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# REPORTS

# DATE:
3/31/2004

# Phase II Environmental Site Assessment

**Gary Johnson Property**

**Former Moon A Tank Battery Location**

**Lea County, New Mexico**

**March 2004**

Prepared for:

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## 1.0 INTRODUCTION

This Phase II Site Investigation is not intended to be considered absolute in its findings and should be evaluated in regard to the following expressed limitations:

- This work was intended to focus on previously identified environmental issues.
- This work was performed at a level of detail consistent with a good faith effort to ascertain and report information of potential utility to the client.
- Any conclusions should be considered subject to modification pending any significant development of new information or enhanced understanding of past or present environmental conditions.
- The depth of understanding of current environmental conditions is proportional to the time and effort expended in the course of investigation. The findings of this report are, therefore, limited by the level of resources committed.

## 2.0 EXECUTIVE SUMMARY

Noble Energy, Inc. (Noble Energy) retained Kane Environmental Engineering, Inc. (Kane Environmental) to conduct a Phase II Environmental site assessment of the parcel of property owned by Mr. Gary Johnson. This parcel is known as the historical location of the Moon A Tank Battery. The primary purpose of this assessment was to determine, to the degree practical, the horizontal and vertical extent of hydrocarbon impact remaining on said property from historical oil and gas operations at this site.

Based on the New Mexico Oil Conservation Division Guidelines (NMOCD) for Remediation of Leaks, Spills and Releases, the subject location has a sensitivity ranking of 20. This elevated ranking is due to proximity to the abandoned domestic water well located on the subject property, east of the mobile home. Remediation guidelines for soils at sites in this sensitivity ranking are:

- TPH (total petroleum hydrocarbon) concentrations.....100 mg/kg
- Benzene.....<10 mg/kg
- Total BTEX (benzene, toluene, ethylbenzene and xylenes)...<50 mg/kg

The following is a summary of this site investigation:

- Five soil borings (B-1 through B-5) were collected from under the vacant mobile, home along the path of the abandoned flow line, to a depth of one-foot below grade surface (bgs). All headspace vapor readings were measured below NMOCD remediation guidelines. Composite 1 (derived from B-1 through B-5) BTEX concentration also met these guidelines. The TPH measured value of Composite 1 exceeded remediation guidelines at a concentration of 273 mg/kg.
- Seventeen soil borings (B-6 through B-22) were collected from the areas of hardened asphaltic hydrocarbons and surrounding areas, with core samples gathered from the surface to a depth of 2' bgs. All headspace readings and BTEX concentrations of these soil samples were measured below NMOCD remediation guidelines. The TPH remediation guideline was exceeded, however, at minimum measured value of 145 mg/kg and a maximum measured value of 10,300 mg/kg.
- The soil borings collected from the area approximately 30' x 20', inside what may have been the historical Moon A Tank Battery firewall, demonstrated exceedances of the NMOCD remediation guidelines for TPH as follows:
  - B-9.....7,450 mg/kg
  - B-12..... 8,930 mg/kg
  - B-14..... 2,900 mg/kg
  - B-15.....10,300 mg/kg

## 2.0 EXECUTIVE SUMMARY, Continued

- Areas of surface asphaltic hydrocarbons were horizontally delineated as required by NMOCD. Complete vertical delineation was limited by refusal, due to hardness of the soil strata.

## 3.0 OVERVIEW

In response to the New Mexico Energy, Minerals and Natural Resources Department Environmental Bureau, Oil Conservation Division (NMOCD), Noble Energy Inc (Noble Energy) submitted a Phase II Environmental Site Assessment (ESA) Site Investigation Plan to address the concerns identified at the property currently owned by Gary Johnson and formerly known as the Moon A Tank Battery. This site investigation was performed on February 17, 2004 after receipt of approval to begin work by both the NMOCD and Mr. Gary Johnson,

The subject property is identified as being located at 1831 Mobile Street, Hobbs, New Mexico, Sec 28, T18S R38E, Lea County, GPS coordinates North 32° 43' 13.6'', West 103° 9' 2.0''. A topographic map of the location is shown as **Figure 1**.

The issues targeted in this site investigation, as previously identified by the NMOCD, included the following:

- weathered asphaltic-type oil
- highly viscous oil identified approximately 6" – 1' bgs
- an abandoned flow line located under Mr. Johnson's mobile home

On January 25, 2000 Mr. Bill Olson of the NMOCD collected a water well sample from the subject site. Analyses of the well water sample included cations, anions, metals, and BTEX (benzene, toluene, ethyl benzene and xylenes). All parameters tested were measured below the primary and secondary drinking water and irrigation water standards, as specified in 20.6.2.3103 NMAC, Section A, B, and C, and depicted in **Table 1**

Mr. Olson also collected five shallow soil samples from the subject property. Sample 0206251150 (BH-1-6") and 0206251210 (BH-1-1ft) were collected in an area reported to be heavily impacted with hydrocarbons. This area is identified as being located near the cyclone fence, on the west side of the Mr. Johnson's mobile home. Samples 020625 1240 (SS-W-1), 020625 1250 (SS-E-1), and 020625 1305 (SS-N-1) were collected at a depth of 1-2' below grade surface (bgs) to the west, east, and north of the mobile home, respectively. These soil samples were analyzed for BTEX, Diesel Range Petroleum Hydrocarbons (DRO), Gasoline Range Petroleum Hydrocarbons (GRO), and metals. A summary of the results of these analyses are included as **Table 2**.

Using the sensitivity ranking methodology outlined in the NMOCD Guidelines for Remediation of Leaks, Spills and Releases, the subject location has been determined by Kane Environmental to have a sensitivity ranking value of 20. This elevated ranking is the result of the targeted site's proximity to an abandoned domestic water well. This well is located within 200' of the targeted site.

## 3.0 **OVERVIEW,** Continued

Remediation guidelines for soils at sites in this sensitivity ranking are as follows:

- TPH (total petroleum hydrocarbon) concentrations..... 100 mg/kg
- Benzene.....<10 mg/kg
- Total BTEX (benzene, toluene, ethylbenzene and xylenes)...<50 mg/kg

## 4.0 METHODOLOGY

Soil borings for this investigation were performed using a hand auger, subject to limitation imposed by the hardness of the soil strata encountered. In all locations indurated caliche was encountered, requiring the borings to be initiated with the hand auger (to locate the boring site) and completed with a bobcat mounted 4-inch auger (with the exception of the area under the mobile home). Refusal of the auger was encountered at a maximum depth of two feet. The depth of sampling was limited to 1' along the abandoned flow line, under the vacant mobile home, due to access restrictions.

Hardened asphaltic hydrocarbons that were encountered at the soil surface were removed prior to sampling to allow a true evaluation of underlying soil conditions. In the event of remedial action at this site, these hardened materials are easily removed from the surface for proper disposition.

Soil intervals were split during sampling, with one sub-sample reserved for laboratory analysis or potential composite preparation, and one sub-sample used for headspace vapor analyses. Where headspace vapor readings exceeded 100 mg/kg and/or where evidence of significant hydrocarbon contamination was encountered, additional soil borings were performed surrounding the suspect location in the four cardinal directions, until PhotoIonization Detector (PID) readings were below 100 mg/kg and soils appeared to show no evidence of contamination based on visual cues. A plot plan depicting soil boring locations, PID readings and TPH values is depicted as **Figure 2**. A summary of PID readings is found as **Table 4**.

## 5.0 SOIL SAMPLE COLLECTION

Five soil borings (Boring 1 – Boring 5) were collected along the abandoned flow line pathway under the vacant mobile home from the surface to a depth of 1'. All headspace readings from these soils were below the instrument detection limits of 0 mg/kg. These samples were field-composited to form a single soil sample for laboratory analyses and labeled as Composite 1.

Six soil borings (B-6 through B-11) were collected from the underlying center of the areas of asphaltic hydrocarbons (as identified by the NMOCD), to a depth of 2'. Headspace readings for soil samples B-6 through B-8, B10 and B-11 were measured below instrument detection limits, and no further delineation was performed. The headspace reading for B-9 was measured at 237 mg/kg, thus requiring further horizontal delineation. Additional vertical delineation was not practical due to refusal. These six soil samples were packaged individually for laboratory analyses.

Four additional soil samples (B-12 through B-15) were collected from a distance of 10' outward from B-9, in the cardinal directions, to horizontally delineate this area. Soil samples were collected from the surface to a depth of 2' bgs at each bore hole. The PID readings indicated elevated hydrocarbons levels to the north (B-13), south (B-14) and west (B-15) of B-9, with headspace readings 126 mg/kg, 68.3 mg/kg, and 24.7 mg/kg respectively. Visual evidence of hydrocarbon contamination was also encountered, and additional borings, labeled B-16 through B-22, were performed to further horizontally delineate the location in these directions.

