# 2R - ___423___

# WORKPLANS

# DATE:
# 2010 - Present

Enterprise Products™

July 9, 2010

ENTERPRISE PRODUCTS PARTNERS LP
ENTERPRISE PRODUCTS OPERATING LLC

ENTERPRISE PRODUCTS GP, LLC, GENERAL PARTNER
ENTERPRISE PRODUCTS OLPGP, INC., SOLE MANAGER

Return Receipt Requested
7009 3410 0001 6448 5235

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RECEIVED OCD
2010 JUL 12 A 11:05

**RE: Corrective Action Work Plan - Trunk A Separator**
**Off Carrasco Gillock Road**
**Carlsbad, Eddy County, New Mexico**

Dear Mr. Chavez:

Enterprise Products Operating LLC (Enterprise) is submitting the enclosed *Corrective Action Work Plan* dated July 1, 2010 for the Trunk A Separator located in Carlsbad, New Mexico. Field investigation activities were conducted in November 2009, and included the advancement of one (1) soil boring (B-1) in the vicinity of the former storage tank battery containment area to a depth of 100 feet below ground surface (bgs). Based on laboratory analytical results from soil borings B-1, total benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations were detected at 280 milligrams per kilogram (mg/Kg) at a depth of 56 to 57 feet bgs which exceeds the New Mexico OCD's Remediation Action Level.

The scope of work within the *Corrective Action Work Plan* includes six (6) additional soil borings to a depth of 100 feet bgs to further delineate the extent of the impacted onsite soils. The borings will be advanced within and around the perimeter of the former onsite storage tank battery. Following the completion of the additional soil borings and receipt of analytical data Enterprise plans to excavate approximately 1,100 cubic yards of soil (approximate dimensions being 60 ft long by 25 ft wide and 20 ft deep) from the former storage tank battery containment area. Following the completion of the excavation activities, the petroleum hydrocarbon affected soils will be treated with the direct application of a bioremediation agent/water mixture to enhance natural attenuation of the petroleum hydrocarbons, chemically oxidize organic compounds, and stimulate naturally occurring bacteria in the on-site soils. Upon completion of excavation activities and receipt of confirmation sample analyses an impermeable polyethylene liner will be installed in the floor of the excavation to prevent the future vertical infiltration of moisture through the affected soils left in-place and to further protect the initial groundwater-bearing unit during the natural attenuation process. The treated soil will be backfilled into the excavation once confirmation samples indicate that treated soils are below OCD Remediation Action Levels and request site closure.

We plan to conduct this work during the third quarter of this year and the NMOCD will be updated once the schedule is finalized. Should you have any question or concerns with the proposed work plan or need additional information please contact me at (713) 381-8327 or Rodney Sartor at (713) 381-6629.

Sincerely,

Russell Gregg
Environmental Scientist

Rodney Sartor
Manager Remediation

/bjm
cc: Jennifer Corser - Enterprise
Chris Mitchell – Southwest Geoscience

Southwest
GEOSCIENCE
8829 Tradeway Street
San Antonio, Texas 78217
Ph: (210) 804-9922
Fax: (210) 804-9944

July 6, 2010

New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Attention: Mr. Carl J. Chavez, CHMM

Re: **Corrective Action Work Plan**
Trunk A Separator
Off Gillock Road
Carlsbad, Eddy County, New Mexico

Mr. Chavez,

On behalf of Enterprise Products Operating, LLC (Enterprise), Southwest Geoscience (SWG) has prepared this corrective action work plan for the above referenced facility in accordance with the technical requirements for Small Landfarms under 19.15.36 New Mexico Administrative Code (NMAC). A topographic map depicting the location of the Site is attached as Figure 1 and a Site Vicinity Map is attached as Figure 2. In addition, a Site Plan indicating the approximate location of pertinent structures and past/proposed field activities is attached as Figure 3.

During previous investigation activities, SWG identified total BTEX (benzene, toluene, ethylbenzene, and xylenes) and TPH concentrations in a soil sample collected from 56 to 57 feet below ground surface (bgs) at the Site in exceedance of the Oil Conservation Division's (OCD) *Remediation Action Levels*. To further evaluate the identified TPH concentrations at the Site, SWG utilized the published *American Petroleum Institute (API) Spreadsheet for Calculating Risk-Based Screening Levels* and the inverse weighted average (TPH Mass Fractions of aliphatic and aromatic hydrocarbons) to establish a Site Specific RBSL for the complete TPH mixture (i.e., the whole product). The identified TPH concentration did not exceed the *Site Specific Risk-Based Screening Level*. Constituent concentrations were compared to the OCD's *Remediation Action Levels* for Sites having a total ranking score of zero (0). Soil sample intervals and soil sample analytical results are presented on Table 1 and Table 2 (attached).

The water table at the Site is estimated as being approximately 100 to 200 feet bgs. The Site is not located within 200 feet of a watercourse, lakebed, sinkhole, or playa lake; within an existing well head protection area or 100-year floodplain; within 500 feet of a wetland; within an area overlaying a subsurface mine; within 500 feet of a permanent residence, school, hospital, institution or church in existence at the time of initial application; or within an unstable area.

Based on the results of previous investigation activities, SWG will advance six (6) additional soil borings to a depth of approximately 100 feet bgs to further evaluate the magnitude and extent of petroleum hydrocarbons in the on-Site soils. The soil borings will be advanced on each side and within the former on-site storage tank battery. One (1) soil sample will be collected form any of the following locations: the zone exhibiting the highest concentration of volatile organic compounds (VOC's) based on visual, olfactory, or photoionization detector (PID) evidence; from the capillary fringe zone; from a change in lithology; or from the bottom of the boring. The soil samples will be submitted for laboratory analysis of TPH GRO/DRO and BTEX (utilizing EPA method SW-846 #8015M and #8021B, respectively) to determine if additional areas are impacted above the OCD *Remediation Action Levels*.

As part of the proposed corrective action, SWG will direct the excavation of an estimated 1,100 cubic yards of soil with approximate dimensions being 60 feet long by 25 feet wide and 20 feet deep within the former storage tank battery area. It should be noted that the volume of soil to be excavated and treated may be expanded based on the results of the proposed supplemental investigation activities. The excavated soils will be screened for the presence of VOC using a PID. The final extent of the excavation will be determined based on the visual, olfactory, and/or PID evidence during field excavation activities. Due to the nature of the unconsolidated alluvial soils (Piedmont alluvial deposits) identified at the Site, the soils >20 feet bgs are not considered readily accessible for excavation due to structural and safety considerations. Therefore, the excavation will be lined with impermeable polyethylene sheeting to inhibit the future vertical migration of moisture through the affected soil left in place and further protect the initial groundwater-bearing unit during the natural attenuation of COCs.

Prior to the commencement of field excavation activities, a berm will be constructed around the proposed treatment area and excavation to prevent stormwater run-on and run-off. In addition, a sign will be posted at this facility (which can be read from 50 feet away) that will include the operator's name, location by unit letter, section, township and range, and an emergency contact telephone number. Records reflecting the generator, the location of origin, the volume, type of waste, and the date of generation from soils treated on-site will be maintained and be readily accessible for division personnel inspection.

The excavated soils will be staged on the adjacent ground surface and spread to a max depth of eight (8) inches for subsequent treatment with a bioremediation agent (*Remedy*) within 72 hours of removal. Earth moving equipment and hand tools will be utilized to till excavated soils to enhance infiltration of the bioremediation agent and exposure of chemicals of concern (COCs) to oxygen. Remedy introduces nonpathogenic bacterial strains designed to metabolize petroleum hydrocarbons. It also enhances microbial activity thereby accelerating the biodegradation of organic contaminates. The agent delivery system will consist of a water truck or similar equipment such as a portable tank, a gas-powered water pump to distribute agent, and rubber hoses to allow for mobile and area specific application. The treated soils will be temporarily left in place to allow for optimal aeration and biodegradation of COCs. In the interim, the excavation will be fenced off to prevent accidental slips or falls into the excavation.

