foot interval. With the data provided (Table 2 and Figure(s) 3 and 4) estimates can be made for contaminant removal and remediation. Delphi recommends gross source removal of the contamination within the defined areas to enhance natural attenuation of the petroleum contaminants. Viable options are to dig and haul to a nearby land farm, or onsite land farming. Confirmation samples should be collected in the vertical extent to verify that TPH contamination was sufficiently removed. The TPH concentrations revealed should be compared to applicable clean up standards for the New Mexico Oil Conservation Division (NMOCD).

#### 6.0 **REFERENCES**

USGS - 7.5 Minute Topographic Quadrangle of Star Lake, NM, 1989

DOQQ aerial photographs Star Lake, NM, 2005

USDA - Soil Conservation Service and Forest Service, Soil Survey Area: McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties Survey Area Data: Version 7, Jan 13, 2007

Office of State Engineers – WATERs Database.

## FIGURES

# SITE LOCATION MAP SITE TOPOGRAPHIC MAP SITE AERIAL PHOTO WITH SOIL BORINGS/ANALYTICAL SITE MAP WITH SOIL BORINGS/ANALYTICAL

**Corrective Action Plan** 









TABLES

**Corrective Action Plan** 

#### TABLE 1 STAR LAKE COMPRESSOR STATION GEOPROBE INVESTIGATION ANALYTICAL RESULTS SUMMARY CONCENTRATIONS (ppm)

			TPH	TPH	TPH		RCRA			
SAMPLE	Time	Depth	GRO	DRO	MRO	РСВ	Metals	Glycol	Comment	
New Oil Tank	1100	6	<5.0	200	850	<0.02	NA		appeared clean?Center	
New Oil Tank	1105	6	<5.0	<10.0	<50.0	NA	NA		S Wall	
SB1W	1113	8	<5.0	<10.0	<50.0	<0.02	Ba 84		No HC? Sample was black	
SB1W	1115	14	<5.0	<10.0	<50.0	NA	NA			
SB2W	1133	8	<5.0	<10.0	<50.0	NA	NA			
SB2W	113	10	NA	NA	NA	NA	NA	<5.0		
SB2W	<b>1</b> 140	12	<5.0	<10.0	<50.0	NA	NA			
SB3W	1152	8	<5.0	<10.0	<50.0	NA	NA			
SB6W	1240	8	6.4	630	2400	<0.02	Ba 46			
SB6W	1245	12	5.2	1100	5300	NA	NA			
SB7W	1250	8	<5.0	690	3100	<0.02	Ba 43			
SB8W	1257	5	<5.0	<10.0	<50.0	NA	NA			
SB10W	1318	8	<5.0	<10.0	<50.0	NA	NA			
SB12W	1350	12	<5.0	<10.0	<50.0	NA	NA			
SB14E	1430	7	NA	NA	NA	NA	NA	<5.0		
SB14E	1431	11	<5.0	<10.0	<50.0	NA	NA			
SB14E	1435	12	<5.0	<10.0	<50.0	NA	NA			
SB15E	1438	7	<5.0	<10.0	<50.0	NA	NA		No HC? Sample was black	
SB16E	1446	7	<5.0	<10.0	<50.0	NA	NA			
SB17E	1453	7	<5.0	1000	8300	NA	NA			
SB17E	1458	8	<5.0	<10.0	<50.0	NA	NA			
SB18E	1504	8	<5.0	680	2800	NA	NA	<5.0		
SB18E	1508	12	<5.0	310	1500	NA	NA			
SB19E	1515	8	<5.0	<10.0	<50.0	NA	NA			
SB20E	1530	6	<5.0	<10.0	<50.0	NA	NA	<5.0		
SB20E	1535	12	<5.0	<10.0	<50.0	NA	NA			
SB21E	1539	4	<5.0	<10.0	<50.0	NA	NA			
SB22E	1545	7	<5.0	<10.0	<50.0	NA	NA	<5.0		
SB22E	1550	12	<5.0	<10.0	<50.0	NA	NA			
SB23E	1547	6	<5.0	<10.0	<50.0	NA	NA			
SB25E	1614	7	<5.0	<10.0	<50.0	NA	NA			
SB25E	1620	12	NA	NA	NA	NA	NA	<5.0	•	
SB26E	1624	4	NA	NA	NA	NA	NA	<5.0		
SB26E	1628	8	<5.0	<10.0	<50.0	NA	NA			

#### Table 2 Star Lake Clark Compressor Building Soil Remediation Volume Approximations

Site	Length (ft)	Width (ft)	Area (SF)	Depth (ft)	Volume (cubic feet)	Volume (cubic yds)
Area of Investigation	170	65	11050	12	132600	4911.11
Area of Excavation	150	25	3750	8	30000	1111.11
Area of Concrete Foundation	140	15	2100	6	12600	466.67
Area of Contamination					17400	644.44

# APPENDIX A PHOTOGRAPHS

**Corrective Action Plan** 



Photograph Number 1: View of the geoprobe direct push unit performing borings at the southwest corner of the former Clark compressor building in the (vicinity of SB2W).



Photograph Number 2: View of the geoprobe direct push unit performing borings on the west side of the former Clark compressor building.

LIMITED PHASE II ESA



Photograph Number 3: View of soils collected in a polycarbonate liner in the process of field screening.



Photograph Number 4: View of the geoprobe looking north, west of the Clark compressors.



Photograph Number 5: View to south on the west side of the Clark compressors.



Photograph Number 6: View of black hydrocarbon contaminated soils encountered at soil boring SB7W at a depth of eight (8) feet below ground surface.



Photograph Number 7: View of the geprobe performing soil borings on the east side of the Clark Compressors.



Photograph Number 8: View of the soils encountered at soil boring SB18E.

LIMITED PHASE II ESA



Photograph Number 9: View of the work in progress on the east side of the Clark compressors.



Photograph Number 10: View to the south of the soil borings performed along the eastern side of the Clark compressors.



Photograph Number 11: View to the south of the soil borings performed around the Clark compressors.



Photograph Number 12: View to the south of the soil boring performed along the western side of the Clark compressors.



Photograph Number 1: View of the Clark foundation excavation looking to the south.



Photograph Number 2: View of the former Clark concrete foundation stockpiled.



Photograph Number 3: View of the Clark foundation excavation, looking to the northwest.



Photograph Number 4: View of the excavation of the Clark foundation trench.



Photograph Number 5: View to the south of the Clark soils excavation.



Photograph Number 6: View to the south of the Clark excavation and Saturn Building.

ENVIRONMENTAL SITE ASSESSMENT


Photograph Number 7: View of the stockpiled soils removed from the Clark foundation trench.



Photograph Number 8: View of backhoe performing vertical extent in the center of the foundation trench.



Photograph Number 9: View of backhoe performing vertical extent in the center of the trench 120' north of the Saturn Building



Photograph Number 10: View of backhoe performing vertical extent in the center of the trench 120' north of the Saturn Building

ENVIRONMENTAL SITE ASSESSMENT

# APPENDIX B LABORATORY ANALYSIS SOILS

**Corrective Action Plan** 

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#### COVER LETTER

Wednesday, March 26, 2008

Claudette Horn PNM Alvarado Square MS 2104 Albuquerque, NM 87158

TEL: (505) 241-2019 FAX (505) 241-4306

RE: Star Lake

Dear Claudette Horn:

Order No.: 0803193

Hall Environmental Analysis Laboratory, Inc. received 34 sample(s) on 3/20/2008 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager Nancy McDuffie, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001



4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109 505.345.3975 ■ Fax 505.345.4107 www.hallenvironmental.com

CLIENT:PNMProject:Star LakeLab Order:0803193

Date: 26-Mar-08

# CASE NARRATIVE

"S" flags denote that the surrogate recovery was poor due to sample dilution or matrix interferences.

Page 1 of 1

1

CLIENT:	PNM			Client Sample I	<b>D:</b> "New" O	il Tank Center 6'	
Lab Order:	0803193			te: 3/18/200	3/18/2008 11:00:00 AM		
Project:	Star Lake			Date Receive	d: 3/20/200	8	
Lab ID:	0803193-01			Matr	ix: SOIL	-	
Analyses	- ·	Result	PQL	Qual Units	DF	Date Analyzed	
EPA METHOD	8082: PCB'S					Analyst: JMP	
Aroclor 1016		ND	0.020	mg/Kg	-1	3/24/2008 5:16:15 PM	
Aroclar 1221		ND	0.020	mg/Kg	1	3/24/2008 5:16:15 PM	
Aroclor 1232		ND	0.020	mg/Kg	1	3/24/2008 5:16:15 PM	
Aroclor 1242		ND	0.020	mg/Kg	- 1	3/24/2008 5:16:15 PM	
Aroclor 1248		ND	0.020	mg/Kg	1	3/24/2008 5:16:15 PM	
Aroclor 1254		ND	0.020	mg/Kg	1	3/24/2008 5:16:15 PM	
Aroclor 1260		ND	0.020	mg/Kg	1	3/24/2008 5:16:15 PM	
Surr: Decach	lorobiphenyl	48.0	15.8-133	%REC	1	3/24/2008 5:16:15 PM	
EPA METHOD	8015B: DIESEL RANG	SE ORGANICS				Analyst: SCC	
Diesel Range O	rganics (DRO)	200	50	mg/Kg	5	3/24/2008 6:08:45 AM	
Motor Oil Range	e Organics (MRO)	850	250	mg/Kg	5	3/24/2008 6:08:45 AM	
Surr: DNOP		. 115	61.7-135	%REC	5	3/24/2008 6:08:45 AM	
EPA METHOD	8015B: GASOLINE R	ANGE				Analyst: BDH	
Gasoline Range	Organics (GRO)	ND	5.0	mg/Kg	1	3/21/2008 6:40:38 PM	
Surr: BFB		100	84-138	%REC	1	3/21/2008 6:40:38 PM	

Date: 26-Mar-08

Qualifiers:

\* Value exceeds Maximum Contaminant Level

E Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

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2

CLIENT:	PNM			Clie	nt Sample ID:	"New" Oi	l Tank South Wall 6'
Lab Order:	0803193			Co	llection Date:	3/18/2008	11:05:00 AM
Project:	Star Lake			D	ate Received:	3/20/2008	
Lab ID:	0803193-02				Matrix:	SOIL	
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS					Analyst: SCC
Diesel Range C	Organics (DRO)	ND	10		mg/Kg	1	3/24/2008 6:43:25 AM
Motor Oil Rang	e Organics (MRO)	NÐ	50		mg/Kg	1	3/24/2008 6:43:25 AM
Surr: DNOP	•	90.3	61.7-135		%REC	1	3/24/2008 6:43:25 AM
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst BDH