The headspace reading for B-12, located approximately 10' to the east of B-9, was measured at 1.4 mg/kg. No further delineation was performed in this direction. Soil samples from B-12 through B-15 were packaged individually for laboratory analyses.

As further delineation of the soil borings B-13, B-14 and B-15, three soil borings (B-16 through B-18) were performed approximately 10 feet outward from B-13, in all cardinal directions except south to horizontally delineate this area. The area to the south was delineated by the B-9 and associated borings. Soil samples were collected from the surface to a depth of 2' bgs at each bore hole. All headspace readings were below instrument detection limits and no further delineation was warranted. Soil samples from these borings were composited for laboratory analyses under the label of Composite 2.

Soil borings B-19 through B-21 (also part of the delineation of B-13, B-14 and B-15) were performed 10 feet outward from B-14 in all cardinal directions except north, as this area was delineated by B-9 and associated borings. Soil samples were collected from the surface to a depth of 2' bgs at each bore hole. All headspace readings were below instrument detection limits, and no further delineation was warranted. Soil samples from these borings were composited for laboratory analyses under the label of Composite 3.

## 5.0 SOIL SAMPLE COLLECTION, Continued

Soil boring B-22 was performed 10 feet west of B-15 to complete the delineation of this area, with B-18, B-19, and B-9 previously defining the areas to the north, south and east of B-22. Soil samples were collected from the surface to a depth of 2-feet. All headspace readings were below instrument detection limits (0 mg/kg), and no further delineation was conducted. This sample was packaged individually for laboratory analyses.

## 6.0 LABORATORY ANALYSES OF SOIL SAMPLES

All soils samples were submitted to Environmental Labs of Texas in Midland for the following analysis:

- TPH DRO - total petroleum hydrocarbons
- TPH GRO - total petroleum hydrocarbons diesel range organics
- BTEX - benzene, toluene, ethyl benzene, and xylenes

Analytical results are summarized in **Table 3**, with complete laboratory results and chain of custody documentation included as the **Appendix A**. All benzene and total BTEX concentrations were below the NMOCD remediation guidelines, with maximum concentrations of benzene (0.299 mg/kg) and total BTEX (18.741 mg/kg) encountered in the soil borings B-12 at 0-2' bgs, and B-9 at 0-2' bgs, respectively.

All Total TPH concentrations were above the 100 mg/kg NMOCD remediation guideline, with concentrations exceeding 1000 mg/kg as follows:

| **Boring** | **Depth (ft)** | **Concentration (mg/kg)** |
|---|---|---|
| B-9 | 0 – 2' | 7, 450 |
| B-12 | 0 – 2' | 8,930 |
| B-14 | 0 – 2' | 2,900 |
| B-15 | 0 – 2' | 10,300 |

These locations correspond to the area suggested to be inside of the former Moon A Tank Battery secondary containment, as evidenced by vegetation lines and circular asphaltic hydrocarbon deposits.

The maximum TPH-GRO and TPH-DRO concentrations of 1,780 mg/kg (GRO) and 9,920 mg/kg (DRO) were encountered in 0-2' bgs samples from B-9 and B-15, respectively. The minimum Total Petroleum Hydrocarbon concentration of 145 mg/kg was encountered in the B-22, 0-2' bgs sample.

Petroleum hydrocarbon levels for all soil samples submitted for laboratory analysis during this site investigation were measured above the NMOCD remediation guidelines for this sensitivity ranking. Benzene and Total BTEX concentrations in all samples were measured below these NMOCD remediation guidelines.

## 7.0 QUALITY ASSURANCE/QUALITY CONTROL

### Field QA/QC Procedures

Soil sampling equipment was decontaminated between sampling locations to limit cross contamination and enable soil samples submitted to the laboratory to accurately reflect site conditions. Decontamination included physical removal of solids, washing equipment with soapy water, followed by a distilled water rinse.

A field PID was used to field screen soil samples to determine which samples would be sent to the laboratory for analysis. This instrument was calibrated prior to shipment to the site. Background (ambient air) organic vapors were measured at 0.0 $\mu g/M^3$.

All soil samples collected for laboratory analysis were placed in pre-cleaned glass jars with Teflon® lined lids appropriate for the analyses to be performed. The sample jars were labeled and placed on ice to preserve volatile organics. Samples were accompanied by a Chain of Custody transfer form and hand delivered to Environmental Labs of Texas.

### Laboratory QA/QC Procedures

All analyses were performed according to accepted TNRCC or EPA methodologies, with extractions and determinations completed within the allowable sample holding times.

Matrix spike and matrix spike duplicate recoveries demonstrate that the extraction procedures employed were performed properly, and that no matrix interferences were present in the samples. All spike recovery analyses were within acceptable limits for the methodology.

Laboratory control samples demonstrate the ability of the laboratory to accurately quantify analyte concentrations in known value samples. All results for laboratory control samples were within the allowable variance from the known concentrations.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

As demonstrated by laboratory analyses, all soil samples collected from the former Moon A Tank Battery location exceed the NMOCD 100 mg/kg remediation guideline for TPH, based on the NMOCD site ranking system. This ranking system and subsequent remediation guidelines are based on the potential for contaminant migration to local receptors such as water wells or surface waters. The subject site elevated ranking score of 20 is based solely on the subject area's proximity to an abandoned domestic water well.

It is recommended that Noble Energy propose an alternate remediation guideline of 1,000 mg/kg to the NMOCD. This proposal is based on the following site conditions:

- **The subject water well is currently abandoned, and based on the condition of the mobile home served by the well, it is unlikely that the well will be in service in the near future.**
- Water samples from the subject well collected by NMOCD in January, 2000 indicated that all parameters tested were below drinking water standards. This analysis demonstrates that the historical operations at the site have not impacted the fresh water zone. **Considering the time span between the historical oil and gas operations and this water analysis, it can be concluded that this water well is not likely to be subject to impact from the site.**
- What appears to have been the main hydrocarbon source (the Tank Moon A Tank Battery equipment) has been removed, with only residual solid-phase hydrocarbons encountered during this investigation. **Said conditions limit the potential for contaminant migration through the soil to vapor transport within the soils or transport with the percolation of rainfall. There is no evidence that an ongoing source of contamination exists.**
- The soils at the subject location are mapped in the Lea County Soil Survey as the Kimbrough-Lea complex, with soils encountered on site exhibiting the properties of the Kimbrough soil. Site soils had a gravelly loam surface overlying fragmented indurated caliche from 6-12" and massive indurated caliche from 12-24". **These indurated layers demonstrate the maximum depth of water percolation from rainfall over the time these soils developed (thousands of years), and further demonstrate the limited potential for rainfall percolation through the soil (that being to an approximate depth of 24").**
- Based on well reports and data available from the New Mexico Office of the State Engineer, the average depth of groundwater reported for 26 wells Sec 28, T18S, R38E is 62 feet bgs. The minimum depth of groundwater is reported at 40 feet bgs. **These reported water depths indicate the limited potential for the contaminant migration to groundwater through vapor transport or rainfall percolation.**

## 8.0 CONCLUSIONS AND RECOMMENDATIONS, Continued

Further vertical delineation can be accomplished during potential remedial actions, with confirmation sampling to insure the NMOCD that complete horizontal and vertical delineation and removal of hydrocarbon impacted soils has been completed.