Upon completion of excavation activities, up to seven (7) discrete soil confirmation samples will be collected from the excavation sidewalls and floor. In addition, up to twenty (20) soil confirmation samples will be collected from the treated soils, using hand augering equipment, pursuant to the time and environmental conditions required for optimal biodegradation of COCs. It should be noted that the number of confirmation samples collected from the excavation and treated soils may be increased based on the results of the proposed supplemental investigation activities and/or the final volume of soil excavated at the Site. The confirmation samples will be submitted for laboratory analysis of TPH GRO/DRO and BTEX utilizing EPA method SW-846 #8015M and #8021B, respectively. In addition, the confirmation samples will be submitted for analysis of Chlorides using EPA method 300.1. The confirmation samples will be compared to NMAC *closure performance standards* of: 0.2 mg/Kg for benzene, 50 mg/Kg for total BTEX, 500 mg/Kg for TPH GRO/DRO combined fraction, and 500 mg/Kg for Chlorides.

The treated soils will be returned to the excavation subsequent to the attainment of the NMAC *closure performance standards* for small landfarms. Earthen berms, fencing, roads, and equipment in place as part of the small landfarm will be removed (as applicable). In addition, disturbed areas will be revegetated to their previous state. Furthermore, one (1) vadose zone soil sample will be collected from three (3) to five (5) feet below the middle of

treatment area and submitted for TPH GRO/DRO and BTEX analysis and comparison under the afore mentioned *closure performance standards*.

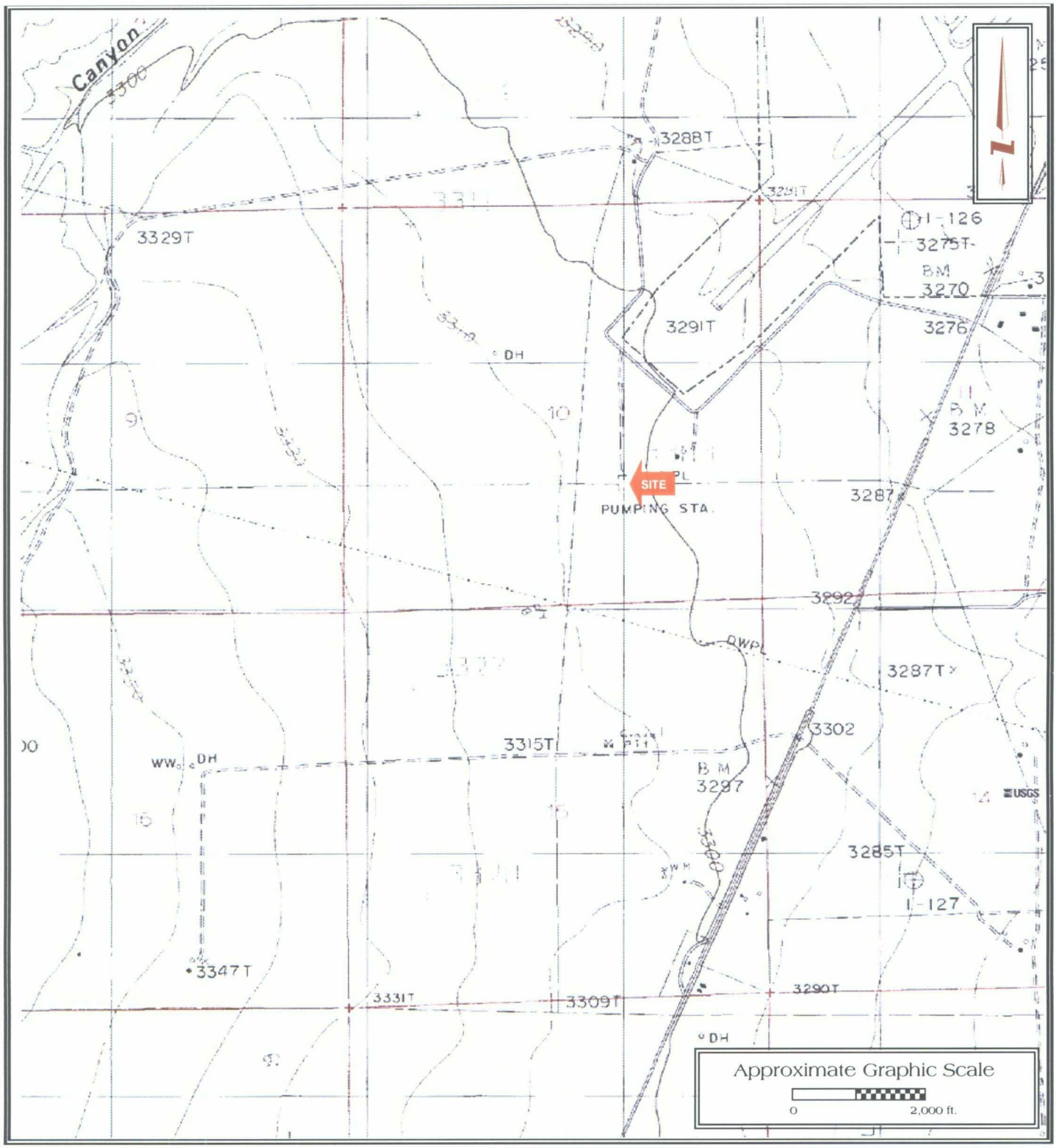
Upon conclusion of field activities and attainment of *closure performance standards* for treated soils, a final closure report will be prepared that will include: documentation of field activities; corrective actions; site plans and maps detailing pertinent site features and field activity locations; photographic documentation of field activities and the closed site; and laboratory analytical results from confirmation samples. The final closure report will be submitted to the bureau division's Santa Fe office. SWG estimates that the proposed supplemental investigation activities will require approximately 4 working days to complete. In addition, it is estimated that field excavation and treatment activities will require approximately 2 to 3 working days to complete. The precise date on which excavation activities will commence is contingent upon contractor availability, weather, and field operations logistics. However, SWG will verify the work schedule of the proposed excavation activities with the OCD at least 72 hours in advance, once established. It is estimated that treated soils will require approximately 6 to 8 weeks to aerate and allow for a thorough biodegradation process. However, soils that cannot be successfully remediated within 3 years will be removed from the Site and disposed of at a division approved surface waste facility.

Should you have any questions or concerns regarding this work plan or otherwise, please contact either of the undersigned at your earliest convenience.