5.0

84-138

mg/Kg

%REC

ND

101

#### Hall Environmental Analysis Laboratory, Inc.

Gasoline Range Organics (GRO)

Surr: BFB

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

Date: 26-Mar-08

1

1

3/21/2008 7:10:51 PM

3/21/2008 7:10:51 PM

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 2 of 30

CLIENT:	PNM			<b>Client Sample ID:</b>	SB1W-8'	
Lab Order:	0803193			<b>Collection Date:</b>	3/18/2008	11:13:00 AM
Project:	Star Lake			Date Received:	3/20/2008	5
Lab ID:	0803193-03			Matrix:	SOIL	
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8082: PCB'S			n ning di kanan di kapan manan di kabangan di kaban mangan mangan nga mangan nga mangan nga mangan nga mangan m		Analyst: JMP
Aroclor 1016	•	ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1221		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1232		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1242		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1248		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1254		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Aroclor 1260		ND	0.020	mg/Kg	1	3/24/2008 6:04:48 PM
Surr: Decach	lorobiphenyl	47.2	15.8-133	%REC	1	3/24/2008 6:04:48 PM
EPA METHOD	8015B: DIESEL RANG	E ORGANICS				Analyst: SCC
Diesel Range O	rganics (DRO)	ND	10	mg/Kg	1	3/24/2008 7:18:05 AM
Motor Oil Range	Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 7:18:05 AM
Surr: DNOP		89.0	61.7-135	%REC	1	3/24/2008 7:18:05 AM
EPA METHOD	B015B: GASOLINE RA	NGE				Analyst: BDH
Gasoline Range	Organics (GRO)	ND	5.0	mg/Kg	1	3/21/2008 7:40:57 PM
Surr: BFB		100	84-138	%REC	1	3/21/2008 7:40:57 PM
EPA METHOD 7	7471: MERCURY					Analyst: SNV
Mercury		ND	0.033	mg/Kg	1	3/25/2008 4:30:22 PM
EPA METHOD	010B: SOIL METALS					Analyst: NMO
Arsenic		ND	2.5	mg/Kg	1	3/26/2008 8:54:30 AM
Barium		84	1.0	mg/Kg	10	3/26/2008 9:56:22 AM
Cadmium		ND	0.10	mg/Kg	1	3/26/2008 8:54:30 AM
Chromium		4.5	0.30	mg/Kg	1	3/26/2008 8:54:30 AM
Lead		7.2	0.25	mg/Kg	1	3/26/2008 8:54:30 AM
Selenium		ND	2.5	· mg/Kg	1	3/26/2008 8:54:30 AM
Silver		ND	0.25	mg/Kg	1	3/26/2008 8:54:30 AM

Date: 26-Mar-08

Qualifiers:	*	Value	exce

- Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL Reporting Limit

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CLIENT:	PNM			Clien	t Sample I	<b>D:</b> SB1W-14'	
Lab Order:	0803193			Col	lection Da	te: 3/18/2008	11:15:00 AM
Project:	• Star Lake			Da	ate Receive	d: 3/20/2008	
Lab ID:	0803193-04	Matrix: SOIL					
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS	· · · · · · · · · · · · · · · · · · ·				Analyst: SCC
Diesel Range C	Drganics (DRO)	ND	10		mg/Kg	1	3/24/2008 7:52:45 AM
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 7:52:45 AM
Surr: DNOP		88.3	61.7-135		%REC	1	3/24/2008 7:52:45 AM
EPA METHOD	8015B: GASOLINE R	ANGE				-	Analyst: BDH
Gasoline Rang	e Organics (GRO)	ND	5.0		mg/Kg	1	3/21/2008 8:11:12 PM
Surr: BFB		104	84-138		%REC	1	3/21/2008 8:11:12 PM

Qualifiers:

Value exceeds Maximum Contaminant Level ۶

Е Value above quantitation range

J Analyte detected below quantitation limits

Not Detected at the Reporting Limit ND

S Spike recovery outside accepted recovery limits В

Date: 26-Mar-08

- Holding times for preparation or analysis exceeded Н
- MCL Maximum Contaminant Level

RL Reporting Limit

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Analyte detected in the associated Method Blank

Date: 26-Mar-08

CLIENT:	PNM	· .		Clier	nt Sample ID:	SB2W-8'	
Lab Order:	0803193			3/18/2008	11:33:00 AM		
Project:	Star Lake			D	ate Received:	3/20/2008	
Lab ID:	0803193-05				Matrix:	SOIL	
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					Analyst: SCC
Diesel Range (	Drganics (DRO)	ND	10		mg/Kg	1	3/24/2008 8:27:25 AM
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 8:27:25 AM
Surr: DNOP	•	86.4	61:7-135		%REC	1	3/24/2008 8:27:25 AM
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/21/2008 8:41:29 PM
Surr: BFB	- · ·	102	84-138		%REC	1	3/21/2008 8:41:29 PM

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:PNMLab Order:0803193Project:Star LakeLab ID:0803193-07

Date: 26-Mar-08

Chent Sample ID: Si	B2W-12'
Collection Date: 3/	/18/2008 11:40:00 AM
Date Received: 3/	20/2008
Matrix: SC	DIL

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE	ORGANICS	weather total and			Analyst: SCC
Diesel Range Organics (DRO)	ND	10	mg/Kg	1	3/24/2008 9:02:10 AM
Motor Oil Range Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 9:02:10 AM
Sur: DNOP	89.6	61.7-135	%REC	1	3/24/2008 9:02:10 AM
EPA METHOD 8015B: GASOLINE RAI	NGE				Analyst: BDH
Gasoline Range Organics (GRO)	ND	. 5.0	mg/Kg	<sup>.</sup> 1	3/21/2008 9:11:46 PM
Surr: BFB	102	84-138	%REC	1	3/21/2008 9:11:46 PM

Qualifiers:

- \* Value exceeds Maximum Contaminant Level
- E Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

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CLIENT:	PNM			Client Sample II	): SB3W-8'			
Lab Order: 0803193				Collection Date	e: 3/18/2008	3/18/2008 11:52:00 AM		
Project:	Star Lake			Date Received	1: 3/20/2008	}		
Lab ID:	0803193-08		·	Matrix	: SOIL	. *		
Analyses	-	Result	PQL	Qual Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RANG	<b>GE ORGANICS</b>				Analyst: SCC		
Diesel Range C	Organics (DRO)	ND	10	mg/Kg	1	3/24/2008 9:31:01 AM		
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 9:31:01 AM		
Surr: DNOP		92.6	61.7-135	%REC	1	3/24/2008 9:31:01 AM		
EPA METHOD	8015B: GASOLINE R	ANGE				Analyst: BDH		
Gasoline Range	e Organics (GRO)	ND	5.0	mg/Kg	1	3/21/2008 9:41:47 PM		

84-138

%REC

98.2

# Hall Environmental Analysis Laboratory, Inc.

Qualifiers:

\*

Surr: BFB

Value exceeds Maximum Contaminant Level

- Е Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В

Date: 26-Mar-08

1

3/21/2008 9:41:47 PM

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:	PNM			Client Sample II	D: SB6W-8'	
Lab Order:	0803193			Collection Dat	e: 3/18/2008	12:40:00 PM
Project:	Star Lake			Date Receive	d: 3/20/2008	
Lab ID:	0803193-09			Matri	x: SOIL	
Analyses	· · · · · · · · · · · · · · · · · · ·	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8082: PCB'S					Analyst: JMP
Aroclor 1016		ND	0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Arocior 1221		ND	0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Aroclor 1232		ND	0.020	mg/Kg	1	3/24/2008 6:53;32 PM
Aroclor 1242		ND	0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Aroclor 1248		ND	0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Aroclor 1254		ND	. 0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Aroclor 1260		ND	0.020	mg/Kg	1	3/24/2008 6:53:32 PM
Surr: Decach	nlorobiphenyl	29.2	15.8-133	%REC	1	3/24/2008 6:53:32 PM
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS				Analyst: SCC
Diesel Range C	Organics (DRO)	630	100	mg/Kg	10	3/23/2008 6:26:21 AM
Motor Oil Rang	e Organics (MRO)	2400	500	mg/Kg	10	3/23/2008 6:26:21 AM
Sur: DNOP		0	<b>61.7-</b> 13 <b>5</b>	S %REC	10	3/23/2008 6:26:21 AM
EPA METHOD	8015B: GASOLINE R	ANGE		•		Analyst: BDH
Gasoline Range	e Organics (GRO)	6.4	5.0	mg/Kg	1.	3/24/2008 2:59:51 PM
Sum: BFB		116	84-138	%REC	1	3/24/2008 2:59:51 PM
EPA METHOD	7471: MERCURY					Analyst: SNV
Mercury		ND	0.033	mg/Kg	1	3/25/2008 4:31:56 PM
EPA METHOD	6010B: SOIL METALS	3				Analyst: NMO
Arsenic		ND	5.0	mg/Kg	2	3/26/2008 9:59:40 AM
Barium	•	46	0.20	mg/Kg	2	3/26/2008 9:59:40 AM
Cadmium		ND	0.20	mg/Kg	2	3/26/2008 9:59:40 AM
Chromium		3.1	0.60	mg/Kg	· 2	3/26/2008 9:59:40 AM
Lead		6.5	0.50	mg/Kg	2	3/26/2008 9:59:40 AM
Selenium		ND	5.0	mg/Kg	2	3/26/2008 9:59:40 AM
Silver		ND	0.50	mg/Kg	2	3/26/2008 9:59:40 AM

Date: 26-Mar-08

Qualifiers:

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- Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:	PNM	Client Sample ID: SB6W-12'							
Lab Order:	Lab Order: 0803193				Collection Date: 3/18/2008 12:45:00 PM				
Project:	Star Lake			D	ate Receive	d: 3/20/2008	3		
Lab ID:	0803193-10	Matrix: SOIL							
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS					Analyst: SCC		
Diesel Range C	Organics (DRO)	1100	100		mg/Kg	10	3/23/2008 7:00:30 AM		
Motor Oil Rang	e Organics (MRO)	5300	500		mg/Kg	10	3/23/2008 7:00:30 AM		
Surr: DNOP		0	61.7-135	S	%REC	10	3/23/2008 7:00:30 AM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	5.2	.5.0		mg/Kg	1	3/24/2008 4:00:12 PM		
Surr: BFB		120	84-138		%REC	1	3/24/2008 4:00:12 PM		