# TABLES

## Table 1

**Analyses Results of Gary Johnson Water Well** **Sampled January 27, 2000**

| Parameter | G. Johnson Water Well, Sampled 1/27/00 | NMED Drinking/Irrigation Water Standards |
|---|---|---|
| **Metals** | **mg/L** | **mg/L** |
| Ag | <0.05 | 0.05[1] |
| Al | <0.50 | 5.0[3] |
| As | <0.10 | 0.1[1] |
| B | <0.05 | 0.75[3] |
| Ba | <0.05 | 1.0[1] |
| Cd | 0.03 | 0.01[1] |
| Co | <0.05 | 0.05[3] |
| Cr | <0.05 | 0.05[1] |
| Cu | <0.10 | 1.0[2] |
| Fe | <0.50 | 1.0[2] |
| Mn | <0.01 | 0.2[2] |
| Mo | <0.01 | 1.0[3] |
| Ni | <0.01 | 0.2[3] |
| Pb | <0.05 | 0.05[1] |
| Se | <0.05 | 0.05[1] |
| Si | 28 | -- |
| Na | 47 | -- |
| K | 4 | -- |
| Mg | 18 | -- |
| Ca | 108 | -- |
| Zn | <0.10 | 10.0[2] |
| Hg | <0.0002 | 0.002[1] |
| **BTEX, mg/L** | | |
| Benzene | <0.005 | 0.01[1] |
| Toluene | <0.005 | 0.75[1] |
| Ethyl benzene | <0.005 | 0.75[1] |
| M,P,O-Xylenes | <0.005 | 0.62[1] |
| Total BTEX | <0.005 | -- |
| **Ion Chromatography, mg/L** | | |
| Chloride | 70 | 250[2] |
| Fluoride | 1.5 | 1.6[1] |
| Nitrate-N | 3.8 | 10.0[1] |
| Sulfate | 110 | 600[2] |
| **Alkalinity (mg/L as $CaCO_3$)** | | |
| Hydroxide Alkalinity | <1.0 | -- |
| Carbonate Alkalinity | <1.0 | -- |
| Bicarbonate Alkalinity | 182 | -- |
| Total Alkalinity | 182 | -- |
| **pH** | 7.2 | 6 - 9 |
| **Specific conductance, uMHOS/cm** | 820 | -- |
| **Total Dissolved Solids, mg/L** | 510 | 1000.0[2] |

[1]20.6.2.3103 NMAC, Section A. Human Health Standards
[2]20.6.2.3103 NMAC, Section B. Other Standards for Domestic Water Supply
[3]20.6.2.3103 NMAC, Section C. Standards for Irrigation Use (Includes section A and B requirements)

## Table 2

**Analyses Results for Soil Samples from Gary Johnson Property** **Sampled June 25, 2002**

| Parameter | 0206251150 BH-1-6 | 0206251150 BH-1 | 0206251150 SS-W-1 | 0206251150 SS-E-1 | 0206251150 SS-N-1 | NMOCD Spill Remediation Guidance[1] |
|---|---|---|---|---|---|---|
| **BTEX, mg/kg** | | | | | | |
| Benzene | <0.050 | <0.1 | <0.1 | <0.010 | 0.0234 | 10 |
| Toluene | <0.050 | <0.1 | <0.1 | <0.010 | <0.020 | -- |
| Ethyl benzene | 0.0806 | 1.16 | <0.1 | <0.010 | 0.0474 | -- |
| Xylenes | 0.328 | 4.23 | 0.352 | <0.010 | 0.183 | -- |
| Total BTEX | 0.409 | 5.39 | 0.352 | <0.010 | 0.254 | 50 |
| **Petroleum Hydrocarbon Analyses, mg/kg** | | | | | | |
| Diesel Range Organics | 11,600 | <250 | 10,200 | 4,600 | 16,500 | 100 (total) |
| Gasoline Range Organics | 32.5 | 352 | <10 | <1 | 20.5 | |
| **Total Metals Analyses, mg/kg** | | | | | | |
| Hg | <0.19 | <0.19 | <0.19 | <0.19 | <0.19 | -- |
| Al | 9140 | 11100 | 7710 | 9490 | 10300 | -- |
| As | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | -- |
| Ba | 100 | 78.1 | 86.5 | 124 | 121 | -- |
| B | 36.0 | 38.4 | 30.1 | 35.2 | 40.6 | -- |
| Cd | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | -- |
| Cr | 6.92 | 8.31 | 5.92 | 6.84 | 7.37 | -- |
| Co | 2.78 | 4.32 | <2.50 | <2.50 | 2.54 | -- |
| Cu | 6.80 | 8.61 | 6.33 | 7.80 | 6.82 | -- |
| Fe | 7250 | 8200 | 6450 | 7150 | 8250 | -- |
| Pb | 7.27 | 4.44 | 6.32 | 156 | 14.9 | -- |
| Mn | 111 | 117 | 115 | 110 | 142 | -- |
| Mo | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | -- |
| Ni | 8.32 | 9.00 | 7.32 | 7.22 | 7.82 | -- |
| Se | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | -- |
| Si | 224 | 214 | 220 | 194 | 208 | -- |
| Ag | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | -- |
| Zn | 35.8 | 47.5 | 25.1 | 55.7 | 49.0 | -- |

[1]Guidelines for Remediation of Leaks, Spills and Releases, NM OCD, August 13, 1993

## Table 3

**Analyses Results for Soil Samples from Gary Johnson Property** **Sampled February 17, 2004**

| Sample ID | Lab ID # | Sample Depth (ft) | TPH-GRO C6 – C12 | TPH-DRO >C12 – C35 | TPH-Total C6 – C35 | Benzene | Toluene | Ethylbenzene | Xylene (p,m) | Xylene (o) | Total BTEX[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Composite 1 (B1 – B5) | 4B18007-01 | 0 – 1 | ND | 273 | 273 | ND | ND | ND | ND | ND | ND |
| B-6 | 4B18007-02 | 0 – 2 | 10.4 | 292 | 302 | ND | ND | 0.0297 | ND | ND | 0.0297 |
| B-7 | 4B18007-03 | 0 – 2 | ND | 367 | 367 | ND | ND | ND | ND | ND | ND |
| B-8 | 4B18007-04 | 0 – 2 | 17.4 | 313 | 330 | ND | 0.0548 | 0.0418 | 0.152 | 0.0182 | 0.2668 |
| B-9 | 4B18007-05 | 0 – 2 | 1,780 | 5,670 | 7,450 | 0.267 | 0.896 | 2.74 | 14.0 | 0.838 | 18.741 |
| B-10 | 4B18007-06 | 0 – 2 | 10.3 | 556 | 566 | ND | ND | ND | 0.0300 | ND | 0.0300 |
| B-11 | 4B18007-07 | 0 – 2 | ND | 211 | 211 | ND | ND | ND | ND | ND | ND |
| B-12 | 4B18007-08 | 0 – 2 | 950 | 7,980 | 8,930 | 0.299 | 0.546 | 1.61 | 7.26 | 0.533 | 10.248 |
| B-13 | 4B18007-09 | 0 – 2 | J(9.75) | 217 | 217 | ND | ND | ND | 0.0492 | ND | 0.0492 |
| B-14 | 4B18007-10 | 0 – 2 | 325 | 2,570 | 2,900 | 0.0651 | 0.183 | 0.418 | 1.50 | 0.310 | 2.4761 |
| B-15 | 4B18007-11 | 0 – 2 | 372 | 9,920 | 10,300 | 0.147 | 0.206 | 0.301 | 1.42 | 0.278 | 2.352 |
| Composite 2 (B16 – B18) | 4B18007-12 | 0 – 2 | ND | 545 | 545 | ND | ND | ND | ND | ND | ND |
| Composite 1 (B19 – B21) | 4B18007-13 | 0 – 2 | 21.6 | 973 | 995 | ND | 0.0365 | 0.0208 | 0.0531 | 0.0235 | 0.1339 |
| B-22 | 4B18007-14 | 0 – 2 | ND | 145 | 145 | ND | ND | ND | ND | ND | ND |
| **NM OCD Thresholds** | --- | --- | --- | --- | **100** | **10** | --- | --- | --- | --- | **50** |

**Notes:** All measured values reported in mg/kg.

Red text denoted measured value in excess of regulatory threshold.

[1] Calculated.

[2] New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division thresholds, as published in the Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993, Ranking Score >19.