Sincerely,

Joseph W. Martinez
Project Manager

B. Chris Mitchell, P. G.
Principal

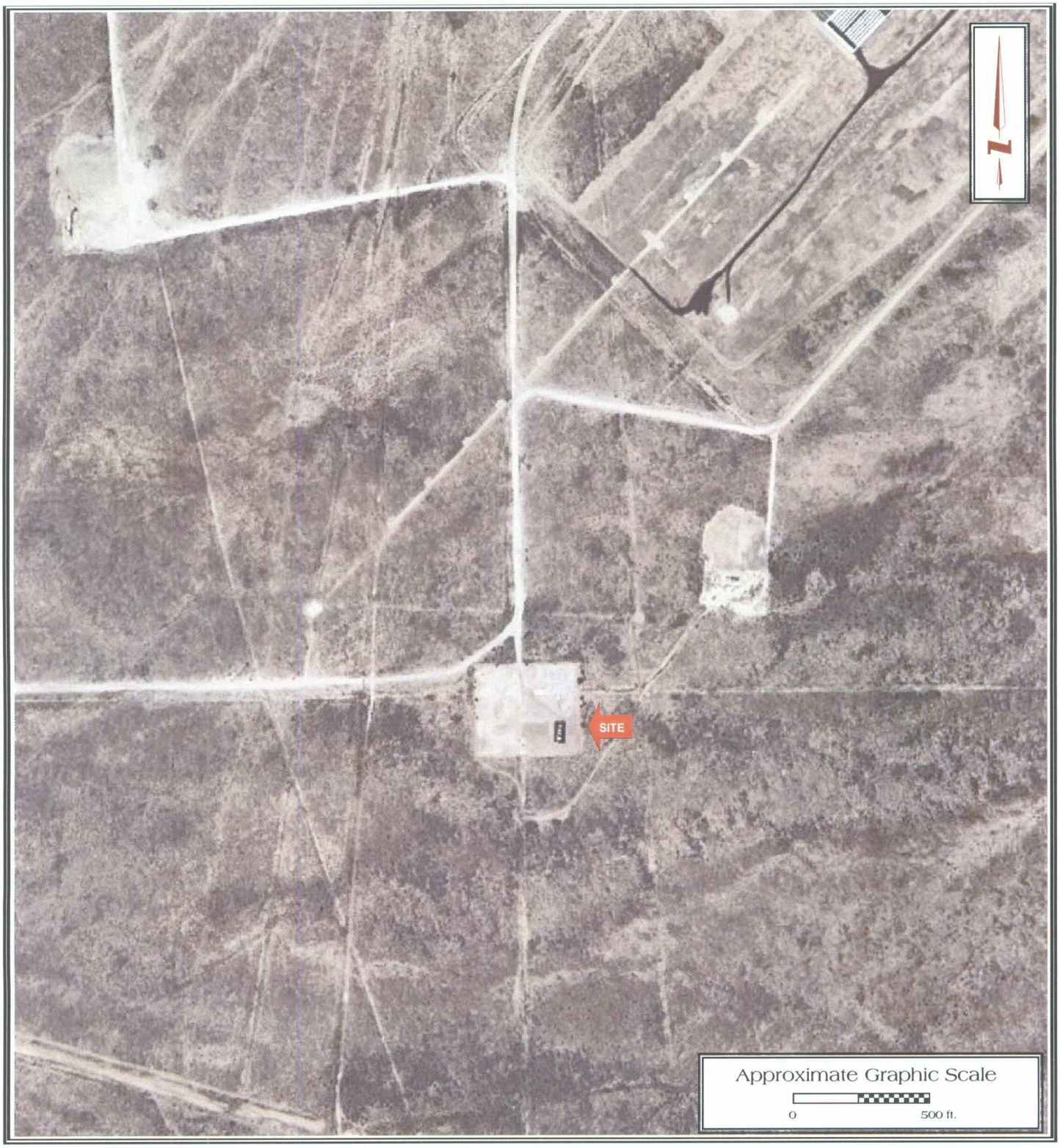



Corrective Action Work Plan
Trunk A Separator
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico

SWG Project No. 0210002

Southwest GEOSCIENCE

FIGURE 1
Topographic Map
Kitchen Cove, NM Quadrangle
Contour Interval - 10 Feet

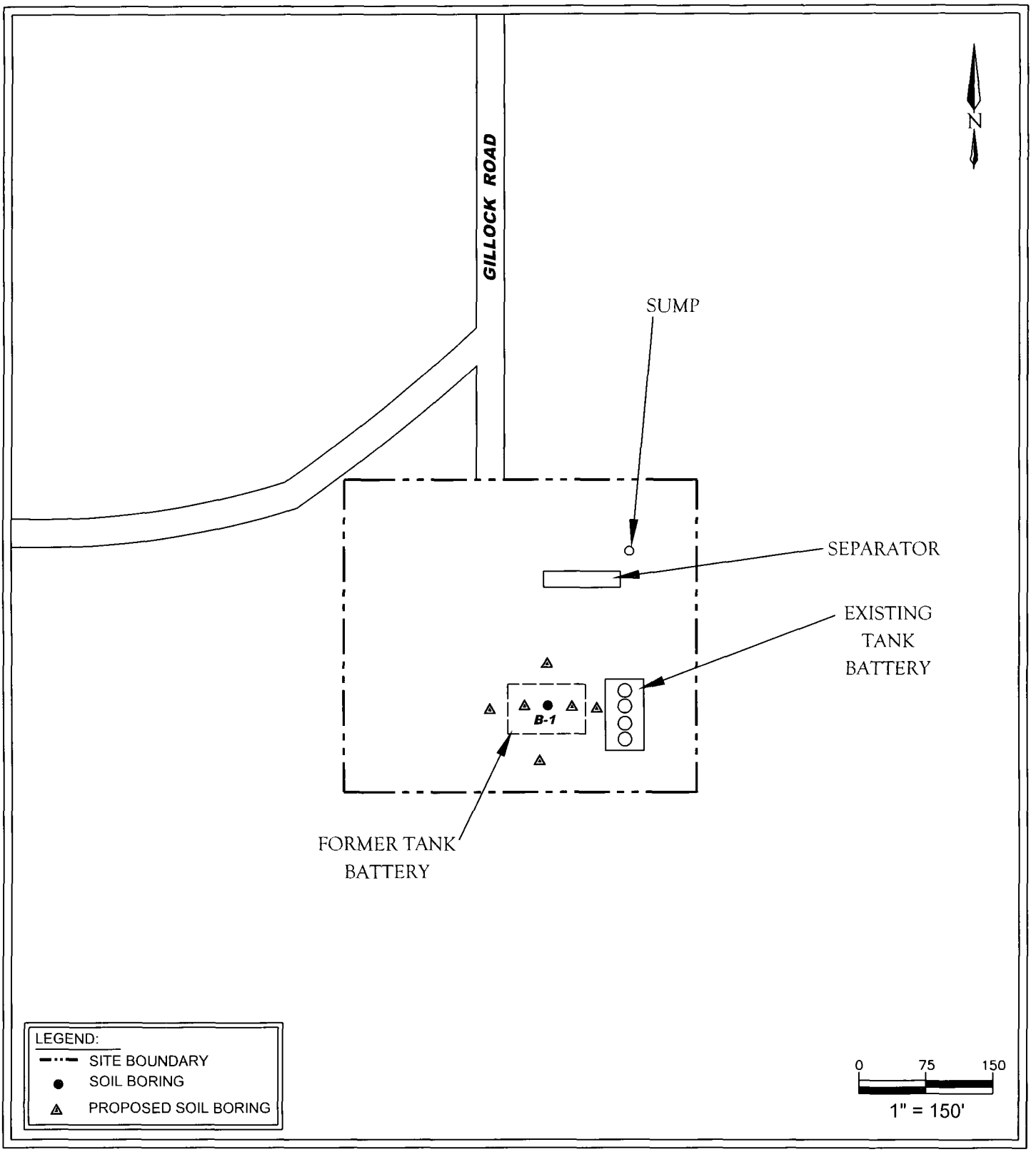



Corrective Action Work Plan
Trunk A Separator
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico

SWG Project No. 0210002

Southwest GEOSCIENCE

FIGURE 2
Site Vicinity Map
2009 Aerial Photograph




**Corrective Action Work Plan**
**Trunk A Separator**
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico

SWG Project No. 0210002

Southwest GEOSCIENCE

FIGURE 3

SITE PLAN

Southwest GEOSCIENCE

## TABLE 1
SOIL ANALYTICAL RESULTS

| Sample I.D. | Date | Sample Depth (feet) | Benzene (mg/kg) | Toluene (mg/kg) | Ethylbenzene (mg/kg) | Xylenes (mg/kg) | Total BTEX (mg/kg) | TPH GRO (mg/kg) | TPH DRO (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| New Mexico Energy, Minerals & Natural Resources Department, Oil Conservation Division, Remediation Action Level | | | 10 | NE | NE | NE | 50 | 5,000 | |
| Non-Residential Site Specific Risk-Based Screening Level | | | NE | NE | NE | NE | NE | 72,000 | |
| B-1 | 11/5/2009 | 13 to 14 | 0.063 (j) | 6 | 0.21 | 35 | 41 | 250 | 1,600 |
| | 11/5/2009 | 56 to 57 | 3.2 | 35 | 12 | 230 | 280 | 2,100 | 4,000 |
| | 11/5/2009 | 99 to 100 | <0.0017 | <0.0018 | <0.0019 | 0.011(j) | 0.011(j) | 0.32 | 70 |

Note: Concentrations in bold and yellow exceed the applicable OCD Remediation Action Level

NE = Not Established

## TABLE 2
SOIL ANALYTICAL RESULTS
PETROLEUM HYDROCARBON MASS FRACTIONS

| Sample ID | Date | Sample Depth | (TX 1005) TPH Result $C_6$ - $C_{35}$ (mg/Kg) | Hydrocarbon Fraction | Observed Concentration (mg/Kg) | Mass Fraction (mg/Kg) | Mass Fraction Total |
|---|---|---|---|---|---|---|---|
| B-1 | 11.5.09 | 56 to 57 | <60 | Aliphatic C6 | <67 | 0.00E+00 | 1.00E+00 |
| | | | | Aliphatic C6-C8 | 120.0 | 2.80E-02 | |
| | | | | Aliphatic >C8-C10 | 1,590.0 | 3.71E-01 | |
| | | | | Aliphatic >C10-C12 | 430.0 | 1.00E-01 | |
| | | | | Aliphatic >C12-C16 | 950.0 | 2.21E-01 | |
| | | | | Aliphatic >C16-C21 | 410.0 | 9.56E-02 | |
| | | | | Aliphatic >C21-C35 | 620.0 | 1.45E-01 | |
| | | | | Aromatic C7-C8 | <67 | 0.00E+00 | |
| | | | | Aromatic >C8-C10 | <67 | 0.00E+00 | |
| | | | | Aromatic >C10-C12 | <67 | 0.00E+00 | |
| | | | | Aromatic >C12-C16 | <67 | 0.00E+00 | |
| | | | | Aromatic >C16-C21 | <67 | 0.00E+00 | |
| | | | | Aromatic >C21-C35 | 170.0 | 3.96E-02 | |

Enterprise Products™



March 5, 2010

ENTERPRISE PRODUCTS PARTNERS LP
ENTERPRISE PRODUCTS OPERATING LLC

ENTERPRISE PRODUCTS GP, LLC, GENERAL PARTNER
ENTERPRISE PRODUCTS OLPGP, INC., SOLE MANAGER

**Return Receipt Requested**
**7009 1680 0001 0284 4851**

Sherry Bonham
New Mexico Oil Conservation Division District 2
1301 W. Grand Avenue
Artesia, New Mexico 88210

**Re: Stage 1 & 2 Abatement Plan**
**Enterprise Field Services, LLC**
**Trunk A Separator**
**Carlsbad, Eddy County, New Mexico**

Dear Ms. Bonham:

Enterprise Field Services, LLC (Enterprise) is submitting the enclosed *Stage 1 Abatement Report & Stage 2 Abatement Plan,* dated January 29, 2010 for the Enterprise Trunk A Separator. This facility is located off of Gillock Road, approximately eight miles southwest of Carlsbad, New Mexico. The Site is an approximate 2.8-acre separation facility associated with an Enterprise natural gas gathering system. The facility was acquired from Gulf Terra Energy Partner, L.P. and included four five hundred barrel storage tanks that stored liquids separated from the natural gas stream. The objective of the Stage 1 Abatement investigation activities was to evaluate the presence, magnitude, and extent of petroleum hydrocarbons in the on-site soil and groundwater (if encountered) in the vicinity of the former storage tank battery. Also, enclosed is the Stage 2 Abatement Plan which documents remedial actions recommended for clean up of the site to applicable regulatory levels.

Field investigation activities were conducted in November 2009, and included the advancement of one (1) soil boring (B-1) in the vicinity of the former storage tank battery containment area to a depth of 100 feet below ground surface (bgs). Soil samples from soil borings B-1 were compared to the New Mexico Oil Conservation Division Remediation Action Levels for sites having a Total Ranking Score of zero. Based on laboratory analytical results, total benzene, toluene, ethylbenzene and xylenes (BTEX) concentration were detected at 280 milligrams per kilogram (mg/Kg) in the soil sample collected at a depth of 56 to 57 feet bgs exceeds the New Mexico OCD's Remediation Action Level.

Based on the results, supplemental site investigation activities will be conducted to further evaluate the magnitude and extent of petroleum hydrocarbons in the subsurface soil. Enterprise proposes to advance six soil borings to a depth of approximately 100 feet bgs. Four (4) of the soil borings will be advanced adjacent to the north, south, east, and west boundaries of the former storage tank battery, and two (2) borings will be advanced within the former tank battery containment area. Soil samples from each soil boring will analyzed for TPH GRO/DRO and BTEX to determine if soils are impacted above OCD Remediation Action Levels.

Following completion of the supplemental site investigation, Stage 2 Abatement activities will include the excavation of approximately 1,100 cubic yards of soil (approximate dimensions being 60 ft long by 25 ft wide and 20 ft deep) from the former storage tank battery containment area. Following the completion of the excavation activities, the petroleum hydrocarbon affected soils will be treated with the direct

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713.381.6500

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HOUSTON, TX 77002-5227
www.epplp.com

application of a bioremediation agent/water mixture to enhance natural attenuation of the petroleum hydrocarbons, chemically oxidize organic compounds, and stimulate naturally occurring bacteria in the on-site soils. Upon completion of excavation activities and receipt of confirmation sample analyses an impermeable polyethylene liner will be installed in the floor of the excavation to prevent the future vertical infiltration of moisture through the affected soils left in-place and to further protect the initial groundwater-bearing unit during the natural attenuation process. The treated soil will be backfilled into the excavation once confirmation samples indicate that treated soils are below OCD Remediation Action Levels and request site closure.

We plan to conduct this work during the second quarter of this year and the NMOCD will be updated once the schedule is finalized. Should you have question concerning these findings or recommendations or need additional information please contact me at (713) 381-8327 or Rodney Sartor at (713) 381-6629.