Date: 26-Mar-08

Qualifiers:	*
	Е

\* Value exceeds Maximum Contaminant Level

Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level RL Reporting Limit

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CLIENT:	PNM			<b>Client Sample II</b>	: SB7W-8'	
Lab Order:	0803193			Collection Dat	e: 3/18/2008	8 12:50:00 PM
Project:	Star Lake			Date Received	: 3/20/2008	3
Lab ID:	0803193-11			Matri	SOIL	
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8082: PCB'S		·		************	Analyst: JMP
Aroclor 1016		ND	0.020	mg/Kg	1	3/24/2008 7:42:04 PM
Aroclor 1221		ND	0.020	mg/Kg	1	3/24/2008 7:42:04 PM
Aroclor 1232		ND	0.020	mg/Kg	1	3/24/2008 7:42:04 PM
Aroclor 1242		ND	0.020	mg/Kg	1	3/24/2008 7:42:04 PM
Aroclor 1248		ND	0.020	mg/Kg	1	3/24/2008 7:42:04 PM
Aroclor 1254		ND	0.020	mg/Kg	1 ·	3/24/2008 7:42:04 PM
Aroclor 1260		ND	0.020	mg/Kg	· 1	3/24/2008 7:42:04 PM
Surr: Decachi	lorobiphenyl	26.4	15.8-133	%REC	1	3/24/2008 7:42:04 PM
EPA METHOD	8015B: DIESEL RANG	E ORGANICS				Analyst: SCC
Diesel Range O	rganics (DRO)	690	100	mg/Kg	10	3/23/2008 7:34:34 AM
Motor Oil Range	Organics (MRO)	3100	500	mg/Kg	10	3/23/2008 7:34:34 AM
Sum DNOP		. 0	61.7-135	S %REC	10	3/23/2008 7:34:34 AM
EPA METHOD 8	8015B: GASOLINE RA	NGE				Analyst: BDH
Gasoline Range	Organics (GRO)	ND	5.0	mg/Kg	1	3/24/2008 4:30:25 PM
Sum BFB		126	84-138	%REC	1	3/24/2008 4:30:25 PM
EPA METHOD 7	7471: MERCURY					Analyst: SNV
Mercury		ND	0.033	mg/Kg	1	3/25/2008 4:33:31 PM
	6010B: SOIL METALS		·			Analyst: NMO
Arsenic		ND	2.5	mg/Kg	1	3/26/2008 9:06:40 AM
Barium		43	0.10	mg/Kg	1	3/26/2008 9:06:40 AM
Cadmium		ND	0.10	mg/Kg	1	3/26/2008 9:06:40 AM
Chromium		3.1	0.30	mg/Kg	1	3/26/2008 9:06:40 AM
Lead		4.9	0.25	mg/Kg	1	3/26/2008 9:06:40 AM
Selenium		ND	2.5	mg/Kg	1	3/26/2008 9:06:40 AM
Silver		ND	0.25	mg/Kg	1	3/26/2008 9:06:40 AM

Date: 26-Mar-08

H Holding times for preparation or analysis exceeded MCL Maximum Contaminant Level

Analyte detected in the associated Method Blank

ND Not Detected at the Reporting Limit

Value above quantitation range

Qualifiers:

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E

J

S Spike recovery outside accepted recovery limits

Analyte detected below quantitation limits

Value exceeds Maximum Contaminant Level

RL Reporting Limit

В

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		<i>v</i>						
CLIENT:	PNM			Clier	t Sample ID:	S	38W-5'	
Lab Order:	0803193			Co	llection Date:	: 3/18/2008 12:57:00 PM		
Project:	Star Lake			D	ate Received:	: 3/20/2008		
Lab ID:	0803193-12				Matrix	S	JIL	
Analyses		Result	PQL	Qual	Units	• .	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					-	Analyst: SCC
Diesel Range C	Drganics (DRO)	ND	10		mg/Kg		1	3/24/2008 10:05:22 AM
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg		1	3/24/2008 10:05:22 AM
Surr: DNOP		90.5	61.7-135		%REC		1	3/24/2008 10:05:22 AM
EPA METHOD	8015B: GASOLINE R	ANGE						Analyst: BDH
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg		1	3/24/2008 5:02:54 PM
Surr: BFB		116	84-138		%REC		1	3/24/2008 5:02:54 PM

Qualifiers:

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Value exceeds Maximum Contaminant Level

E Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

Date: 26-Mar-08

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL Reporting Limit

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Hall Envir	ronmental Anal	lysis Labora	atory, I	nc.		Date: 26-Ma	r-08			
CLIENT:	PNM	***		Client Sample ID: SB10W-8'						
Lab Order:	0803193			Collec	tion Da	te: 3/18/2008	1:18:00 PM			
Project:	Star Lake			Date	Receiv	ed: 3/20/2008				
Lab ID:	0803193-13	Matrix: SOIL								
Analyses	······································	Result	PQL	Qual U	nits	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS	an an ang ang karina			<u>akan karakan distan distan distang dis</u>	Analyst: SCC			
Diesel Range C	Drganics (DRO)	ND	. 10	- mg	g/Kg	1	3/24/2008 10:34:29 AM			
Motor Oil Rang	e Organics (MRO)	ND	50	m	j/Kg	1	3/24/2008 10:34:29 AM			
Surr: DNOP		92.7	61.7-135	%	REC	1	3/24/2008 10:34:29 AM			
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH			
Gasoline Rang	e Organics (GRO)	ND	5.0	mç	j/Kg	1	3/24/2008 5:33:02 PM			
Surr: BFB		114	84-138	%	REC	. 1	3/24/2008 5:33:02 PM			

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Qualiflers:

Value exceeds Maximum Contaminant Level

- Е .Value above quantitation range
- J Analyte detected below quantitation limits

NÐ Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank

Date: 26-Mar-08

- н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit •

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CLIENT:	PNM			Clier	t Sample I	<b>D:</b> SB12W-1	: SB12W-12'		
Lab Order:	0803193			Co	llection Da	te: 3/18/2008	: 3/18/2008 1:50:00 PM		
Project:	Star Lake			D	ate Receive	ed: 3/20/2008	3/20/2008		
Lab ID:	0803193-14	Matrix: SOIL							
Analyses	· · · · · · · · · · · · · · · · · · ·	Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RANG	BE ORGANICS			n (faithfician an a		Analyst: SCC		
Diesel Range C	Organics (DRO)	ND	10		mg/Kg	1	3/24/2008 11:03:18 AM		
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 11:03:18 AM		
Surr: DNOP		94.2	61.7-135		%REC	1	3/24/2008 11:03:18 AM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/24/2008 6:03:14 PM		
Surr: BFB		114	84-138		%REC	1	3/24/2008 6:03:14 PM		

Date: 26-Mar-08

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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Date: 26-Mar-08

CLIENT:	PNM		Client Sample ID: SB14E-11'								
Lab Order:	0803193				Co	llection Da	te: 3/18/2008	2:31:00 PM			
Project:	Star Lake				D	ate Receive	d: 3/20/2008				
Lab ID:	0803193-16	~ <b>u</b> ~			Matr	ix: SOIL					
Analyses			Result	PQL	Qual	Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL R	ANGE OF	GANICS					Analyst: SCC			
Diesel Range C	Organics (DRO)		ND	10		mg/Kg	1	3/24/2008 12:13:17 PM			
Motor Oll Range	e Organics (MRO)		ND	50		mg/Kg	1	3/24/2008 12:13:17 PM			
Surr: DNOP			91.7	61.7-135		%REC	1	3/24/2008 12:13:17 PM			
EPA METHOD	8015B: GASOLIN	E RANGE	i					Analyst: BDH			
Gasoline Range	e Organics (GRO)		ND	5.0		mg/Kg	1	3/24/2008 6:33:22 PM			
Surr: BFB			116	84-138		%REC	1	3/24/2008 6:33:22 PM			

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Qualifiers:

- \* Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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		· · · · · · · · · · · · · · · · · · ·	,,,							
CLIENT:	PNM		Client Sample ID: SB14E-12'							
Lab Order:	0803193			<b>Collection Da</b>	te: 3/18/200	3/18/2008 2:35:00 PM				
Project:	Star Lake			Date Received: 3/20/2008						
Lab ID:	0803193-17		Matrix: SOIL							
Analyses		Result	PQL	Qual Units	DF	Date Analyzed				
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS				Analyst: SCC				
Diesel Range (	Organics (DRO)	ND	10	mg/Kg	1	3/24/2008 12:36:31 PM				
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 12:36:31 PM				
Surr: DNOP		92.1	61.7-135	%REC	1	3/24/2008 12:36:31 PM				
EPA METHOD	8015B: GASOLINE RA	ANGE				Analyst: BDH				
Gasoline Range	e Organics (GRO)	ND	5.0	mg/Kg	1	3/24/2008 7:03:33 PM				
Surr: BFB	1. A.	114	84-138	%REC	1	3/24/2008 7:03:33 PM				

Qualifiers:

\*

Value exceeds Maximum Contaminant Level

E Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

Date: 26-Mar-08

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:	PNM		<u></u>	Client Sample II	D: SB15E-7				
Lab Order:	0803193			<b>Collection Dat</b>	e: 3/18/2008	: 3/18/2008 2:38:00 PM			
Project:	Star Lake	-		Date Receive	d: 3/20/2008	3/20/2008			
Lab ID:	0803193-18	Matrix: SOIL							
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANGE OF	RGANICS				Analyst: SCC			
Diesel Range C	Drganics (DRO)	ND	10	mg/Kg	1	3/24/2008 1:17:25 PM			
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	. 1	3/24/2008 1:17:25 PM			
Surr: DNOP		101	61.7-135	%REC	1	3/24/2008 1:17:25 PM			
EPA METHOD	8015B: GASOLINE RANGE					Analyst: BDH			
Gasoline Range	e Organics (GRO)	ND	5.0	mg/Kg	1	3/24/2008 7:33:44 PM			
Surr BEB		110	84-138	%REC	1	3/24/2008 7:33:44 PM			

Date: 26-Mar-08

# Hall Environmental Analysis Laboratory, Inc.

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Qualifiers:	*	Value exceeds Maximum Contaminant Level	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike recovery outside accepted recovery limits		Page 16 of 30

CLIENT:	PNM			Clier	D: SB16E-7'	SB16E-7'				
Lab Order:	0803193		Collection Date: 3/18/2008 2:46:00 PM							
Project:	Star Lake		3							
Lab ID:	0803193-19	Matrix: SOIL								
Analyses		Result	PQL	Quai	Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS		· · · · · · · · · ·			Analyst: SCC			
Diesel Range C	Irganics (DRO)	ND	10		mg/Kg	1	3/24/2008 1:45:39 PM			
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 1:45:39 PM			
Surr: DNOP		91.1	61.7-135	-	%REC	1	3/24/2008 1:45:39 PM			
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH			
Gasoline Range Organics (GRO)		ND	5.0		mg/Kg	1	3/24/2008 8:04:03 PM			
Surr: BFB		116	84-138		%REC	1	3/24/2008 8:04:03 PM			