## Table 4

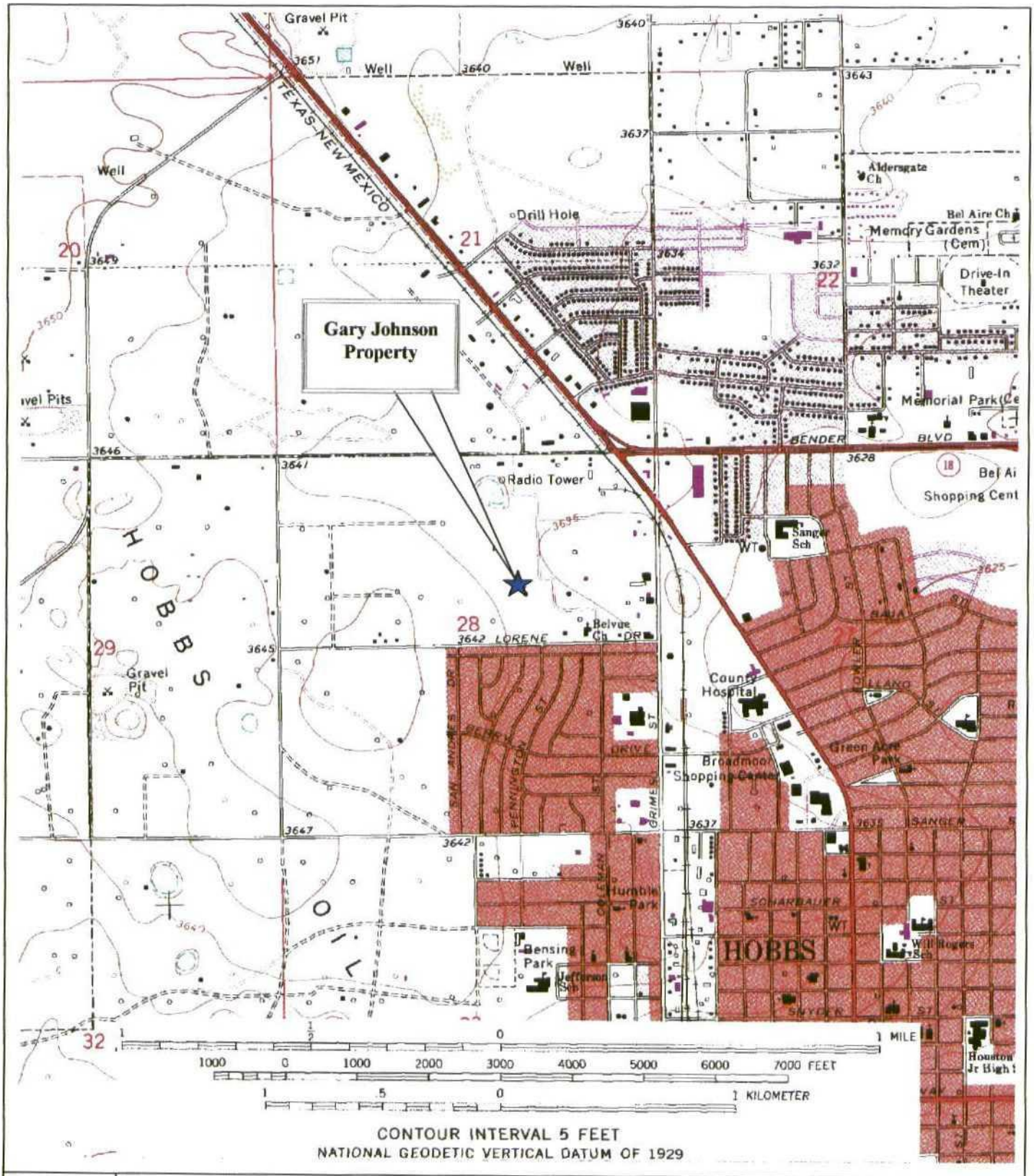
### Field Headspace Readings and Soil Boring Logs

| SAMPLE ID | Field Headspace, ppm | Field Boring Log |
|---|---|---|
| B-1 0-2' | 0.0 | Asphaltine layer 0-0.25", gravelly fine sandy loam 0.25-6.0", fragmented indurated caliche 6-12" |
| B-2 0-2' | 0.0 | Asphaltine layer 0-0.25", gravelly fine sandy loam 0.25-6.0", fragmented indurated caliche 6-12" |
| B-3 0-2' | 0.0 | Gravelly fine sandy loam 0.0-6.0", fragmented indurated caliche 6-12" |
| B-4 0-2' | 0.0 | Gravelly fine sandy loam 0.0-6.0", fragmented indurated caliche 6-12" |
| B-5 0-2' | 0.0 | Gravelly fine sandy loam 0.0-6.0", fragmented indurated caliche 6-12" |
| B-6 0-2' | 0.0 | Asphaltine layer 0-1", gravelly fine sandy loam 1-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-7 0-2' | 0.0 | Asphaltine layer 0-1", gravelly fine sandy loam 1-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-8 0-2' | 0.0 | Asphaltine layer 0-1", gravelly fine sandy loam 1-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-9 0-2' | 237 | Asphaltine layer 0-1", gravelly fine sandy loam 1-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-10 0-2' | 0.0 | Asphaltine layer 0-1.25", gravelly fine sandy loam 1.25-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-11 0-2' | 0.0 | Asphaltine layer 0-0.5", gravelly fine sandy loam 0.5-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-12 0-2' | 1.4 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-13 0-2' | 126 | Asphaltine layer 0-0.5", gravelly fine sandy loam 0.5-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-14 0-2' | 68.3 | Asphaltine layer 0-0.5", gravelly fine sandy loam 0.5-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-15 0-2' | 24.7 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-16 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-17 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-18 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-19 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-20 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-21 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| B-22 0-2' | 0.0 | Gravelly fine sandy loam 0-6", fragmented indurated caliche 6-12", indurated caliche 12-24" |
| **NM OCD Thresholds** | 100[1] | |

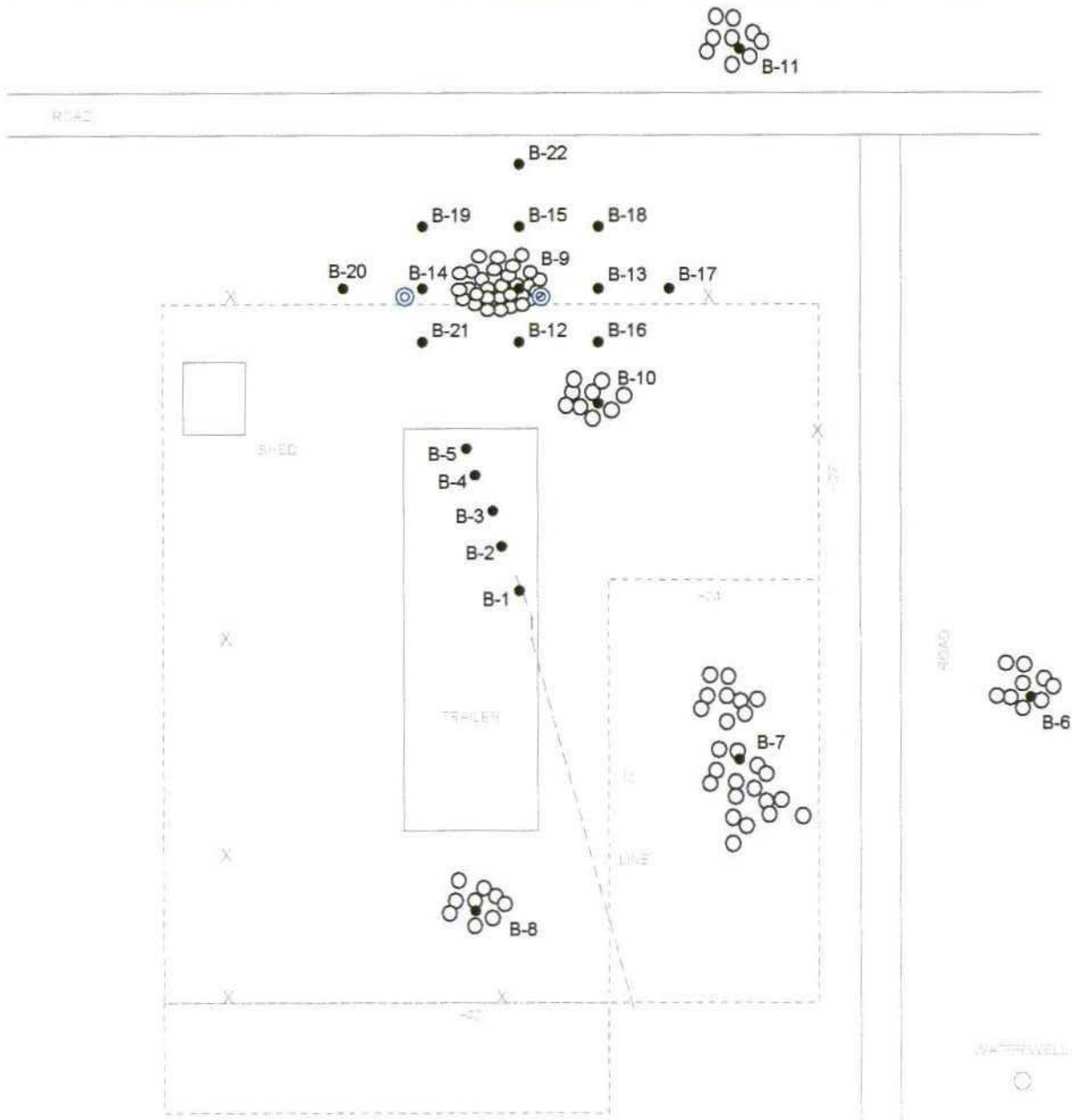
**Notes:**

[1] New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division thresholds, as published in the Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993, Ranking Score >19, headspace readings substituted for BTEX analyses..