Sincerely,

Russell Gregg
Environmental Scientist

Rodney Sartor
Manager Remediation

Cc: Jennifer Corser - Enterprise
Chris Mitchell – Southwest Geoscience
Rodney Sartor - Enterprise

# STAGE 1 ABATEMENT REPORT AND STAGE 2 ABATEMENT PLAN

Property:

Trunk A Separator
Off Gillock Road
Carlsbad, Eddy County, New Mexico

February 24, 2010
SWG Project No. 0210002

Prepared for:

Enterprise Products Operating, LLC
PO Box 4324
Houston, Texas 77210-4324
Attn: Mr. Russell D. Gregg

Prepared by:

Joseph W. Martinez
Project Manager

B. Chris Mitchell, P.G.
Principal Geoscientist

Southwest
GEOSCIENCE
8829 Tradeway Street
San Antonio, Texas 78217
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## LIST OF APPENDICES

# STAGE 1 ABATEMENT REPORT AND STAGE 2 ABATEMENT PLAN

## Trunk A Separator
## Off Gillock Road
## Carlsbad, Eddy County, New Mexico

## SWG Project No. 0210002

## 1.0 EXECUTIVE SUMMARY

Southwest Geoscience (SWG) has prepared this Stage 1 Abatement Report and Stage 2 Abatement Plan for the purpose of detailing the results of site investigation activities conducted at the Enterprise Products Operating, LLC (Enterprise) Trunk A Separator, referred to hereinafter as the "Site" or "subject Site", and to develop a plan for abatement of identified chemicals of concern (COCs) to levels below the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), Oil Conservation Division (OCD) *Remediation Action Levels* using the New Mexico EMNRD OCD *Guidelines for Remediation of Leaks, Spills and Releases* as guidance.

The Site is located off Gillock Road, approximately eight (8) miles southwest of Carlsbad, New Mexico. The Site is an approximate 2.8-acre separation facility associated with an Enterprise natural gas gathering system.

The objective of the Stage 1 Abatement investigation activities was to evaluate the presence, magnitude, and extent of petroleum hydrocarbons in the on-Site soil and groundwater (if encountered) in the vicinity of the former storage tank battery. A summary of the investigation and findings is presented below:

- The Site is currently utilized as commercial/industrial (non-residential) land use. No registered wells within one-half (1/2) mile of the Site, and no beneficial use of aquifers/groundwater sources, unregistered water wells or sensitive human and ecological receptors were observed within a 500-foot (ft) radius of the Site.

- One (1) soil boring was advanced at the Site during the completion of the investigation activities. Soil boring B-1 was advanced within the former tank battery containment area to a depth of 100 ft below ground surface (bgs). No ground water was encountered in the soil boring. Based on SWG's review of the laboratory analytical results, the total BTEX concentration of 280 mg/Kg identified in the soil sample collected at a depth of 56 to 57 feet bgs exceeds the OCD's *Remediation Action Level.*

Based on the findings of the Stage 1 site investigation activities, SWG proposes a supplemental site investigation to further evaluate the magnitude and extent of petroleum hydrocarbons in the on-Site soil. The scope of the proposed supplemental investigation includes the advancement of six (6) soil borings to a depth of approximately 100 feet bgs in the vicinity of the former storage tank battery. Soil samples will be collected continuously to document lithology, color, relative moisture content and visual or olfactory evidence of petroleum hydrocarbons, scanned with a photoionization detector (PID) for the presence of volatile organic compounds (VOCs), and soil samples collected from each soil boring for analysis of TPH GRO/DRO and BTEX to determine if soils are impacted above OCD *Remediation Action Levels.*

To abate COCs in soil and further eliminate potential exposure pathways including ingestion, inhalation, dermal contact and groundwater protection, SWG has developed a Stage 2 Abatement Plan. The objective of the proposed abatement activities is to reduce the concentration of COCs in surface soil to below the OCD *Remediation Action Levels* and inhibit the future vertical migration of COCs in soils which will remain in-place, allowing COCs to naturally attenuate. A summary of the proposed Stage 2 Abatement Plan is provided below:

- Excavate and treat approximately 1,100 cubic yards of soil (approximate dimensions being 60 ft long by 25 ft wide and 20 ft deep) from the former storage tank battery containment area, which eliminates potential exposure pathways including ingestion, dermal contact and/or volatilization and inhalation of COCs from the petroleum hydrocarbons affected surface soils;

- Due to the nature of the unconsolidated alluvial soils identified at the Site, the soils >20 feet bgs are not considered readily accessible for excavation due to structural and safety considerations; and,

- Install an impermeable polyethylene sheeting liner in the floor of the excavation to inhibit the future vertical infiltration of moisture through the petroleum hydrocarbon affected soils left in-place, to further protect the initial groundwater-bearing unit during the natural attenuation of COCs in soil. SWG anticipates COCs left in-place in soil will naturally attenuate overtime through adsorption, desorption, dispersion, diffusion, biodegradation, and abiotic degradation.

## 2.0 INTRODUCTION

### 2.1 Site Description

The Site is located off Gillock Road, approximately eight (8) miles southwest of Carlsbad, New Mexico. The Site is an approximate 2.8-acre separation facility associated with an Enterprise natural gas gathering system. During the completion of routine maintenance and pigging[1] operations, condensate and produced water, which accumulate in the subject gathering pipeline system, are separated from the natural gas stream at the Site. The liquids separated from the natural gas stream are stored in the on-site storage tanks pending off-site disposal. Prior to the construction of the current storage tank battery, which consists of four (4) 500-barrel storage tanks within a lined secondary containment, liquids were stored in storage tanks located on the south-central portion of the Site.

A topographic map depicting the location of the Site is included as Figure 1, and a Site Vicinity Map is included as Figure 2 in Appendix A.

[1] ***Pigging*** *in the maintenance of pipelines refers to the practice of using pipeline scrapper traps or 'pigs' to clean paraffin, produced liquids and debris from the interior of the pipeline. This is accomplished by inserting the pig into a 'pig launcher'. The launcher is then closed and the pressure of the product in the pipeline is used to push it along down the pipe until it reaches the receiving trap - the 'pig catcher'.*

## 2.2 Site Investigation Scope of Work

The objective of the Stage 1 Abatement activities was to evaluate the presence of petroleum hydrocarbons in the on-Site soil and groundwater (if encountered) as a result of historic operations.

The scope of work provided by SWG during the completion of Stage 1 Abatement activities included the following:

1) The advancement of one (1) soil boring within the former storage tank battery containment area to a depth of approximately one-hundred (100) ft below ground surface (bgs).

2) Conduct field screening during drilling operations utilizing a PID meter to evaluate the presence of volatile organic compounds (VOCs) and to assist in determining the soil sample locations.

3) Collect soil samples from the soil boring for analysis of Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO)/Diesel Range Organics (DRO) and benzene, toluene, ethylbenzene, and xylenes (BTEX) to determine if soil is impacted above applicable regulatory standards.

## 2.3 Standard of Care & Limitations

The findings and recommendations contained in this report represent SWG's professional opinions based upon information derived from the on-Site activities and other services performed under this scope of work and were arrived at in accordance with currently acceptable professional standards. The findings were based upon analytical results provided by an independent laboratory. Evaluations of the geologic conditions at the Site for the purpose of this investigation are made from a single data point (i.e. soil boring) and Site wide subsurface conditions may vary from this point. SWG makes no warranties, express or implied, as to the services performed hereunder. Additionally, SWG does not warrant the work of third parties supplying information used in the report (e.g. laboratories, regulatory agencies, or other third parties).

This report is based upon a specific scope of work requested by Enterprise Products Operating, LLC. The agreement between SWG and Enterprise Products Operating, LLC outlines the scope of work, and only those tasks specifically authorized by that agreement or outlined in this report were performed. This report has been prepared for the intended use of Enterprise Products Operating, LLC and their subsidiaries, and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the Site) is prohibited without the express written authorization of Enterprise Products Operating, LLC and SWG.

# 3.0 SITE CHARACTERIZATION

## 3.1 Geology & Hydrogeology

According to the New Mexico Bureau of Geology and Mineral Resource (*Geologic Map of New Mexico 2003*), the Site overlies Piedmont Alluvial deposits. This includes silts, sands, clays, gravel, sandstone, and conglomerates.