Date: 26-Mar-08

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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Date: 26-Mar-08

CLIENT:	PNM			Clie	nt Sample I	D: SB17E-4'	Ι.			
Lab Order:	0803193			Co	llection Da	te: 3/18/2008	3 2:53:00 PM			
Project:	Star Lake			Date Received: 3/20/2008						
Lab ID:	0803193-20	· .	Matrix: SOIL							
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS		بجراد سنغبط			Analyst: SCC			
Diesel Range C	Organics (DRO)	1000	100		mg/Kg	10	3/23/2008 12:42:21 PM			
Motor Oil Rang	e Organics (MRO)	8300	500		mg/Kg	10	3/23/2008 12:42:21 PM			
Surr: DNOP	·	0	61.7-135	S	%REC	10	3/23/2008 12:42:21 PM			
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH			
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/24/2008 8:34:20 PM			
Surr: BFB		118	84-138		%REC	1	3/24/2008 8:34:20 PM			

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL Reporting Limit

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CLIENT: PNM Client Sample ID							SB17E-8'		
Lab Order:		Collection Date: 3/18/2008 2:58:00 PM							
Project:	Star Lake			Da	ite Receive	d: 3/20/2008	\$		
Lab ID:	0803193-21	Matrix: SOIL							
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					Analyst: SCC		
Diesel Range C	Drganics (DRO)	ND	10		mg/Kg	<b>1</b> ·	3/24/2008 2:20:39 PM		
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 2:20:39 PM		
Surr: DNOP		95.9	<b>61</b> .7-135		%REC	1	3/24/2008 2:20:39 PM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	. ND	5.0		mg/Kg	1	3/24/2008 9:04:36 PM		
Surr: BFB		114	84-138		%REC	1	3/24/2008 9:04:36 PM		

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Qualifiers:

Value exceeds Maximum Contaminant Level

E Value above quantitation range

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

Date: 26-Mar-08

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL Reporting Limit

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		J								
CLIENT:	PNM		Client Sample ID: SB18E-8'							
Lab Order:	0803193			Collection Date: 3/18/2008 3:04:00 PM						
Project:	Star Lake			D	ate Receive	ed: 3/20/2008				
Lab ID:	0803193-22		Matrix: SOIL							
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS					Analyst: SCC			
Diesel Range (	Organics (DRO)	680	100		mg/Kg	10	3/23/2008 1:51:01 PM			
Motor Oil Rang	e Organics (MRO)	2800	500		mg/Kg	10	3/23/2008 1:51:01 PM			
Surr: DNOP		0	61.7-135	S	%REC	10	3/23/2008 1:51:01 PM			
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH			
Gasoline Rang	e Organics (GRO)	ND	5.0		mg/Kg	1	3/24/2008 9:36:13 PM			
Surr: BFB		69.0	84-138	S	%REC	1	3/24/2008 9:36:13 PM			

#### Qualifiers: Value exceeds Maximum Contaminant Level Е Value above quantitation range J Analyte detected below quantitation limits ND Not Detected at the Reporting Limit

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- S Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank

Date: 26-Mar-08

- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL **Reporting Limit** 

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CLIENT:	PNM	le ID: SB18E-12	SB18E-12'						
Lab Order:	0803193			Collection	Date: 3/18/2008	3/18/2008 3:08:00 PM			
Project:	Star Lake			Date Rece	ived: 3/20/2008	3/20/2008			
Lab ID:	0803193-23		· ·						
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANG	SE ORGANICS				Analyst: SCC			
Diesel Range C	Organics (DRO)	310	100	mg/Kg	10	3/23/2008 2:25:27 PM			
Motor Oil Rang	e Organics (MRO)	1500	500	mg/Kg	10	3/23/2008 2:25:27 PM			
Surr: DNOP		120	61.7-135	%REC	10	3/23/2008 2:25:27 PM			
EPA METHOD	8015B: GASOLINE R	ANGE				Analyst: BDH			
Gasoline Range	organics (GRO)	ND	5.0	mg/Kg	1	3/24/2008 10:06:28 PM			
Surr: BFB		116	84-138	%REC	1	3/24/2008 10:06:28 PM			

Date: 26-Mar-08

Qualifiers: \*

- Value exceeds Maximum Contaminant Level
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level RL

Reporting Limit

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		-									
CLIENT:	PNM		Client Sample ID: SB19E-8'								
Lab Order:	0803193	Collection Date: 3/18/2008 3:15:00 PM									
Project:	Star Lake		Date Received: 3/20/2008 Matrix: SOIL								
Lab ID:	0803193-24										
Analyses	· · · · · · · · · · · · · · · · · · ·	Result	PQL	Qual	Units	DF	Date Analyzed				
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS	kerte for some cite and			والمراجع فالمتعادية والمحادث	Analyst: SCC				
Diesel Range C	Drganics (DRO)	ND	10		mg/Kg	1	3/24/2008 2:46:49 PM				
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 2:46:49 PM				
Surr: DNOP		89.1	61.7-135		%REC	1	3/24/2008 2:46:49 PM				
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH				
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/24/2008 10:36:36 PM				
Surr: BFB		115	84-138		%REC	1	3/24/2008 10:36:36 PM				

Qualifiers:

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Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank

Date: 26-Mar-08

- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL **Reporting Limit**

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CLIENT:	· PNM			Client Sample II	e ID: SB20E-6'					
Lab Order:	0803193			<b>Collection Dat</b>	e: 3/18/200	8 3:30:00 PM				
Project:	Star Lake	· .	Date Received: 3/20/2008							
Lab ID:	0803193-25		Matrix: SOIL							
Analyses	<u> </u>	Result	PQL	Qual Units	DF	Date Analyzed				
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS				Analyst: SCC				
Diesel Range (	Organics (DRO)	ND	10	m <b>g/Kg</b>	. 1	3/24/2008 3:21:50 PM				
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 3:21:50 PM				
Surr: DNOP		91.4	61.7-135	%REC	1	3/24/2008 3:21:50 PM				
EPA METHOD	8015B: GASOLINE R	ANGE				Analyst: BDH				
Gasoline Range	e Organics (GRO)	ND	5.0	mg/Kg	1	3/24/2008 11:06:53 PM				
Surr: BFB		118	84-138	%REC	1	3/24/2008 11:06:53 PM				

Qualifiers:

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- Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- Analyte detected below quantitation limits J
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits S
- Analyte detected in the associated Method Blank В

Date: 26-Mar-08

- H. Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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							· · · · · · · · · · · · · · · · · · ·		
CLIENT:	PNM	······································		Clien	t Sample II	): SB20E-12	2'		
Lab Order:	0803193			Col	e: 3/18/2008	3/18/2008 3:35:00 PM			
Project:	Star Lake			Da	<b>1:</b> 3/20/2008	3/20/2008			
Lab ID:	0803193-26		Matrix: SOIL						
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					Analyst: SCC		
Diesel Range C	Organics (DRO)	ND	10		mg/Kg	1	3/24/2008 3:56:51 PM		
Motor Oil Rang	e Organics (MRO)	ND	50		m <b>g/Kg</b>	1	3/24/2008 3:56:51 PM		
Surr: DNOP		98.0	61.7-135		%REC	1	3/24/2008 3:56:51 PM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Rang	e Organics (GRO)	ND	5.0		mg/Kg	1	3/25/2008 1:07:21 AM		
Surr: BFB		117	84-138		%REC	1	3/25/2008 1:07:21 AM		

Date: 26-Mar-08

 Qualifiers:
 \*
 Value exceeds Maximum Contaminant Level
 B

 E
 Value above quantitation range
 H

 J
 Analyte detected below quantitation limits
 MCL

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Leve RL Reporting Limit

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MCL Maximum Contaminant Level

	CIV					
	Chent Sample D	D: SB21E-4				
	Collection Dat	e: 3/18/200	3/18/2008 3:39:00 PM			
	8					
	Matri	x: SOIL				
PQL	Qual Units	DF	Date Analyzed			
			Analyst: SCC			
10	mg/Kg	1	3/24/2008 4:32:05 PM			
50	mg/Kg	1	3/24/2008 4:32:05 PM			
61.7-135	%REC	1	3/24/2008 4:32:05 PM			
			Analyst: BDH			
5.0	mg/Kg	1	3/25/2008 1:37:33 AM			
84-138	%REC	· <b>1</b>	3/25/2008 1:37:33 AM			
	PQL 10 50 61.7-135 5.0 84-138	Collection Dat Date Receive Matri PQL Qual Units 10 mg/Kg 50 mg/Kg 61.7-135 %REC 5.0 mg/Kg 84-138 %REC	Collection Date: 3/18/2003           Date Received:         3/20/2003           Matrix:         SOIL           PQL         Qual         Units         DF           10         mg/Kg         1           50         mg/Kg         1           61.7-135         %REC         1           5.0         mg/Kg         1           84-138         %REC         1			

Date: 26-Mar-08

#### Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:	PNM			Client Sample	ID: SB22E-7				
Lab Order:	0803193			Collection Da	te: 3/18/2008	3:45:00 PM			
Project:	Star Lake			Date Receiv	ed: 3/20/2008	3/20/2008			
Lab ID:	0803193-28		Matrix: SOIL						
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS				Analyst: SCC			
Diesel Range (	Drganics (DRO)	ND	10	mg/Kg	1	3/24/2008 5:07:24 PM			
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 5:07:24 PM			
Surr: DNOP		105	61.7-135	%REC	1	3/24/2008 5:07:24 PM			
EPA METHOD	8015B: GASOLINE R	ANGE				Analyst: BDH			
Gasoline Rang	e Organics (GRO)	ND	5.0	mg/Kg	1	3/25/2008 2:07:48 AM			
Surr: BFB		117	84-138	%REC	1	3/25/2008 2:07:48 AM			

Qualifiers:

\* Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

Date: 26-Mar-08

- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level

RL Reporting Limit

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CLIENT:	PNM	· · · · · · · · · · · · · · · · · · ·		Client Sample I	D: SB22E-1	2'			
Lab Order:	0803193								
Project:	Star Lake		Date Received: 3/20/2008 Matrix: SOIL						
Lab ID:	0803193-29								
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	8015B: DIESEL RANGI	E ORGANICS				Analyst: SCC			
Diesel Range C	Organics (DRO)	ND	10	mg/Kg	1	3/24/2008 6:17:53 PM			
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/24/2008 6:17:53 PM			
Surr: DNOP		112	61.7-135	%REC	1	3/24/2008 6:17:53 PM			
EPA METHOD	8015B: GASOLINE RAI	NGE				Analyst: BDH			
Gasoline Range	e Organics (GRO)	ND /	5.0	mg/Kg	1	3/25/2008 2:37:50 AM			
Surr: BEB		116	84-138	%REC	1	3/25/2008 2·37·50 AM			