# FIGURES




| | | |
|---|---|---|
| **Figure 1** | Noble Energy, Inc.<br>**MOON A LEASE, Gary Johnson Property**<br>Lea County, New Mexico | USGS Hobbs West Quadrangle |




| LINE LEGEND | |
|---|---|
| CYCLONE FENCE | - - -X- - - |
| CATTLE FENCE | - - - - - - - |
| HARDENED BLACK MATERIAL | |
| FENCE POST | |
| SAMPLE POINT | |

| SAMPLE ID | TPH VALUE (mg/kg) |
|---|---|
| COMP 1 0-1' (B-1 – B-5) | 273 |
| B-6 0-2' | 302 |
| B-7 0-2' | 367 |
| B-8 0-2' | 330 |
| B-9 0-2' | 7,450 |
| B-10 0-2' | 566 |
| B-11 0-2' | 211 |
| B-12 0-2' | 8,930 |
| B-13 0-2' | 217 |
| B-14 0-2' | 2,900 |
| B-15 0-2' | 10,300 |
| COMP 2 0-2' (B-16 - B18) | 545 |
| COMP 3 0-2' (B-19 – B21) | 995 |
| B-22 0-2' | 145 |
| NMEMNRD OCD STANDARD | 100 |

| SAMPLE ID | Field Headspace, mg/kg |
|---|---|
| B-1 0-1' | 0 |
| B-2 0-1' | 0 |
| B-3 0-1' | 0 |
| B-4 0-1' | 0 |
| B-5 0-1' | 0 |
| B-6 0-2' | 0 |
| B-7 0-2' | 0 |
| B-8 0-2' | 0 |
| B-9 0-2' | 237 |
| B-10 0-2' | 0 |
| B-11 0-2' | 0 |
| B-12 0-2' | 1.4 |
| B-13 0-2' | 126 |
| B-14 0-2' | 68.3 |
| B-15 0-2' | 24.7 |
| B-16 0-2' | 0 |
| B-17 0-2' | 0 |
| B-18 0-2' | 0 |
| B-19 0-2' | 0 |
| B-20 0-2' | 0 |
| B-21 0-2' | 0 |
| B-22 0-2' | 0 |
| NMEMNRD OCD STANDARD | 100 |

NOT TO SCALE

KANE
Environmental Engineering, Inc.

| | |
|---|---|
| DRAWN BY: SMH/DCL | DATE: 2/27/04 |
| REVISED: | PROJ NUMBER: 04-106 |
| N 32° 43.227' W 100° 09.033' | SW/4 NE/4 SEC 28, T18S, R38E |

**Figure 2**

# Moon Lease Site Investigation

Hobbs, New Mexico

# APPENDIX A

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

# Analytical Report

**Prepared for:**

Deb Lambertson

Kane Environmental (Midland)

4713 Rosewood Drive

Midland, TX 79707

Project: Moon SIP

Project Number: 04-106

Location: Lea County, NM

Lab Order Number: 4B18007

Report Date: 02/24/04

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| Comp. 1 0-1' | 4B18007-01 | Soil | 02/17/04 11:45 | 02/18/04 10:42 |
| B-6 0-2' | 4B18007-02 | Soil | 02/17/04 14:30 | 02/18/04 10:42 |
| B-7 0-2' | 4B18007-03 | Soil | 02/17/04 14:45 | 02/18/04 10:42 |
| B-8 0-2' | 4B18007-04 | Soil | 02/17/04 15:00 | 02/18/04 10:42 |
| B-9 0-2' | 4B18007-05 | Soil | 02/17/04 15:10 | 02/18/04 10:42 |
| B-10 0-2' | 4B18007-06 | Soil | 02/17/04 15:20 | 02/18/04 10:42 |
| B-11 0-2' | 4B18007-07 | Soil | 02/17/04 15:30 | 02/18/04 10:42 |
| B-12 0-2' | 4B18007-08 | Soil | 02/17/04 15:45 | 02/18/04 10:42 |
| B-13 0-2' | 4B18007-09 | Soil | 02/17/04 15:55 | 02/18/04 10:42 |
| B-14 0-2' | 4B18007-10 | Soil | 02/17/04 16:05 | 02/18/04 10:42 |
| B-15 0-2' | 4B18007-11 | Soil | 02/17/04 16:10 | 02/18/04 10:42 |
| Comp 2 0-2' | 4B18007-12 | Soil | 02/17/04 16:30 | 02/18/04 10:42 |
| Comp 3 0-2' | 4B18007-13 | Soil | 02/17/04 16:45 | 02/18/04 10:42 |
| B22 0-2' | 4B18007-14 | Soil | 02/17/04 16:50 | 02/18/04 10:42 |



12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Comp. 1 0-1' (4B18007-01)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/19/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (p/m) | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *82.0 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *92.7 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **273** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **273** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *94.0 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *93.8 %* | *70-130* | | " | " | " | " | |
| **B-6 0-2' (4B18007-02)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/19/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **0.0297** | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *82.4 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *96.4 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **10.4** | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **292** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **302** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *96.0 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *91.6 %* | *70-130* | | " | " | " | " | |
| **B-7 0-2' (4B18007-03)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/19/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (p/m) | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *86.0 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *93.0 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **367** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **367** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *84.6 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *98.4 %* | *70-130* | | " | " | " | " | |

Environmental Lab of Texas



Roland K Tuttle

Quality Assurance Review

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **B-8 0-2' (4B18007-04)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/19/04 | EPA 8021B | |
| **Toluene** | **0.0548** | 0.0250 | " | " | " | " | " | " | |
| **Ethylbenzene** | **0.0418** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **0.152** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.0182** | 0.0250 | " | " | " | " | " | " | J |
| *Surrogate: a,a,a-Trifluorotoluene* | | *82.0 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *97.8 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **17.4** | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **313** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **330** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *78.2 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *74.0 %* | *70-130* | | " | " | " | " | |
| **B-9 0-2' (4B18007-05)** | | | | | | | | | |
| **Benzene** | **0.267** | 0.100 | mg/kg dry | 100 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| **Toluene** | **0.896** | 0.100 | " | " | " | " | " | " | |
| **Ethylbenzene** | **2.74** | 0.100 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **14.0** | 0.100 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.838** | 0.100 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *158 %* | *80-120* | | " | " | " | " | *S-04* |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **1780** | 50.0 | mg/kg dry | 5 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **5670** | 50.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **7450** | 50.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *21.6 %* | *70-130* | | " | " | " | " | *S-06* |
| *Surrogate: 1-Chlorooctadecane* | | *21.6 %* | *70-130* | | " | " | " | " | *S-06* |
| **B-10 0-2' (4B18007-06)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **0.0300** | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *92.2 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *96.4 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **10.3** | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **556** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **566** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *89.0 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *89.0 %* | *70-130* | | " | " | " | " | |

Environmental Lab of Texas

*The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory.. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.*

Roland K Tuttle

Quality Assurance Review



12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **B-11 0-2' (4B18007-07)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (p/m) | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *85.7 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *90.7 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **211** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **211** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *83.2 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *85.8 %* | *70-130* | | " | " | " | " | |
| **B-12 0-2' (4B18007-08)** | | | | | | | | | |
| **Benzene** | **0.299** | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| **Toluene** | **0.546** | 0.0250 | " | " | " | " | " | " | |
| **Ethylbenzene** | **1.61** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **7.26** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.533** | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *349 %* | *80-120* | | " | " | " | " | *S-04* |
| *Surrogate: 4-Bromofluorobenzene* | | *90.4 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **950** | 50.0 | mg/kg dry | 5 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **7980** | 50.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **8930** | 50.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *17.9 %* | *70-130* | | " | " | " | " | *S-06* |
| *Surrogate: 1-Chlorooctadecane* | | *21.2 %* | *70-130* | | " | " | " | " | *S-06* |
| **B-13 0-2' (4B18007-09)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **0.0492** | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *85.5 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *103 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | J [9.75] | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | J |
| **Diesel Range Organics >C12-C35** | **217** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **217** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *82.0 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *97.2 %* | *70-130* | | " | " | " | " | |

Environmental Lab of Texas



Roland K. Tuttle

Quality Assurance Review

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **B-14 0-2' (4B18007-10)** | | | | | | | | | |
| **Benzene** | **0.0651** | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| **Toluene** | **0.183** | 0.0250 | " | " | " | " | " | " | |
| **Ethylbenzene** | **0.418** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **1.50** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.310** | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *138 %* | *80-120* | | " | " | " | " | *S-04* |
| *Surrogate: 4-Bromofluorobenzene* | | *97.0 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **325** | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **2570** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **2900** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *90.4 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *110 %* | *70-130* | | " | " | " | " | |
| **B-15 0-2' (4B18007-11)** | | | | | | | | | |
| **Benzene** | **0.147** | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| **Toluene** | **0.206** | 0.0250 | " | " | " | " | " | " | |
| **Ethylbenzene** | **0.301** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (p/m)** | **1.42** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.278** | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *190 %* | *80-120* | | " | " | " | " | *S-04* |
| *Surrogate: 4-Bromofluorobenzene* | | *94.1 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **372** | 50.0 | mg/kg dry | 5 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **9920** | 50.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **10300** | 50.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *16.5 %* | *70-130* | | " | " | " | " | *S-06* |
| *Surrogate: 1-Chlorooctadecane* | | *23.8 %* | *70-130* | | " | " | " | " | *S-06* |
| **Comp 2 0-2' (4B18007-12)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (p/m) | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *88.6 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *97.4 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **545** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **545** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *83.8 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *105 %* | *70-130* | | " | " | " | " | |