The lithology encountered during the advancement of soil boring B-1 included a silty sand from the surface to a depth of approximately 4 feet bgs. The silty sand was underlain by poorly sorted sand and gravel to a depth of approximately 82 feet bgs. A pale tan sandy silt was encountered from a depth of 82 to 95 feet bgs. The pale tan sandy silt stratum was underlain by a sandy silt with gravel to the terminus of the soil boring at 100 feet bgs.

The initial ground-water bearing unit in the vicinity of the Site is associated with the Piedmont Alluvial deposits. Based on the water wells completed in the regional vicinity of the Site, the depth to the initial groundwater-bearing unit in the vicinity of the site ranges from 205 to 236 feet bgs.

## 3.2 Sensitive Receptor Survey

During the completion of field activities, a sensitive receptor survey, which included a one-half (1/2) mile radius search for registered water wells and a 500-ft radius walking survey for unregistered water wells and potential sensitive human and ecological receptors, was performed in the vicinity of the Site.

A records inventory of water wells located within a one-half mile of the Site was completed and included as Appendix B. SWG searched the State of New Mexico, Office of the State Engineer, Well Logs for water wells located within Section 10, the SW¼ of Section 11, the NW¼ of Section 14 and the N½ of Section 15, which fall within a ½ mile radius of the Site. The results of the water well search conducted during the investigation activities did not identify the beneficial use of groundwater within a one-half (1/2) mile radius of the Site.

During the completion of the 500-foot receptor survey, SWG inspected the Site vicinity for dwellings, schools, hospitals, day care centers, nursing homes, businesses, and subsurface utilities located within 500 ft of the Site. In addition, sensitive receptors such as surface water bodies, parks, recreational areas, wildlife sanctuaries, and wetlands areas located within 500 ft of the Site were evaluated, if present. The Site is located within an agricultural rangeland and oil and gas production and storage setting. SWG did not observe the above referenced sensitive receptors within a 500-foot radius of the Site.

# 4.0 SITE INVESTIGATION

## 4.1 Soil Borings

On November 5, 2009, one (1) soil boring was advanced at the Site under the direction of SWG. Soil boring B-1 was advanced within the former storage tank battery containment area to a depth of 100 feet (ft) below bgs.

Figure 3 is a Site Plan that indicates the approximate location of the soil boring in relation to pertinent structures and land features (Appendix A). Photographic documentation is provided in Appendix C.

Soil boring B-1 was advanced using an air rotary drilling rig under the supervision of a State of New Mexico licensed water well driller. Soil samples were collected continuously. Soil samples were observed to document soil lithology, color, moisture content, and visual and olfactory evidence of petroleum hydrocarbons. Each soil sample was immediately divided into portions designated for field screening or laboratory analysis. Field headspace analysis was conducted by placing the portion of the soil sample designated for field screening into a plastic Ziplock bag. The plastic bag was sealed and then placed in a warm area to promote volatilization. The air above the sample, the headspace, was then evaluated using a PID capable of detecting VOCs. The PID was calibrated utilizing an isobutylene standard prior to use in the field.

During the completion of the soil boring, an on-Site geoscientist documented the lithology encountered and constructed a continuous profile of the soil column from the surface to the soil boring terminus. Soil samples from the soil boring were visually inspected and classified in the field. The lithology encountered during the advancement of soil boring B-1 included a brown silty sand to a depth of approximately four (4) ft bgs. The silty sand stratum was underlain by poorly sorted sand and gravel to a depth of approximately 82 ft bgs. A pale tan sandy silt was encountered from a depth of approximately 82 to 95ft bgs. A pale tan and gray sandy silt with very fine gravel was encountered from a depth of approximately 95 ft bgs to the terminus of the soil boring at 100 ft bgs. No groundwater was encountered in the boring. Detailed lithologic descriptions are presented on the soil boring logs included in Appendix D.

Petroleum hydrocarbon odors were noted from the surface to a depth of approximately 89 feet bgs. PID readings ranging from below the instruments detection limit to 623 parts per million (ppm) were detected in the soil samples collected from soil boring B-1. The highest PID reading was observed in the soil sample collected from a depth of 56 to 57 feet bgs in soil boring B-1. Field screening results are presented on the soil boring logs included in Appendix D.

## 4.2 Investigation Sampling Program

### 4.2.1 Soil Sampling Program

SWG's soil sampling program involved submitting three (3) soil samples from the soil boring for laboratory analysis. Soil samples were collected from the following intervals:

- One (1) soil sample was collected from the zone exhibiting the highest concentration of VOC's based on visual, olfactory or PID evidence in the upper 20 feet bgs;
- One (1) soil sample was collected from the zone exhibiting the highest concentration of VOC's based on visual, olfactory or PID evidence from a depth of >20 feet bgs; and,
- One (1) soil sample was collected from the bottom of the boring.

Soil sample intervals are presented with the soil sample analytical results (Table 1) in Appendix E and are provided on the soil boring logs included in Appendix D.

# 5.0 LABORATORY ANALYTICAL PROGRAM

## 5.1 Laboratory Analytical Methods

The soil samples collected from soil boring B-1 were analyzed for TPH GRO/DRO and BTEX utilizing EPA method SW-846 #8015 and #8021B, respectively.

Laboratory results are summarized in the tables included in Appendix E. The executed chain-of-custody form and laboratory data sheets are provided in Appendix F.

## 5.2 Quality Assurance/Quality Control (QA/QC)

Sampling equipment was cleaned using an Alconox® wash and potable water rinse prior to the beginning of the project and before the collection of each sample.

Soil samples were collected and placed in laboratory prepared glassware, sealed with custody tape and placed on ice in a cooler, which was secured with a custody seal. The sample coolers and completed chain-of-custody forms were relinquished to TestAmerica Laboratories, Inc.'s (TestAmerica) analytical laboratory in Corpus Christi, Texas for normal turnaround.

TestAmerica performed the analyses of samples under an adequate and documented quality assurance program to meet the project and data quality objectives. The laboratory's quality assurance program is generally consistent with the quality standards outlined in the National Environmental Laboratory Accreditation Program, as amended. In addition, the data generated by TestAmerica meets the intralaboratory performance standards for the selected analytical method and the performance standards are sufficient to meet the bias, precision, sensitivity, representativeness, comparability, and completeness, as specified in the project data quality objectives.

# 6.0 DATA EVALUATION

The Site is subject to regulatory oversight by the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), Oil Conservation Division (OCD). To address activities related to condensate releases, the New Mexico EMNRD OCD utilizes the *Guidelines for Remediation of Leaks, Spills and Releases* as guidance, in addition to the OCD rules, specifically NMAC 19.15.30 Remediation. These guidance documents establish investigation and abatement action requirements for sites subject to reporting and/or corrective action.

Based on SWG's review of Site characteristics (specifically: depth to groundwater, wellhead protection area and distance to surface water) an associated ranking score of zero (0) was determined for the Site in accordance with the *Guidelines for Remediation of Leaks, Spills and Releases*. Consequently, the OCD's *Remediation Action Levels* for the on-Site soils are 10 milligrams per kilogram (mg/Kg) benzene, 50 mg/Kg total BTEX and 5,000 mg/Kg TPH.

## 6.1 Soil Samples

SWG compared the petroleum hydrocarbon constituent concentrations identified in the on-Site soils to the OCD's *Remediation Action Levels* for sites having a Total Ranking Score of zero (0).