Qualifiers:

\*

Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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Date: 26-Mar-08

·			To day 1 hand a new reasoning						
CLIENT:	PNM			Clier	nt Sample Π	<b>):</b> SB23E-6			
Lab Order:	0803193			Co	llection Dat	e: 3/18/200	8 3:57:00 PM		
Project:	Star Lake	Date Received: 3/20/2008							
Lab ID:	0803193-30	Matrix: SOIL							
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RANG	GE ORGANICS		<u></u>			Analyst: SCC		
Diesel Range C	Drganics (DRO)	ND	10		mg/Kg	1	3/24/2008 6:52:05 PM		
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 6:52:05 PM		
Surr: DNOP		109	61.7-135		%REC	1	3/24/2008 6:52:05 PM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/25/2008 3:08:04 AM		
Surr: BFB		117	84-138		%REC	1	3/25/2008 3:08:04 AM		

Qualifiers: Value exceeds Maximum Contaminant Level 8 В Analyte detected in the associated Method Blank Ε Value above quantitation range Н Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits MCL Maximum Contaminant Level Not Detected at the Reporting Limit ND RL Reporting Limit S Spike recovery outside accepted recovery limits

Date: 26-Mar-08

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CLIENT:	PNM			Client	Sample II	): SB25E-7'			
Lab Order:	0803193		Colle	ction Date	e: 3/18/2008 4	4:14:00 PM			
Project:	Star Lake			Dat	e Received	l: 3/20/2008			
Lab ID:	0803193-31		Matrix: SOIL						
Analyses		Result	PQL	Qual L	Inits	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					Analyst: SCC		
Diesel Range C	Organics (DRO)	ND	10	rr	ng/Kg	1	3/24/2008 7:27:20 PM		
Motor Oil Rang	e Organics (MRO)	ND	50	n	ng/Kg	1	3/24/2008 7:27:20 PM		
Surr: DNOP		99.5	61.7-135	%	REC	1	3/24/2008 7:27:20 PM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	ND	5.0	m	ng/Kg	1	3/25/2008 3:38:12 AM		
Sur: BFB	•	117	84-138	%	REC	1	3/25/2008 3:38:12 AM		

Qualifiers:

\*

Value exceeds Maximum Contaminant Level

- Е Value above quantitation range
- Analyte detected below quantitation limits J

Not Detected at the Reporting Limit ND

- S Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank

Date: 26-Mar-08

- Holding times for preparation or analysis exceeded Н
- MCL Maximum Contaminant Level
- RL Reporting Limit

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CLIENT:	PNM			Clier	nt Sample I	D: SB26E-8'	· · · · · · · · · · · · · · · · · · ·		
Lab Order:	0803193			Co	te: 3/18/2008	3/18/2008 4:28:00 PM 3/20/2008			
Project:	Star Lake			D	ed: 3/20/2008				
Lab ID:	0803193-34		Matrix: SOIL						
Analyses	·····	Result	PQL	Qual	Units	DF	Date Analyzed		
EPA METHOD	8015B: DIESEL RANG	SE ORGANICS					Analyst: SCC		
Diesel Range C	organics (DRO)	ND	10		mg/Kg	1	3/24/2008 8:02:34 PM		
Motor Oil Range	e Organics (MRO)	ND	50		mg/Kg	1	3/24/2008 8:02:34 PM		
Surr: DNOP		112	61.7-135		%REC	1	3/24/2008 8:02:34 PM		
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: BDH		
Gasoline Range	e Organics (GRO)	ND	5.0		mg/Kg	1	3/25/2008 4:08:13 AM		
Surr: BFB		116	84-138		%REC	1	3/25/2008 4:08:13 AM		

Qualifiers:

\*

Value exceeds Maximum Contaminant Level

- E Value above quantitation range
- J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

Date: 26-Mar-08

H Holding times for preparation or analysis exceeded

- MCL Maximum Contaminant Level
- RL Reporting Limit

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#### LABORATORY ANALYTICAL REPORT

**Client:** Hall Environmental 0803193 Project: Lab ID: C08030903-001 Client Sample ID: SB2W-10'

Report Date: 03/26/08 Collection Date: 03/18/08 11:38 DateReceived: 03/21/08 Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS							
Ethylene Glycol	ND	mg/kg		5.0		SW8015B	03/24/08 12:41 / eli-b
Propylene Glycol	ND	mg/kg		5.0		SW8015B	03/24/08 12:41 / eli-b
Sur: 2-Butoxyethanol	82.0	%REC	70	0-130		SW80158	03/24/08 12:41 / eli-b

ReportRL - Analyte reporting limit.Definitions:QCL - Quality control limit. RL - Analyte reporting limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.
**Client:** Hall Environmental Project: 0803193 C08030903-002 Lab ID: Client Sample ID: SB14E-7'

Report Date: 03/26/08 Collection Date: 03/18/08 14:30 DateReceived: 03/21/08 Matrix: Soil

Analyses	Result	Units	Qualifiers RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS						
Ethylene Glycol	ND	mg/kg	5.0	-	SW8015B	03/24/08 12:59 / eli-b
Propylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 12:59 / ell-b
Surr: 2-Butoxyethanol	82.0	%REC	70-130		SW8015B	03/24/08 12:59 / eli-b

 
 Report
 RL - Analyte reporting imm.

 Definitions:
 QCL - Quality control limit.
 RL - Analyte reporting limit.

 Client:
 Hall Environmental

 Project:
 0803193

 Lab ID:
 C08030903-003

 Client Sample ID:
 SB18E-8'

 Report Date:
 03/26/08

 Collection Date:
 03/18/08
 15:04

 DateReceived:
 03/21/08

 Matrix:
 Soil

Analyses	Result	Units	Qualifiers F	MCL/ IL QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS						
Ethylene Glycol	ND	mg/kg	5	.0	SW8015B	03/24/08 13:17 / eli-b
Propylene Glycol	ND	mg/kg	5	0	SW8015B	03/24/08 13:17 / eli-b
Surr: 2-Butoxyethanol	83.0	%REC	70-	130	SW8015B	03/24/08 13:17 / ell-b

ReportRL - Analyte reporting limit.Definitions:QCL - Quality control limit.

Client: Hall Environmental Project: 0803193 Lab ID: C08030903-004 Client Sample ID: SB20E-6'

Report Date: 03/26/08 Collection Date: 03/18/08 15:30 DateReceived: 03/21/08 Matrix: Soil

Analyses	Result	Units	Qualifiers RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS						
Ethylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 13:35 / eli-b
Propylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 13:35 / eli-b
Surr: 2-Butoxyethanol	86.0	%REC	70-130		SW8015B	03/24/08 13:35 / eli-b

 
 Report
 RL - Analyte reporting limit.

 Definitions:
 QCL - Quality control limit.
 RL - Analyte reporting limit.

 Client:
 Hall Environmental

 Project:
 0803193

 Lab ID:
 C08030903-005

 Client Sample ID:
 SB22E-7'

 Report Date:
 03/26/08

 Collection Date:
 03/18/08
 15:45

 DateReceived:
 03/21/08
 03/21/08

 Matrix:
 Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS							
Ethylene Glycol	ND	mg/kg		5.0		SW8015B	03/24/08 13:52 / eli-b
Propylene Glycol	ND	mg/kg		5.0		SW8015B	03/24/08 13:52 / eli-b
Surr: 2-Butoxyethanol	81.0	%REC	7	0-130		SW8015B	03/24/08 13:52 / eli-b

Report Definitions: RL - Analyte reporting limit. QCL - Quality control limit.

Client: Hall Environmental 0803193 Project: C08030903-006 Lab ID: Client Sample ID: SB25E-12'

Report Date: 03/26/08 Collection Date: 03/18/08 16:20 DateReceived: 03/21/08 Matrix: Soil

Analyses	Result	Units	Qualifiers RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS						
Ethylene Glycol	NĎ	mg/kg	5.0		SW8015B	03/24/08 14:10 / eli-b
Propylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 14:10 / eli-b
Surr: 2-Butoxyethanol	85.0	%REC	70-13	0	SW8015B	03/24/08 14:10 / eli-b

Report

RL - Analyte reporting limit. Definitions: QCL - Quality control limit.

**Client:** Hall Environmental Project: 0803193 Lab ID: C08030903-007 Client Sample ID: SB26E-4'

Report Date: 03/26/08 Collection Date: 03/18/08 16:24 DateReceived: 03/21/08 Matrix: Soil

Analyses	Result	Units	Qualifiers RL	MCL/ QCL	Method	Analysis Date / By
ORGANIC CHARACTERISTICS						
Ethylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 14:28 / eli-b
Propylene Glycol	ND	mg/kg	5.0		SW8015B	03/24/08 14:28 / eli-b
Surr: 2-Butoxyethanol	87.0	%REC	70-130		SW8015B	03/24/08 14:28 / eli-b

Report

RL - Analyte reporting limit. Definitions: QCL - Quality control limit.