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Quality Assurance Review



12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Comp 3 0-2' (4B18007-13)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB41909 | 02/19/04 | 02/20/04 | EPA 8021B | |
| **Toluene** | **0.0365** | 0.0250 | " | " | " | " | " | " | |
| **Ethylbenzene** | **0.0208** | 0.0250 | " | " | " | " | " | " | J |
| **Xylene (p/m)** | **0.0531** | 0.0250 | " | " | " | " | " | " | |
| **Xylene (o)** | **0.0235** | 0.0250 | " | " | " | " | " | " | J |
| *Surrogate: a,a,a-Trifluorotoluene* | | *86.6 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *92.3 %* | *80-120* | | " | " | " | " | |
| **Gasoline Range Organics C6-C12** | **21.6** | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **973** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **995** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *86.6 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *110 %* | *70-130* | | " | " | " | " | |
| **B22 0-2' (4B18007-14)** | | | | | | | | | |
| Benzene | ND | 0.0250 | mg/kg dry | 25 | EB42312 | 02/23/04 | 02/23/04 | EPA 8021B | |
| Toluene | ND | 0.0250 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (p/m) | ND | 0.0250 | " | " | " | " | " | " | |
| Xylene (o) | ND | 0.0250 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *85.6 %* | *80-120* | | " | " | " | " | |
| *Surrogate: 4-Bromofluorobenzene* | | *101 %* | *80-120* | | " | " | " | " | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg dry | 1 | EB41802 | 02/18/04 | 02/19/04 | EPA 8015M | |
| **Diesel Range Organics >C12-C35** | **145** | 10.0 | " | " | " | " | " | " | |
| **Total Hydrocarbon C6-C35** | **145** | 10.0 | " | " | " | " | " | " | |
| *Surrogate: 1-Chlorooctane* | | *94.4 %* | *70-130* | | " | " | " | " | |
| *Surrogate: 1-Chlorooctadecane* | | *100 %* | *70-130* | | " | " | " | " | |





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|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## General Chemistry Parameters by EPA / Standard Methods

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Comp. 1 0-1' (4B18007-01)** | | | | | | | | | |
| **% Solids** | **98.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-6 0-2' (4B18007-02)** | | | | | | | | | |
| **% Solids** | **94.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-7 0-2' (4B18007-03)** | | | | | | | | | |
| **% Solids** | **93.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-8 0-2' (4B18007-04)** | | | | | | | | | |
| **% Solids** | **93.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-9 0-2' (4B18007-05)** | | | | | | | | | |
| **% Solids** | **88.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-10 0-2' (4B18007-06)** | | | | | | | | | |
| **% Solids** | **94.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-11 0-2' (4B18007-07)** | | | | | | | | | |
| **% Solids** | **93.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-12 0-2' (4B18007-08)** | | | | | | | | | |
| **% Solids** | **89.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-13 0-2' (4B18007-09)** | | | | | | | | | |
| **% Solids** | **92.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-14 0-2' (4B18007-10)** | | | | | | | | | |
| **% Solids** | **91.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B-15 0-2' (4B18007-11)** | | | | | | | | | |
| **% Solids** | **93.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **Comp 2 0-2' (4B18007-12)** | | | | | | | | | |
| **% Solids** | **93.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |

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|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## General Chemistry Parameters by EPA / Standard Methods

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Comp 3 0-2' (4B18007-13)** | | | | | | | | | |
| **% Solids** | **94.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |
| **B22 0-2' (4B18007-14)** | | | | | | | | | |
| **% Solids** | **95.0** | 1.0 | % | 1 | EB41901 | 02/19/04 | 02/19/04 | % calculation | |

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|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB41802 - 8015M** | | | | | | | | | | |
| **Blank (EB41802-BLK1)** | | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg wet | | | | | | | |
| Diesel Range Organics >C12-C35 | ND | 10.0 | " | | | | | | | |
| Total Hydrocarbon C6-C35 | ND | 10.0 | " | | | | | | | |
| *Surrogate: 1-Chlorooctane* | *35.9* | | *mg/kg* | *50.0* | | *71.8* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *35.6* | | *"* | *50.0* | | *71.2* | *70-130* | | | |
| **Blank (EB41802-BLK2)** | | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | ND | 10.0 | mg/kg wet | | | | | | | |
| Diesel Range Organics >C12-C35 | ND | 10.0 | " | | | | | | | |
| Total Hydrocarbon C6-C35 | ND | 10.0 | " | | | | | | | |
| *Surrogate: 1-Chlorooctane* | *38.4* | | *mg/kg* | *50.0* | | *76.8* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *36.4* | | *"* | *50.0* | | *72.8* | *70-130* | | | |
| **LCS (EB41802-BS1)** | | | | Prepared & Analyzed: 02/18/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 411 | 10.0 | mg/kg wet | 500 | | 82.2 | 75-125 | | | |
| Diesel Range Organics >C12-C35 | 415 | 10.0 | " | 500 | | 83.0 | 75-125 | | | |
| Total Hydrocarbon C6-C35 | 826 | 10.0 | " | 1000 | | 82.6 | 75-125 | | | |
| *Surrogate: 1-Chlorooctane* | *39.4* | | *mg/kg* | *50.0* | | *78.8* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *35.1* | | *"* | *50.0* | | *70.2* | *70-130* | | | |
| **LCS (EB41802-BS2)** | | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 414 | 10.0 | mg/kg wet | 500 | | 82.8 | 75-125 | | | |
| Diesel Range Organics >C12-C35 | 419 | 10.0 | " | 500 | | 83.8 | 75-125 | | | |
| Total Hydrocarbon C6-C35 | 833 | 10.0 | " | 1000 | | 83.3 | 75-125 | | | |
| *Surrogate: 1-Chlorooctane* | *43.3* | | *mg/kg* | *50.0* | | *86.6* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *35.7* | | *"* | *50.0* | | *71.4* | *70-130* | | | |
| **Calibration Check (EB41802-CCV1)** | | | | Prepared & Analyzed: 02/18/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 495 | | mg/kg | 500 | | 99.0 | 80-120 | | | |
| Diesel Range Organics >C12-C35 | 459 | | " | 500 | | 91.8 | 80-120 | | | |
| Total Hydrocarbon C6-C35 | 954 | | " | 1000 | | 95.4 | 80-120 | | | |
| *Surrogate: 1-Chlorooctane* | *53.9* | | *"* | *50.0* | | *108* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *36.0* | | *"* | *50.0* | | *72.0* | *70-130* | | | |