In addition, to further evaluate the identified TPH concentrations at the Site, SWG utilized the published *American Petroleum Institute (API) Spreadsheet for Calculating Risk-Based Screening Levels* and the inverse weighted average (TPH Mass Fractions) derived from the TPH Method TX 1006 analysis to establish Site Specific RBSL for the complete TPH mixture (i.e., the whole product), for each exposure pathway related to sediment. The *API Spreadsheet for Calculating Risk-Based Screening Levels* is provided in Appendix E.

The soil samples collected from soil boring B-1at a depth of 13 to 14 feet bgs and 99 to 100 feet bgs did not exhibit benzene, total BTEX or TPH concentrations above the OCD's *Remediation Action Levels*.

**Based on SWG's review of the laboratory analytical results, the total BTEX concentration of 280 mg/Kg identified in the soil sample collected at a depth of 56 to 57 feet bgs exceeds the OCD's *Remediation Action Level*.**

The results of the soil sample analytical results are summarized in Appendix E.

## 7.0 SUPPLEMENTAL INVESTIGATION

Based on the results of the initial investigation activities, supplemental site investigation activities will be conducted to further evaluate the magnitude and extent of petroleum hydrocarbons in the on-site soil.

### 7.1 Supplemental Site Investigation Scope of Work

SWG proposes the following scope of work as part of supplemental site investigation activities:

1) Advance six (6) soil borings to a depth of approximately 100 feet bgs. Four (4) of the soil borings will be advanced adjacent to north, south, east, and west of the former storage tank battery, and two (2) borings will be advanced within the former tank battery containment area.

2) Soil samples will be collected continuously to document lithology, color, relative moisture content, and visual or olfactory evidence of petroleum hydrocarbons. In addition, the samples will be scanned with a PID for the presence of VOCs.

3) Collect soil samples from each soil boring for analysis of TPH GRO/DRO and BTEX to determine if soils are impacted above OCD *Remediation Action Levels*.

## 8.0 ABATEMENT OF CONTAMINANTS

SWG has developed a Stage 2 Abatement Plan hereunder, at minimum, for the abatement of previously identified COCs. It should be noted that the scope of abatement activities (e.g.: volume of excavated and treated material) may be expanded based on the results of the proposed supplemental site investigation activities. The results of the supplemental site investigation activities will assist in defining the final parameters of abatement activities.

The abatement options evaluated to address the COCs identified at the Site were compiled based on the following assumptions:

1) The primary constituents with regard to proposed abatement actions at the Site are limited to BTEX; and

2) Due to the nature of the unconsolidated alluvial soils (Piedmont alluvial deposits) identified at the Site, the soils >20 feet bgs are not considered readily accessible for excavation due to structural and safety considerations. In accordance with the OSHA Excavation Standard, excavations completed in Type C Soils (Granular soils including gravel, sand, and loamy sand) must be sloped or benched at less than 34 degrees. Due to the presence of pipelines, storage tanks, separation equipment and related appurtenances and facilities, an insufficient area is available to facilitate an excavation deeper than 20 feet bgs.

## 8.1 Development & Assessment of Abatement Options

During the development of the Stage 2 Abatement Plan, SWG evaluated the following abatement options relative to the Site.

### Option No. 1 – Excavation, Treatment, Poly Liner Installation, & Natural Attenuation

Option No. 1 would include the excavation and treatment of readily accessible soils (<20 feet bgs) and the installation of an impermeable polyethylene liner to inhibit the vertical migration of COCs left in-place pending natural attenuation. Due to the nature of the unconsolidated alluvial soils identified at the Site, the soils >20 feet bgs are not considered readily accessible for excavation due to structural and safety considerations.

During the completion of the proposed excavation activities, an estimated 1,100 cubic yards of petroleum hydrocarbon affected soils, which extend to a depth of approximately 20 feet bgs, will be brought to the surface. The excavated soils will be transported directly from the excavation and spread in an approximate 1-foot lift on the southwestern portion of the Site.

Subsequent to the completion of excavation activities, the petroleum hydrocarbon affected soils will be treated utilizing the direct application of a bioremediation agent (Remedy®)/water mixture to enhance natural attenuation of the petroleum hydrocarbons, stimulate naturally occurring bacteria in the on-site soils, and introduce additional nonpathogenic bacterial strains designed to metabolize petroleum hydrocarbons. *Remedy* is a product that enhances microbial activity thereby accelerating the biodegradation of organic contaminants. *Remedy* introduces enzymes and microbial spores to the area of the impacted soil that is already experiencing natural biodegradation. The microbial spores along with indigenous microorganisms naturally present in the soil are bio-chemically stimulated to excite the organic contaminant eating microbes. The microbes rapidly and effectively degrade organic contaminants in the soil until the organic food source is depleted. Because of the sandy lithology identified at the Site, it is anticipated that the oxygen content in the soil is elevated so it provides a favorable environment for the microbes.

*Remedy* is not a dispersant and does not contain surfactants (<1%) to help facilitate organic molecular breakdown. *Remedy* is a bioremediation enhancer that depends extensively on temperature, pH, moisture content, oxygen, and existing nutrient content in the soil.

Subsequent to the completion of abatement actions, COCs left in place will continue to naturally attenuate over time. Natural attenuation is the process by which contaminants in the environment are naturally degraded, or reduced in concentration by various means including volatilization, adsorption, desorption, dispersion, dilution, diffusion, biodegradation, and abiotic degradation. Natural attenuation is achieved when one or more of these processes reduces the total mass, toxicity, mobility, volume, or concentration of a contaminant.

In addition, subsequent to the completion of excavation and treatment activities, the floor of the excavation will be lined with impermeable polyethylene sheeting to inhibit the future vertical infiltration of moisture through the affected soil left in-place. The impermeable polyethylene sheeting serves to:

1. Further protect deeper vadose zone soils;

2. Further protect the initial groundwater-bearing unit, which occurs at a depth of >200 feet bgs in the site vicinity; and,

3. Allow COCs left-in place to naturally attenuate.

The proposed abatement activities would eliminate potential exposure pathways including ingestion, dermal contact and/or volatilization and inhalation of COCs from the petroleum hydrocarbons affected surface soils and protect the initial groundwater-bearing unit from contaminants during natural attenuation.

### Option No. 2 – Statistical Evaluation

Option No. 2 would include the statistical evaluation of COC concentrations in the affected soils at the Site. In order to determine if the concentrations of COCs at the Site statistically exceed the OCD *Remediation Action Levels*, SWG will conduct a statistical test of the following set of hypotheses:

(i) . The null hypothesis (Ho) is that the arithmetic mean of the COC concentrations in the affected soil is equal to or greater than the OCD *Remediation Action Level.*
(ii) The alternative hypothesis (Ha) is that the arithmetic mean COC concentration is less than the OCD *Remediation Action Level.*

SWG will establish a "true mean" for COCs in the affected soil using the 95% Upper Confidence Level (UCL). The confidence level is a tool for acknowledging uncertainties and variability within an environmental data set without presenting an unacceptable risk to human health or the environment. In environmental studies, the uncertainties are commonly due to limited sampling data. The 95% upper confidence level defines a value that equals or exceeds the true mean 95% of the time.

During the completion of supplemental site investigation and abatement activities, a sufficient number of soil samples would be collected from the affected area (<1/4-acre area) to statistically evaluate COC concentrations at the Site.

### Option No. 3 – Soil Vapor Extraction

Option No. 3 would include the implantation of Soil Vapor Extraction (SVE) technology at the Site. During the completion of supplemental site investigation activities, the two (2) soil

borings advanced within the storage tank battery containment would be completed as soil vapor extraction wells.