# **QA/QC Summary Report**

Client: Hall Environmental Project: 0803193 
 Report Date:
 03/26/08

 Work Order:
 C08030903

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8015B					~~~			Batch:	B_31556
Sample ID: LCS-31556	Laboratory Co	ntrol Sample			Run: SUB-	B108081		03/24	/08 12:05
Ethylene Glycol	108	mg/kg	5.0	108	70	130			
Propylene Glycol	96.8	mg/kg	5.0	97	70	130			
Surr: 2-Butoxyethanol			1.0	94	70	130			
Sample ID: MB-31556	Method Blank				Run: SUB-	B108081		03/24	/08 12:23
Ethylene Glycol	ND	mg/kg	5.0						
Propylene Glycol	ND	mg/kg	5.0						
Surr: 2-Butoxyethanol			1.0	92	70	130			
Sample ID: C08030903-007A	Sample Matrix	Spike			Run: SUB-	B108081		03/24	/08 14:46
Ethylene Glycol	92.2	mg/kg	5.0	92	70	130			
Propylene Glycol	95.8	mg/kg	5.0	96	70	130			
Surr: 2-Butoxyethanol			1.0	87	70	130			
Sample ID: C08030903-007A	Sample Matrix	Spike Duplicate			Run: SUB-	B108081		03/24	/08 15:04
Ethylene Glycol	93.7	mg/kg	5.0	94	70	130	1.6	20	
Propylene Glycol	98.6	mg/kg	5.0	99	70	130	2.9	20	
Surr: 2-Butoxyethanol			1.0	85	70	130			
Method: SW8015B							Analytic	al Run: SUB	B108081
Sample ID: CCV_0324HG105r-W	Continuing Ca	libration Verificatio	n Standa	rd				03/24	/08 11:47
Ethylene Glycol	113	mg/kg	5.0	113	85	115			
Propylene Glycol	· 113	mg/kg	5.0	113	85	115			
Surr: 2-Butoxyethanol			1.0	102	70	130			

Qualifiers: ` RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

# **QA/QC SUMMARY REPORT**

Client:	PNM
Droject.	Star I a

Project: Star Lake						Work Order: 0803193
Analyte	Result	Units	PQL	%Rec	LowLimit HighLimit	%RPD RPDLimit Qual
Method: EPA Method 8015B: I Sample ID: MB-15437	Diesel Range	Organics MBLK			Batch ID: 15437	Analysis Date: 3/22/2008 8:41:19 PM
Diesel Range Organics (DRO) Motor Oil Range Organics (MRO) Sample ID: MB-15438	ND ND	mg/Kg mg/Kg MBLK	10 50		Batch ID: 15438	Analysis Date: 3/22/2008 10:24:46 PM
Diesel Range Organics (DRO) Motor Oil Range Organics (MRO) Sample ID: LCS-15437	ND ND	mg/Kg mg/Kg LCS	10 50		Batch ID: 15437	Analysis Date: 3/22/2008 9:15:59 PM
Diesel Range Organics (DRO) Sample ID: LCS-15438	43.71	mg/Kg LCS	10	87.4	64.6 116 Batch ID: 15438	Analysis Date: 3/22/2008 10:59:11 PM
Diesel Range Organics (DRO) Sample ID: LCSD-15437	42.73	mg/Kg LCSD	10	85.5	64.6 116 Batch ID: 15437	Analysis Date: 3/22/2008 9:50:20 PM
Diesel Range Organics (DRO) Sample ID: LCSD-15438	43.50	mg/Kg LCSD	10	87.0	64.6 116 Batch ID: <b>15438</b>	0.484 17.4 Analysis Date: 3/22/2008 11:33:32 PM
Diesel Range Organics (DRO)	44.42	mg/Kg	10	88.8	64.6 116	3.88 17.4
Method: EPA Method 8015B: C Sample ID: 0803193-04A MSD	iasoline Ran	ge MSD			Batch ID: 15430	Analysis Date: 3/21/2008 11:11:58 PM
Gasoline Range Organics (GRO) Sample ID: 0803193-24A MSD	24.02	mg/Kg MSD	5.0	96.1	69.5 120 Batch ID: 15431	2.53 11.6 Analysis Date: 3/24/2008 2:29:44 PM
Gasoline Range Organics (GRO) Sample ID: MB-15430	22.46	mg/Kg MBLK	5.0	89.8	69.5 120 Batch ID: 15430	3.53 11.6 Analysis Date: 3/21/2008 6:10:33 PM
Gasoline Range Organics (GRO) Sample ID: MB-15431	ND	mg/Kg MBLK	5.0		Batch ID: 15431	Analysis Date: 3/24/2008 12:59:17 PM
Gasoline Range Organics (GRO) Sample ID: LCS-15430	ND	mg/Kg LCS	5.0		Batch ID: 15430	Analysis Date: 3/21/2008 11:42:04 PM
Gasoline Range Organics (GRO) Sample ID: LCS-15431	23.25	mg/Kg LCS	5.0	93.0	69.5 120 Batch ID: <b>15431</b>	Analysis Date: 3/24/2008 1:29:27 PM
Gasoline Range Organics (GRO) Sample ID: 0803193-04A MS	21.58	mg/Kg MS	5.0	86.3	69.5 120 Batch ID: 15430	Analysis Date: 3/21/2008 10:42:03 PM
Gasoline Range Organics (GRO) Sample ID: 0803193-24A MS	23.42	mg/Kg MS	5.0	93.7	69.5 120 Batch ID: 15431	Analysis Date: 3/24/2008 1;59:37 PM
Gasoline Range Organics (GRO)	21.68	mg/Kg	5.0	86.7	69.5 120	

#### Qualifiers:

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Page 1

# **QA/QC SUMMARY REPORT**

Client: Project:	PNM Star Lake							Work	Order: 0803193
Analyte		Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD RP	DLimit Qual
Method: EPA Me	ethod 8082: PC	B's	·•		· · · · · · · · · · · · · · · · · · ·				
Sample ID: MB-15	444		MBLK			Batch I	D: 15444	Analysis Date:	3/24/2008 2:50:33 PM
Aroclor 1016		ND	mg/Kg	0.020					
Arocior 1221		ND	mg/Kg	0.020					
Aroclor 1232		ND	mg/Kg	0.020					
Aroclor 1242		ND	mg/Kg	0.020					
Aroclor 1248		ND	mg/Kg	0.020					
Aroclor 1254		ND	mg/Kg	0.020					
Aroclor 1260		ND	mg/Kg	0.020					
Sample ID: LCS-1	5444		LCS			Batch IE	): 15444	Analysis Date:	3/24/2008 3:39:04 PM
Aroclor 1260		0.06805	mg/Kg	0.020	54.4	51.4	120		
Sample ID: LCSD-	15444		LCSD			Batch ID	): 15444	Analysis Date:	3/24/2008 4:27:40 PM
Aroclor 1260		0.06855	mg/Kg	0.020	54.8	51.4	120	0.732 2	0
Method: EPA Me	thod 7471: Me	rcurv							
Sample ID: MB-15	469		MBLK			Batch IC	): 15469	Analysis Date:	3/25/2008 4:27:14 PM
Mercury		ND	mg/Kg	0.033					
Sample ID: LCS-1	5469		LCS			Batch IC	): 15469	Analysis Date:	3/25/2008 4:28:48 PM
Mercury		0.1827	mg/Kg	0.033	110	80	120		
Method: EPA Me	thod 6010B: So	oil Metals							
Sample ID: MB-15	456		MBLK	•		Batch ID	: 15456	Analysis Date:	3/26/2008 7:57:57 AM
Arsenic		ND	mg/Kg	2.5					
Barium		ND .	mg/Kg	0.10					
Cadmium	•	ND	mg/Kg	0.10					
Chromium		ND	mg/Kg	0.30					
Lead		ND	mg/Kg	0.25					
Selenium		ND	mg/Kg	2.5					
Silver		ND	mg/Kg	0.25					
Sample ID: LCS-16	5456		LCS			Batch ID	15456	Analysis Date:	3/26/2008 8:02:20 AM
Arsenic		23.91	mg/Kg	2.5	94.8	80	120		
Barium		24.74	mg/Kg	0.10	98.1	80 .	120		
Cadmium		24.53	mg/Kg	0.10	97.2	80	120		
Chromium		24.71	mg/Kg	0.30	98.0	80	120		
Lead		24.07	mg/Kg	0.25	95.4	80	120		
Selenium		24. <b>92</b>	mg/Kg	2.5	98.8	80	120		
<b>O</b> 34		26 40		0.05					

- Qualifiers:
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Page 2

Samp	le Receipt Cl	hecklist			
Client Name PNM		Date Received	ł:	3/20/2008	
Work Order Number 0803193		Received by:	AT		
Checklist completed by:	3/20 Date	Sample ID la	bels checked by:	initials	8
Matrix: Carrier name	e <u>Client drop-</u>	off			
Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present		
Custody seals intact on shipping container/cooler?	Yes 🗌	No 🗌	Not Present	Not Shipped	
Custody seals intact on sample bottles?	Yes 🗹	No 🗔	N/A		
Chain of custody present?	Yes 🗹	No 🗌			
Chain of custody signed when relinquished and received?	Yes . 🗹	No 🛄			
Chain of custody agrees with sample labels?	Yes 🗹	No 🗌			
Samples in proper container/bottle?	Yes 🗹	No 🗌			
Sample containers intact?	Yes 🖌	No 🗔			
Sufficient sample volume for indicated test?	Yes 🗹	No 🗔			
, All samples received within holding time?	Yes 🗹	No 🗔			
Water - VOA vials have zero headspace? No VOA vials sul	bmitted 🗹	Yes 🗌	No 🗌		
Water - Preservation labels on bottle and cap match?	Yes 🗌	No 🗔	N/A 🗹		
Water - pH acceptable upon receipt?	Yes 🗌	No 🗌	N/A 🔽		
Container/Temp Blank temperature?	11°	<6° C Acceptable	9		
COMMENTS:		lf given sufficient	time to cool.		-
Client contacted Date contacted:		Perso	n contacted		
Contacted by: Regarding:			-		
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L ENVIROR L ENVIROR L YSIS LAB hallenvironmental.cor E - Albuquerque, NN 75 Fax 505-345-4	EDC (Method 8260) 8310 (PUA or PAH) 8081 Pesticides (8082 PCB's) 8081 PESTICIDES (8081 PCB's) 8081 PEST	
HAL ANA 4901 Hawkins N Tel. 505-345-39	BTEX + MTBE + TMB's (8021) BTEX + MTBE + TPH (Gas only) TPH Method 8015B (Gas/Diesel) TPH (Method 418.1) TPH (Method 504.1) EDB (Method 504.1)	
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Tum-Around D Standar Project Nan Project #	Project Mar Sampler: Container Type and #	2-4.52 1-4.67 1-4.67 1-4.03
Custody Record	241-2019	5820 E - 12' 5821 E - 4' 5821 E - 4' 5822 E - 12' 5822 E - 12' 5825 E - 12' 5826 E - 4' 5826 E - 4' 5826 E - 8' 5826 E - 8' 7100 E - 8' 7100 E - 8'
PNN AWars	Type)	1530 1535 1535 1535 1559 1559 1559 1559 1559
Client: C	Phone # email or OA/OC Pi Stand Cother EDD ( Date	3/8/6. Date: Date: Date: 1000000000000000000000000000000000000



#### COVER LETTER

Wednesday, June 25, 2008

Claudette Horn PNM Alvarado Square MS 2104 Albuquerque, NM 87158

TEL: (505) 241-2019 FAX (505) 241-4306

RE: Star Lake

Dear Claudette Horn:

Order No.: 0806269

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 6/18/2008 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager Nancy McDuffie, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001



4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109 505.345.3975 ■ Fax 505.345.4107 www.hallenvironmental.com

Date: 25-Jun-08

CLIENT:PNMProject:Star LakeLab Order:0806269

# **CASE NARRATIVE**

Analytical Comments for METHOD 8015DRO\_S, SAMPLE 0806269-01A: DNOP not recovered due to dilution