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Quality Assurance Review



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## Organics by GC - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB41802 - 8015M** | | | | | | | | | | |
| **Calibration Check (EB41802-CCV2)** | | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 504 | | mg/kg | 500 | | 101 | 80-120 | | | |
| Diesel Range Organics >C12-C35 | 537 | | " | 500 | | 107 | 80-120 | | | |
| Total Hydrocarbon C6-C35 | 1040 | | " | 1000 | | 104 | 80-120 | | | |
| *Surrogate: 1-Chlorooctane* | *57.6* | | " | *50.0* | | *115* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *49.0* | | " | *50.0* | | *98.0* | *70-130* | | | |
| **Matrix Spike (EB41802-MS1)** | **Source: 4B18001-02** | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 567 | 10.0 | mg/kg dry | 556 | ND | 102 | 75-125 | | | |
| Diesel Range Organics >C12-C35 | 601 | 10.0 | " | 556 | 52.6 | 98.6 | 75-125 | | | |
| Total Hydrocarbon C6-C35 | 1170 | 10.0 | " | 1110 | 52.6 | 101 | 75-125 | | | |
| *Surrogate: 1-Chlorooctane* | *54.2* | | *mg kg* | *50.0* | | *108* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *40.3* | | " | *50.0* | | *80.6* | *70-130* | | | |
| **Matrix Spike (EB41802-MS2)** | **Source: 4B18007-01** | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 556 | 10.0 | mg/kg dry | 510 | ND | 109 | 75-125 | | | |
| Diesel Range Organics >C12-C35 | 824 | 10.0 | " | 510 | 273 | 108 | 75-125 | | | |
| Total Hydrocarbon C6-C35 | 1380 | 10.0 | " | 1020 | 273 | 109 | 75-125 | | | |
| *Surrogate: 1-Chlorooctane* | *57.1* | | *mg kg* | *50.0* | | *114* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *51.4* | | " | *50.0* | | *103* | *70-130* | | | |
| **Matrix Spike Dup (EB41802-MSD1)** | **Source: 4B18001-02** | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 553 | 10.0 | mg/kg dry | 556 | ND | 99.5 | 75-125 | 2.50 | 20 | |
| Diesel Range Organics >C12-C35 | 620 | 10.0 | " | 556 | 52.6 | 102 | 75-125 | 3.11 | 20 | |
| Total Hydrocarbon C6-C35 | 1170 | 10.0 | " | 1110 | 52.6 | 101 | 75-125 | 0.00 | 20 | |
| *Surrogate: 1-Chlorooctane* | *53.3* | | *mg kg* | *50.0* | | *107* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *40.2* | | " | *50.0* | | *80.4* | *70-130* | | | |
| **Matrix Spike Dup (EB41802-MSD2)** | **Source: 4B18007-01** | | | Prepared: 02/18/04 Analyzed: 02/19/04 | | | | | | |
| Gasoline Range Organics C6-C12 | 553 | 10.0 | mg/kg dry | 510 | ND | 108 | 75-125 | 0.541 | 20 | |
| Diesel Range Organics >C12-C35 | 825 | 10.0 | " | 510 | 273 | 108 | 75-125 | 0.121 | 20 | |
| Total Hydrocarbon C6-C35 | 1380 | 10.0 | " | 1020 | 273 | 109 | 75-125 | 0.00 | 20 | |
| *Surrogate: 1-Chlorooctane* | *56.3* | | *mg kg* | *50.0* | | *113* | *70-130* | | | |
| *Surrogate: 1-Chlorooctadecane* | *49.8* | | " | *50.0* | | *99.6* | *70-130* | | | |





Roland K. Tuttle

Quality Assurance Review

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|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB41909 - EPA 5030C (GC)** | | | | | | | | | | |
| **Blank (EB41909-BLK1)** | | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| Benzene | ND | 0.0250 | mg/kg wet | | | | | | | |
| Toluene | ND | 0.0250 | " | | | | | | | |
| Ethylbenzene | ND | 0.0250 | " | | | | | | | |
| Xylene (p/m) | ND | 0.0250 | " | | | | | | | |
| Xylene (o) | ND | 0.0250 | " | | | | | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *85.9* | | *ug kg* | *100* | | *85.9* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *98.9* | | *"* | *100* | | *98.9* | *80-120* | | | |
| **LCS (EB41909-BS1)** | | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| Benzene | 104 | | ug/kg | 100 | | 104 | 80-120 | | | |
| Toluene | 97.2 | | " | 100 | | 97.2 | 80-120 | | | |
| Ethylbenzene | 96.0 | | " | 100 | | 96.0 | 80-120 | | | |
| Xylene (p/m) | 189 | | " | 200 | | 94.5 | 80-120 | | | |
| Xylene (o) | 96.8 | | " | 100 | | 96.8 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *95.3* | | *"* | *100* | | *95.3* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *110* | | *"* | *100* | | *110* | *80-120* | | | |
| **Calibration Check (EB41909-CCV1)** | | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| Benzene | 95.3 | | ug/kg | 100 | | 95.3 | 80-120 | | | |
| Toluene | 88.8 | | " | 100 | | 88.8 | 80-120 | | | |
| Ethylbenzene | 87.5 | | " | 100 | | 87.5 | 80-120 | | | |
| Xylene (p/m) | 171 | | " | 200 | | 85.5 | 80-120 | | | |
| Xylene (o) | 89.4 | | " | 100 | | 89.4 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *93.0* | | *"* | *100* | | *93.0* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *101* | | *"* | *100* | | *101* | *80-120* | | | |
| **Matrix Spike (EB41909-MS1)** | **Source: 4B18013-01** | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| Benzene | 2380 | | ug/kg | 2500 | 33.2 | 93.9 | 80-120 | | | |
| Toluene | 2310 | | " | 2500 | 100 | 88.4 | 80-120 | | | |
| Ethylbenzene | 2290 | | " | 2500 | 96.6 | 87.7 | 80-120 | | | |
| Xylene (p/m) | 4360 | | " | 5000 | 207 | 83.1 | 80-120 | | | |
| Xylene (o) | 2490 | | " | 2500 | 239 | 90.0 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *96.1* | | *"* | *100* | | *96.1* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *104* | | *"* | *100* | | *104* | *80-120* | | | |

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Quality Assurance Review



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| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Organics by GC - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB41909 - EPA 5030C (GC)** | | | | | | | | | | |
| **Matrix Spike Dup (EB41909-MSD1)** | **Source: 4B18013-01** | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| Benzene | 2450 | | ug/kg | 2500 | 33.2 | 96.7 | 80-120 | 2.94 | 20 | |
| Toluene | 2430 | | " | 2500 | 100 | 93.2 | 80-120 | 5.29 | 20 | |
| Ethylbenzene | 2440 | | " | 2500 | 96.6 | 93.7 | 80-120 | 6.62 | 20 | |
| Xylene (p/m) | 4620 | | " | 5000 | 207 | 88.3 | 80-120 | 6.07 | 20 | |
| Xylene (o) | 2620 | | " | 2500 | 239 | 95.2 | 80-120 | 5.62 | 20 | |
| *Surrogate: a,a,a-Trifluorotoluene* | *101* | | " | *100* | | *101* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *107* | | " | *100* | | *107* | *80-120* | | | |
| **Batch EB42312 - EPA 5030C (GC)** | | | | | | | | | | |
| **Blank (EB42312-BLK1)** | | | | Prepared & Analyzed: 02/23/04 | | | | | | |
| Benzene | ND | 0.0250 | mg/kg wet | | | | | | | |
| Toluene | ND | 0.0250 | " | | | | | | | |
| Ethylbenzene | ND | 0.0250 | " | | | | | | | |
| Xylene (p/m) | ND | 0.0250 | " | | | | | | | |
| Xylene (o) | ND | 0.0250 | " | | | | | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *85.0* | | *ug kg* | *100* | | *85.0* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *98.9* | | " | *100* | | *98.9* | *80-120* | | | |
| **LCS (EB42312-BS1)** | | | | Prepared & Analyzed: 02/23/04 | | | | | | |
| Benzene | 96.6 | | ug/kg | 100 | | 96.6 | 80-120 | | | |
| Toluene | 91.6 | | " | 100 | | 91.6 | 80-120 | | | |
| Ethylbenzene | 90.8 | | " | 100 | | 90.8 | 80-120 | | | |
| Xylene (p/m) | 178 | | " | 200 | | 89.0 | 80-120 | | | |
| Xylene (o) | 90.3 | | " | 100 | | 90.3 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *91.9* | | " | *100* | | *91.9* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *97.6* | | " | *100* | | *97.6* | *80-120* | | | |





Roland K. Tuttle

Quality Assurance Review



12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

## Organics by GC - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB42312 - EPA 5030C (GC)** | | | | | | | | | | |
| **Calibration Check (EB42312-CCV1)** | | | | Prepared: 02/23/04 Analyzed: 02/24/04 | | | | | | |
| Benzene | 96.8 | | ug/kg | 100 | | 96.8 | 80-120 | | | |
| Toluene | 91.9 | | " | 100 | | 91.9 | 80-120 | | | |
| Ethylbenzene | 92.2 | | " | 100 | | 92.2 | 80-120 | | | |
| Xylene (p/m) | 182 | | " | 200 | | 91.0 | 80-120 | | | |
| Xylene (o) | 97.7 | | " | 100 | | 97.7 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *87.2* | | " | *100* | | *87.2* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *116* | | " | *100* | | *116* | *80-120* | | | |
| **Matrix Spike (EB42312-MS1)** | **Source: 4B18007-14** | | | Prepared: 02/23/04 Analyzed: 02/24/04 | | | | | | |
| Benzene | 94.0 | | ug/kg | 100 | ND | 94.0 | 80-120 | | | |
| Toluene | 89.5 | | " | 100 | ND | 89.5 | 80-120 | | | |
| Ethylbenzene | 89.2 | | " | 100 | ND | 89.2 | 80-120 | | | |
| Xylene (p/m) | 175 | | " | 200 | ND | 87.5 | 80-120 | | | |
| Xylene (o) | 86.2 | | " | 100 | ND | 86.2 | 80-120 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *95.7* | | " | *100* | | *95.7* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *93.9* | | " | *100* | | *93.9* | *80-120* | | | |
| **Matrix Spike Dup (EB42312-MSD1)** | **Source: 4B18007-14** | | | Prepared: 02/23/04 Analyzed: 02/24/04 | | | | | | |
| Benzene | 93.1 | | ug/kg | 100 | ND | 93.1 | 80-120 | 0.962 | 20 | |
| Toluene | 88.2 | | " | 100 | ND | 88.2 | 80-120 | 1.46 | 20 | |
| Ethylbenzene | 88.1 | | " | 100 | ND | 88.1 | 80-120 | 1.24 | 20 | |
| Xylene (p/m) | 173 | | " | 200 | ND | 86.5 | 80-120 | 1.15 | 20 | |
| Xylene (o) | 88.6 | | " | 100 | ND | 88.6 | 80-120 | 2.75 | 20 | |
| *Surrogate: a,a,a-Trifluorotoluene* | *89.5* | | " | *100* | | *89.5* | *80-120* | | | |
| *Surrogate: 4-Bromofluorobenzene* | *102* | | " | *100* | | *102* | *80-120* | | | |