CLIENT:	PNM			Clie	nt Sample ID:	Clark Ex	cav CL 100' North of Bldg
Lab Order:	0806269			Co	liection Date:	6/17/200	8 5:00:00 PM
Project:	Star Lake			D	ate Received:	6/18/200	8
Lab ID:	0806269-01				Matrix:	SOIL	
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RAN	GE ORGANICS					Analyst: SCC
Diesel Range C	Drganics (DRO)	1500	200		mg/Kg	20	6/22/2008 8:22:57 AM
Motor Oil Rang	e Organics (MRO)	12000	1000		mg/Kg	20	6/22/2008 8:22:57 AM
Sum DNOP		0	61.7-135	S	%REC	20	6/22/2008 8:22:57 AM
EPA METHOD	8015B: GASOLINE R	ANGE					Analyst: NSB
Gasoline Rang	e Organics (GRO)	ND	50		mg/Kg	10	6/24/2008 11:16:24 PM
Surr: BFB		90.2	84-138		%REC	10	6/24/2008 11:16:24 PM
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		ND	0.50		mg/Kg	10	6/24/2008 11:16:24 PM
Toluene		ND	0.50		mg/Kg	10	6/24/2008 11:16:24 PM
Ethylbenzene		ND	0.50		mg/Kg	10	6/24/2008 11:16:24 PM
Xylenes, Total		ND	1.0		mg/Kg	10	6/24/2008 11:16:24 PM

81.4-117

87.9

%REC

## Hall Environmental Analysis Laboratory, Inc.

Date: 25-Jun-08

10

6/24/2008 11:16:24 PM

#### Qualifiers:

Surr: 4-Bromofluorobenzene

- \* Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 1 of 2

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CLIENT:	PNM			Clier	it Sample ID:	Clark Exc	cav CL 120' North of Bldg
Lab Order:	0806269			Co	llection Date:	6/17/2008	3 5:45:00 PM
Project:	Star Lake			D	ate Received:	6/18/2008	3
Lab ID:	0806269-02	·			Matrix:	SOIL	
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RANG	E ORGANICS	<u> </u>				Analyst: SCC
Diesel Range O	rganics (DRO)	ND	10		mg/Kg	1	6/20/2008 1:21:10 PM
Motor Oil Range	organics (MRO)	ND	50		mg/Kg	1	6/20/2008 1:21:10 PM
Surr: DNOP		88.8	61.7-135		%REC	1	6/20/2008 1:21:10 PM
EPA METHOD	8015B: GASOLINE RA	NGE					Analyst: NSB
Gasoline Range	Organics (GRO)	ND	5.0		mg/Kg	1	6/24/2008 11:46:33 PM
Surr: BFB		100	84-138		%REC	1	6/24/2008 11:46:33 PM
EPA METHOD 8	8021B: VOLATILES						Analyst: NSB
Benzene		ND	0.050		mg/Kg	1	6/24/2008 11:46:33 PM
Toluene		ND	0.050		mg/Kg	1	6/24/2008 11:46:33 PM
Ethylbenzene		ND	0.050		mg/Kg	1	6/24/2008 11:46:33 PM
Xylenes, Total		ND	0.10		mg/Kg	1	6/24/2008 11:46:33 PM
Surr: 4-Bromo	ofluorobenzene	100	81.4-117		%REC	1 .	6/24/2008 11:46:33 PM

Date: 25-Jun-08

Qualifiers:

\* Value exceeds Maximum Contaminant Level Value above quantitation range

Е J

- Analyte detected below quantitation limits ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits S
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

Page 2 of 2

# QA/QC SUMMARY REPORT

Client: PNM										
Project: Star Lake	_						· V	/ork (	Order:	0806269
Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPD	Limit G	Jual
Method: EPA Method 8015B:	Diesel Range	Organics								
Sample ID: MB-16245		MBLK			Batch I	ID: 16245	Analysis Da	ate:	6/19/20	08 9:45:55 AM
Diesel Range Organics (DRO)	ND	mg/Kg	10							
Motor Oil Range Organics (MRO)	ND	mg/Kg	50							
Sample ID: LCS-16245		LCS			Batch I	D: 16245	Analysis Da	ate:	6/19/200	8 10:20:02 AM
Diesel Range Organics (DRO)	35.55	mg/Kg	10	71.1	64.6	116			•	
Sample ID: LCSD-16245		LCSD			Batch i	D: 16245	Analysis Da	ate:	6/19/200	8 10:54:22 AM
Diesel Range Organics (DRO)	35.29	mg/Kg	10	70.6	64.6	116	0.728	17.	4	
Method: EPA Method 8015B:	Gasoline Rar	ige								
Sample ID: MB-16271		MBLK			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 2:48:53 AM
Gasoline Range Organics (GRO)	ND	mg/Kg	5.0							
Sample ID: LCS-16271		LCS			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 1:18:42 AM
Gasoline Range Organics (GRO)	24.56	ma/Ka	5.0	87.4	69.5	120				
Sample ID: LCSD-16271		LCSD			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 1:48:48 AM
Gasoline Range Organics (GRO)	25.01	mg/Kg	5.0	89.2	69.5	120	1.82	11.	6	
Method: EPA Method 8021B:	Volatiles						**************************************			
Sample ID: .MB-16271		MBLK			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 2:48:53 AM
Benzene	ND	mg/Kg	0.050							
Toluene	ND	mg/Kg	0.050							
Ethylbenzene	ND	mg/Kg	0.050							
Xylenes, Total	ND	mg/Kg	0.10							
Sample ID: LCS-16271		LCS			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 1:18:42 AM
Benzene	0.2928	mg/Kg	0.050	105	78.8	132				
Toluene	2.030	mg/Kg	0.050	101	78.9	112				
Ethylbenzene	0.4135	mg/Kg	0.050	103	69.3	125				
Xylenes, Total	2.465	mg/Kg	0.10	107	73	128				
Sample ID: LCSD-16271		LCSD			Batch I	D: 16271	Analysis Da	ate:	6/25/20	08 1:48:48 AM
Benzene	0.2963	mg/Kg	0.050	106	78.8	132	1.19	27		
Toluene	2.037	mg/Kg	0.050	101	78.9	112	0.354	19	I	
Ethylbenzene	0.4119	mg/Kg	0.050	103	69.3	125	0.388	10	I	
Xylenes, Totał	2.470	mg/Kg	0.10	107	73	128	0.190	13	•	

Qualifiers:

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

4

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	Sample Receipt Che	ecklist			
Client Name PNM		Date Received:	:	6/18/2008	
Work Order Number 0806269		Received by:	ARS	10	
Checklist completed by:	n Ulle	Sample ID lat 303	els checked by:	Initials	
Matrix: Carri	ier name <u>Client drop-off</u>				
Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Present		
Custody seals intact on shipping container/cooler?	Yes	No 🗌	Not Present	Not Shipped	
Custody seals intact on sample bottles?	Yes	No 🗌	N/A		
Chain of custody present?	Yes 🗹	Νο			
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗔			
Chain of custody agrees with sample labels?	Yes 🗹	No 🗔			
Samples in proper container/bottle?	Yes 🖌	No 🗌			
Sample containers intact?	Yes 🗹	No 🗌			
Sufficient sample volume for indicated test?	Yes 🗹	No 🗌			
All samples received within holding time?	Yes 🗹	No 🛄			
Water - VOA vials have zero headspace? No VOA	vials submitted  🗹	Yes 🗌	No 🗀		
Water - Preservation labels on bottle and cap match?	Yes	No 🗌	N/A 🗹		
Water - pH acceptable upon receipt?	Yes 🗌	No 🗔	N/A 🗹		
Container/Temp Blank temperature?	14°	<6° C Acceptable			
COMMENTS:	I	If given sufficient t	ime to cool.		
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HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel: 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	B (Method 504.1) C (Method 802.1) A R B Metals B A Retals B A Pesticides / PCB's (8082) B Pesticides / PCB's (8082) C (Semi-VOA) C (Sem	808     831       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     808       808     900       808     900       808     900       808     900       808     900       808     900       900     900       910     900       910     900	
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# APPENDIX C NRCS SOIL SURVEY DATA

**Corrective Action Plan** 

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Star Lake Compressor Facility

Soil Map–McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties (Star Lake Compressor Station)



12/11/2007 Page 2 of 3

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# Map Unit Legend

McKinley County Area	, New Mexico, McKinley Count	y and Parts of Cibola and San .	Juan Counties (NM692)
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Calladito-Elias association, 1 to 6 percent slopes	5.5	100.0%
Totals for Area of Interest (AOI)		5.5	100.0%

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# Map Unit Description

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

USDA

Soils of one series can differ in texture of the surface layer, slope, stoniness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Lucy loamy sand, 0 to 5 percent slopes, is a phase of the Lucy series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Springhill-Nankin complex, 15 to 25 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Mantachie, Kinston, and luka soils, 0 to 1 percent slopes, frequently flooded, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example.

Table 2 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

### **Report**—Map Unit Description

# McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties

#### 12-Calladito-Elias association, 1 to 6 percent slopes

#### Map Unit Setting

*Elevation:* 6,300 to 6,800 feet *Mean annual precipitation:* 9 to 10 inches *Mean annual air temperature:* 46 to 49 degrees F *Frost-free period:* 100 to 135 days

#### **Map Unit Composition**

Calladito and similar soils: 55 percent Elias and similar soils: 30 percent

#### **Description of Calladito**

#### Setting

Landform: Dunes on valley sides Landform position (three-dimensional): Side slope Down-slope shape: Concave, convex Across-slope shape: Concave, convex



#### Parent material: Eolian deposits derived from sandstone

#### Properties and qualities

Slope: 1 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to

very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm) Available water capacity: Low (about 5.3 inches)

#### Interpretive groups

Land capability (nonirrigated): 7e Ecological site: Deep Sand (R037XA007NM)

#### **Typical profile**

0 to 2 inches: Loamy fine sand 2 to 26 inches: Loamy fine sand 26 to 65 inches: Loamy fine sand

#### **Description of Elias**

#### Setting

Landform: Fan remnants on valley sides Landform position (three-dimensional): Side slope, tread Down-slope shape: Convex, concave Across-slope shape: Convex, concave Parent material: Fan alluvium derived from sandstone and shale

#### Properties and qualities

Slope: 1 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 1 percent

Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum: 30.0

Available water capacity: Moderate (about 6.0 inches)

#### Interpretive groups

Land capability (nonirrigated): 7s Ecological site: Sodic Slopes (R037XA008NM)

#### **Typical profile**

0 to 1 inches: Fine sandy loam

1 to 3 inches: Sandy clay loam

3 to 10 inches: Sandy clay loam



10 to 18 inches: Loamy fine sand 18 to 33 inches: Sandy clay loam 33 to 65 inches: Clay loam

#### Data Source Information

Soil Survey Area: McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties Survey Area Data: Version 7, Jan 13, 2007

# **Physical Soil Properties**

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Silt* as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility* refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

*Erosion factors* are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor Kw* indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

*Erosion factor Kf* indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."



Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

#### Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Web Soil Survey 2.0 National Cooperative Soil Survey Star Lake Compressor Station

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Physical Soil Properties–McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties

**Report—Physical Soil Properties** 

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nd Sa	Erosi K				20	.17	.20	.28	32	.32	20	.32	32
of Cibola a	Organic matter	Pct			0.5-1.0	0.0-0.5	0.0-0.5	0:3-0:7	0:3-0.7	0:3-0.7	0.2-0.5	0.2-0.5	0.2=0:5
County and Parts	Linear extensibility	Pct			0.0-2.9	0.0-2.9	0.0-2.9	0:0-2:9	0:0-2:9	0:0-2:9	0.0-2.9	0:0-2:9	3.0-5.9
xico, McKinley	Available water capacity	In/In			0.09-0.10	0.06-0.08	0.09-0.10	0:13-0.15	0.11-0.12	0.11-0.12	0:07-0:08	0:07-0:08	0.10-0.11
ity Area, New Me	Saturated hydraulic conductivity	micro m/sec			42.34-141.14	42.34-141.14	42.34-141.14	14.11-42.34	1,41-4.23	1.41-4.23	14.11-42.34	1.41-4.23	0.42-1.41
Kinley Cour:	Moist bulk density	g/cc			1.45-1.55	1.55-1.65	1.45-1.55	1.50-1.60	1.45-1.55	1.45-1.55	1:60-1:70	1:55-1.65	1:55-1:65
rties- M	Clay	Pct			2-10	2-10	2-10	10-20	20-35	20-35	2-10	20-35	30-40
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Ph	Depth	IJ			0-2	2-26	26-65	0-1	1-3	3-10	10-18	18-33	33-65
	Map symbol and soil name		12Calladito- Elias	association, 1 to 6 percent slopes	Calladito			Elias					

# **Data Source Information**

Soil Survey Area: McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties Survey Area Data: Version 7, Jan 13, 2007

Web Soil Survey 2.0 National Cooperative Soil Survey

# **Engineering Properties**

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

*Classification* of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

*Rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

USDA

#### References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Engineering Properties-McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties

Star Lake Compressor Station

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# **Report—Engineering Properties**

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d Parts of	4			100	100	100	90-100	95-100	95-100	95-100	95-100	95-100
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Properties- McKinley Cou USDA texture				Loamy fine sand	Loamy fine sand	Loamy fine sand	Fine sandy loam	Sandy clay loam	Sandy clay loam	Loamy fine sand	Sandy'clay loam	Glav Ioàm
ngineering Depth		ц		0-2	2-26	26-65	0-1	1-3	3-10	10-18	18-33	33-65
Et Map unit symbol and soil	Jame		12—Calladito-Elias association, 1 to 6 percent slopes	Calladito			Elias					

# **Data Source Information**

Soil Survey Area: McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties Survey Area Data: Version 7, Jan 13, 2007

Web Soil Survey 2.0 National Cooperative Soil Survey

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USDA Natural Resources Conservation Service

12/11/2007 Page 3 of 3

# APPENDIX D SOIL BORING LOGS

**Corrective Action Plan** 

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	WELL CONST.	Descrip - Lith.	USCS	FROM	S TO	AMPLE REC	BLOW-COUNT	NUMBER OR PID READING	LITHOLOGIC DESCRIPTION (LITH, USCS, GRAIN SIZE PROPORTIONS, WET COLOR, RINDG., SORT., CONSOL., DIST. FEATURES)					
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	WELL	- LITH.		FROM	S	AMPLE	BLOW-	NUMBER OR	LITHOLOGIC DESCRIPTION (LITH., USCS, GRAIN SIZE PROPORTIONS, WET COLOR BUDG SOURCE CONSCI DIST. ETATURES)
C1 C						HEC.	COUNT	D.S	O-4 Clean. O-4 Poor Recovery Sand Slightly Cleyev HEROWAY S'BIBlack Moist He odor
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									L+ Brawn tan color					
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ij	WELL CONST.	- UTH.	uscs	FROM	TO	REC	BLOW-	NUMBER OR PID READING	(LITH., USCS, GRAIN SIZE PROPORTIONS, WET COLOR, RNDG., SORT., CONSOL., DIST. FEATURES)
									0=4' Clean. SC
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, , ,								0-4: Clean Sand Free-med gramed Ton Orange Brown No Contemporation
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WEL	L - UПН.	USCS	FROM	S/ TO	MPLE		MEER OR	LITHOLOGEC DESCRIPTION (LITH, USCS, GRAIN SIZE PROPORTIONS, WET COLOR, RNDG., SORT., CONSOL, DIST. FEATURES)					
5								0-4! Med grained Sand Sirghtly Cleytay Orange brown no He contamination 4-8 Same as above Clean Sample 2 8					
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X	CATION	DESCRIF	TION: ·.	*	<del></del>					
	WELL	- ЦПН.	·		S	AMPLI	E	······································		LITHOLOGIC DESCRIPTION
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										0-4' Soud Med arous
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									17 mil. 446 (CT 24	4-8 Some as above
										Clean More cicy
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م	CATION	DESCRIF	TION:											
	WELL CONST.	- UTH,	uses	FROM	S	AMPLI X	E.0#-	NUMBER OR	UTHOLOGIC DESCRIPTION (UTH., USCS, GRAIN SIZE PROPORTIONS, WET					
						REC	COUNT	<u>PID READING</u>	O-12' Clean.					
5									4-9 Same as above					
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\$ /4	\$/A	W	S T 8		DRILLING MET DRILLING COI DATE STARTE FIELD REP.:_ COMMENTS:_	HOD: TTR.: DATE COMPLETED: D: DATE COMPLETED:
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WE	าา - เพร		SAMPLE		ROR	LITHOLOGIC DESCRIPTION (LITH., USCS, GRAIN SIZE PROPORTIONS, WET
					O- M C T	-B' Clean led grain Sand Brownian sine layey from 4'-7' ine grained Sand B' Maist No contomination
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	ATION	DESCRIP	TION: · .						LITHOLOGIC DESCRIPTION
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	•								0.3. Clean 3-4' light gray Glor More of Sophic or degraded life oder Soil Sandy Sc med Frained
5									Sarph & u' Jor Stycon
		•							TD 12 lisht gray 12 50- TPL+
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N DESCRIF	7Tion:	011/01/0		
LITH.	USCS FROM	TO SAMPLE	NUMBER OR	(LITH, USCS, GRAIN SIZE PROPORTIONS, WET ON OR, RNDG, SORT, CONSDL, DEST, FRATURES)
			JANT PED READING	0-4' 0-3 clean 3-4 Slight Color change light gravy
				4-7 Ster Color Moist/wet darkest 2 7' sample Collected 7.5' clean
				STIN SM/SC
	1/4 N DESCRIF	MAP: 	I MAP:	SITE III         SITE III

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BORING LOG Page 16 of 26 STTE HD: <u>SR 1/6 F2</u> LC STTE COORDENATES (FL): N GROUND ELEVATION (FL 44SL): STATE: \_\_\_\_\_\_C ORILLING METHOD: \_\_\_\_\_\_C DRILLING CONTR.: \_\_\_\_\_C DRILLING CONTR.: \_\_\_\_\_C LOCATION MAP: LOCATION ID: COUNTY: DATE COMPLETED: .1/4 . \_1/4 \_ \_1/4 \_\_\_1/4 S\_ . T. R LOCATION DESCRIPTION: LITHOLOGIC DESCRIPTION SAMPLE WELL - LITH. (LITH, USCS, GRAIN SIZE PROPORTIONS, WET X BLOK- NUMBER OR REC COUNT PID READING CONST USCS FROM то COLOR, RNDG., SORT., CONSOL., DIST. FEATURES) 0-31 brown Med. Sromed Sand 3-4' gray discoved soil clayey sc grow From 4'-7.5' cleaning up 2 8' sample connected 27'

		MAP:	1999, p.,	م الارتخاب الم الارت الم الارتخاب الم الا		AD CONTUNE AND AD		SITE ID. SITE CC N GROUNI STATE: ORILLIN DRILLIN DRILLIN DRIELD F	STE 10: <u>S817E</u> LOCATION 10: STE COORDINATES (FL): N GROUND ELEVATION (FL MSL): STATE: ORALING METHOD: DRILING CONTR.: DATE STARTED: DATE COMPLETED:				
LOCATION DESCRIPTION: WELL - LITH USES FROM TO REPORT ON READER OF COLOR, ROOM, SOLF, DATAPORTIONS, WELT CONST LITH USES FROM TO REPORT PROPERTION COLOR, ROOM, SOLF, DATAPORTIONS, WELT COLOR, ROOM, SOLF, DATAPORT, DATAPORT COLOR, ROOM, SOLF, DATAPORT, DATAPO	_1/4 _	_1/4	1/4	.1/4 S	1	r 1	R	COMBAE	NTS:				
5 Clean Soud And Storn brown 2.4' light Stay Soud And Coarse Cleyer Slight HC odor Sample @ 4' 4-8' appears Clean Sample @ 8'	LOCATION E P WELL T CONST.	- LITH.	USCS	FROM	54 TO	AMPLE	BLOT	NUMBER OR	LITHOLOGIC DESCRIPTION (LITH, USCS, GRAIN SIZE PROPORTIONS, WET COLOR, RNDG., SORT., COMSOL., DIST., FEATURES)				
	5.								0-5' Clean Soud And Srain brown 2-4' light Stay Sand Med Coarse : Clayar Slight HC odor Sample @ 4' 4-8' appears clean Sample @ 8'				

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5								0-2: Clean Said and grained brown color moist slightly Cleyey SC 2-4 gray discovered Soil Moist/Wat Cleyey SC
10	Physics Superan		~~~~~					4-8 4' Fine Storned Sand UniForm S-7 Clayay gray 7-8 Sand Stay Nac odor
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<u>8</u>			USCS	FROM	το	REC	THLIC	PID READING	COLOR, RNDG., SORT., CONSOL, DIST. FEATURES) O-2 Clean med graned Sand Stightery clayer 2-4 gray discolored can be				
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S' Brown Soil light Head 8-12' appears Clean 317 col Sample collecture a 12' 8-82 Clean Sandy Soil 3	5									4-8 Lisht gray discoloration
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