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## General Chemistry Parameters by EPA / Standard Methods - Quality Control

## Environmental Lab of Texas

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch EB41901 - % Solids** | | | | | | | | | | |
| **Blank (EB41901-BLK1)** | | | | Prepared & Analyzed: 02/19/04 | | | | | | |
| % Solids | 100 | 1.0 | % | | | | | | | |
| **Duplicate (EB41901-DUP1)** | | **Source: 4B18001-01** | | Prepared & Analyzed: 02/19/04 | | | | | | |
| % Solids | 88.0 | 1.0 | % | | 87.0 | | | 1.14 | 20 | |

| | | |
|---|---|---|
| Kane Environmental (Midland) | Project: Moon SIP | Fax: (432) 689-7785 |
| 4713 Rosewood Drive | Project Number: 04-106 | **Reported:** |
| Midland TX, 79707 | Project Manager: Deb Lambertson | 02/24/04 15:47 |

## Notes and Definitions

| | |
|---|---|
| S-06 | The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's. |
| S-04 | The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect. |
| J | Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag). |
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |





Roland K. Tuttle

Quality Assurance Review



12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

# Environmental Lab of Texas

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

*CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST*

Project Manager: Deb Lambertson
Company Name: Kane Environmental
Company Address: 4713 Rosewood Drive
City/State/Zip: Midland TX 79707
Telephone No: 432-689-8675 Fax No: 432-689-7785
Sampler Signature:

Project Name: Moon SIP
Project #: 04-106
Project Loc: Lea County, NM
PO #:

| LAB # (lab use only) 418007 | FIELD CODE | Date Sampled | Time Sampled | No. of Containers 4oz glass | Preservative: Ice | Preservative: $HNO_3$ | Preservative: HCl | Preservative: NaOH | Preservative: $H_2SO_4$ | Preservative: None | Preservative: Other (Specify) | Matrix: Water | Matrix: Sludge | Matrix: Soil | Matrix: Other (specify) | Analyze For: TCLP: TPH: 418.1 8015M 1005 1006 | Analyze For: TOTAL: Cations (Ca, Mg, Na, K) | Anions (Cl, SO4, CO3, HCO3) | SAR / ESP / CEC | Metals: As Ag Ba Cd Cr Pb Hg Se | Volatiles | Semivolatiles | BTEX 8021B/5030 or BTEX 8260 | RCI | N.O.R.M. | TPH DRO/GRO | | | | | RUSH TAT (Pre-Schedule) | Standard TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -01 | Comp 1 0-1' | 2/17/04 | 11:45 | 1 | X | | | | | | | | | X | | | | | | | | | X | | | X | | | | | | |
| -02 | B-6 0-2' | 2/17/04 | 14:30 | 1 | | | | | | | | | | X | | | | | | | | | X | | | X | | | | | | |
| -03 | B-7 0-2' | 2/17/04 | 1445 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -04 | B-8 0-2' | 2/17/04 | 1500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -05 | B-9 0-2' | 2/17/04 | 1510 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -06 | B-10 0-2' | 2/17/04 | 1520 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -07 | B-11 0-2' | | 1530 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -08 | B-12 0-2' | | 1545 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -09 | B-13 0-2' | | 1555 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -10 | B-14 0-2' | | 1605 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Special Instructions: Today Turnaround mand
dlambertson@earthlink.net

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| | 2/18/04 | 07:00 | | | |
| Relinquished by: Deb Lambertson | Date 2/18/04 | Time 7:00 | Received by ELOT: Jeanne McMurrey | Date 2/18/04 | Time 1042 |

Sample Containers Intact? Y N
Temperature Upon Receipt: -3, 0°C
Laboratory Comments:

# Environmental Lab of Texas

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Rob Landreth
Company Name: Jones Environmental
Company Address: 4713 Rosewood Drive
City/State/Zip: Midland TX 79707
Telephone No: 432-689-8675 Fax No: 432-689-7785
Sampler Signature:

Project Name: Mesa SW
Project #: 04-106
Project Loc: Lea County, NM
PO #:

| LAB # (lab use only) | FIELD CODE | Date Sampled | Time Sampled | No. of Containers | Preservative: Ice | HNO3 | HCl | NaOH | H2SO4 | None | Other (Specify) | Matrix: Water | Sludge | Soil | Other (specify): | Analyze For: TCLP: TPH: 418.1 8015M 1005 1006 | Cations (Ca, Mg, Na, K) | Anions (Cl, SO4, CO3, HCO3) | SAR / ESP / CEC | Metals: As Ag Ba Cd Cr Pb Hg Se | Volatiles | Semivolatiles | BTEX 8021B/5030 or STEX 8260 | RCI | N C R M | TOTAL: TPH 1005 (GRO) | | | | | RUSH TAT (Pre-Schedule) | Standard TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4B18007 | | | | 4 each/ss | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -11 | B15 0-2 | 2/17 | 1610 | 1 | X | | | | | | | | | X | | | | | | | | X | | | X | | | | | | | |
| -12 | Comp 2 0-2 | ↓ | 1630 | ↓ | ↓ | | | | | | | | | ↓ | | | | | | | | ↓ | | | ↓ | | | | | | | |
| -13 | Comp 3 0-2 | | 1645 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -14 | B22 0-2 | ↓ | 1650 | ↓ | ↓ | | | | | | | | | ↓ | | | | | | | | ↓ | | | ↓ | | | | | | | |

Special Instructions:
7 Day Turnaround max

Sample Containers Intact? Y N
Temperature Upon Receipt: -3.0°
Laboratory Comments:

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| | 2/18/04 | 0700 | | | |
| Relinquished by: | Date | Time | Received by ELOT: | Date | Time |
| | 2/18/04 | 7:00 | Jason McKinney | 2/18/04 | 1042 |

# Environmental Lab of Texas
## Variance / Corrective Action Report – Sample Log-In

Client: Kane Environmental

Date/Time: 02-18-04 @ 1100

Order #: 4818007

Initials: JMA

### Sample Receipt Checklist

| | | | |
|---|---|---|---|
| Temperature of container/cooler? | (Yes) | No | -3.0 C |
| Shipping container/cooler in good condition? | (Yes) | No | |
| Custody Seals intact on shipping container/cooler? | Yes | No | (Not present) |
| Custody Seals intact on sample bottles? | Yes | No | (Not present) |
| Chain of custody present? | (Yes) | No | |
| Sample Instructions complete on Chain of Custody? | (Yes) | No | |
| Chain of Custody signed when relinquished and received? | (Yes) | No | |
| Chain of custody agrees with sample label(s) | (Yes) | No | |
| Container labels legible and intact? | (Yes) | No | |
| Sample Matrix and properties same as on chain of custody? | (Yes) | No | |
| Samples in proper container/bottle? | (Yes) | No | |
| Samples properly preserved? | (Yes) | No | |
| Sample bottles intact? | (Yes) | No | |
| Preservations documented on Chain of Custody? | (Yes) | No | |
| Containers documented on Chain of Custody? | (Yes) | No | |
| Sufficient sample amount for indicated test? | (Yes) | No | |
| All samples received within sufficient hold time? | (Yes) | No | |
| VOC samples have zero headspace? | (Yes) | No | Not Applicable |

Other observations:

_____

_____

_____

### Variance Documentation:

Contact Person: - _____ Date/Time: _____ Contacted by: _____

Regarding:

_____

_____

_____

Corrective Action Taken:

_____

_____

_____

_____

_____

_____

_____

_____