SVE, also known as "soil venting" or "vacuum extraction", is an *in situ* remedial technology that reduces concentrations of volatile constituents in petroleum products adsorbed to soils in the unsaturated (vadose) zone. Using this technology, a vacuum is applied through extraction wells near the source of contamination in the soil. Volatile constituents of the contaminant mass "evaporate" and the vapors are drawn toward the extraction wells. Extracted vapor is then treated as necessary (commonly with carbon adsorption) before being released to the atmosphere. The increased air flow through the subsurface can also stimulate biodegradation of some of the contaminants, especially those that are less volatile.

### 8.2 Proposed Abatement Actions

SWG will direct the excavation of approximately 1,100 cubic yards of soil (with approximate dimension being 60 ft long, 25 ft wide and 20 ft deep)[2] from the former tank battery containment area. Soils will be screened for the presence of VOCs using a PID. Soils will be staged near the excavation and spread to a depth of approximately one (1) foot thick. In addition, earth moving equipment/tiller and hand tools will be utilized to till excavated soils to enhance infiltration of bioremediation agent and exposure of COCs to oxygen. SWG will direct the treatment of impacted soils with the bioremediation agent (Remedy®)/water mixture and subsequent reworking of soil media to ensure a thorough and consistent treatment of soils. The agent delivery system will consist of a water truck or similar equipment such as a portable tank, a gas powered water pump to distribute agent, and rubber hoses to allow for mobile and area specific application.

In addition, subsequent to the completion of excavation and treatment activities, the floor of the excavation will be lined with impermeable polyethylene sheeting to inhibit the future vertical infiltration of moisture through the affected soil left in-place, to further protect the initial groundwater-bearing unit during the natural attenuation of COCs.

### 8.3 Post Abatement Confirmation

Subsequent to the completion of excavation activities, up to seven (7) discrete soil samples will be collected from the excavation floor and sidewalls based on the PID field screening results. Following treatment of impacted soils, up to twenty (20) discrete soil samples will be collected from treated soils.

All confirmation samples will be analyzed for TPH GRO/DRO and BTEX utilizing EPA method SW-846 #8015 and #8021B, respectively. In addition, the soil sample exhibiting the highest benzene concentration will be resubmitted for TCLP analysis.

## 9.0 COMPLETION AND SITE CLOSURE

Prior to backfilling the excavation, the floor of the excavation will be lined with impermeable polyethylene sheeting to inhibit the future vertical infiltration of moisture through the affected soil left in-place, to further protect the initial groundwater-bearing unit during the natural attenuation of COCs.

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[2] *The results of the supplemental site investigation activities will assist in determining the final excavation dimension and consequently the final amount of excavated material that will be brought to the surface and treated*

Treatment of affected soils shall be deemed successful once confirmation samples from the excavation and treated soils indicate that COCs are below OCD *Remediation Action Levels*. Treated soils may be used to backfill the excavation once successfully remediated.

Upon successful abatement of COCs in the affected soils, the results of the abatement actions will be reported to the OCD and a closure request would be made for the portion of the Site that was impacted by the identified storage tank battery release(s).

If soils and/or groundwater located on the Site are to be disturbed during future excavations or construction activities, proper procedures should be followed with respect to worker health and safety, and any affected soil encountered should be properly characterized, treated, reused and/or disposed in accordance with applicable local, state or federal regulations.

## 10.0 SCHEDULE

The completion of abatement actions will require an estimated three (3) months; however, time estimations regarding the completion of abatement actions depend upon several factors, many of which cannot be pre-determined. Variables which may impact the estimated time required to attain the applicable OCD *Remediation Action Levels* for the identified COCs include, inclement weather, regulatory input, and/or operational encumbrances.

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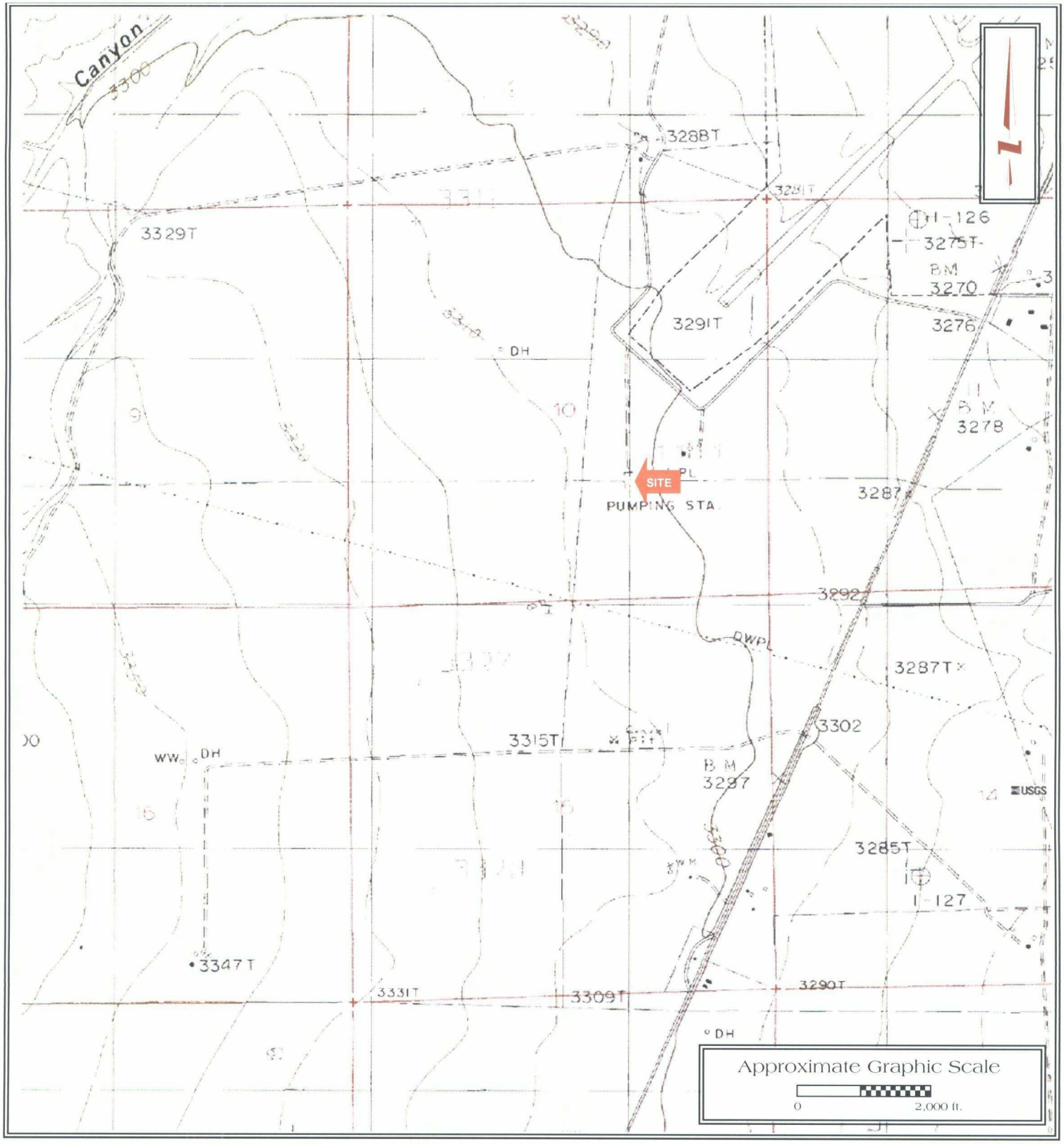
# APPENDIX A

## Figures




Stage 1 Abatement Report &
Stage 2 Abatement Plan
Trunk A Separator
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico
SWG Project No. 0210002

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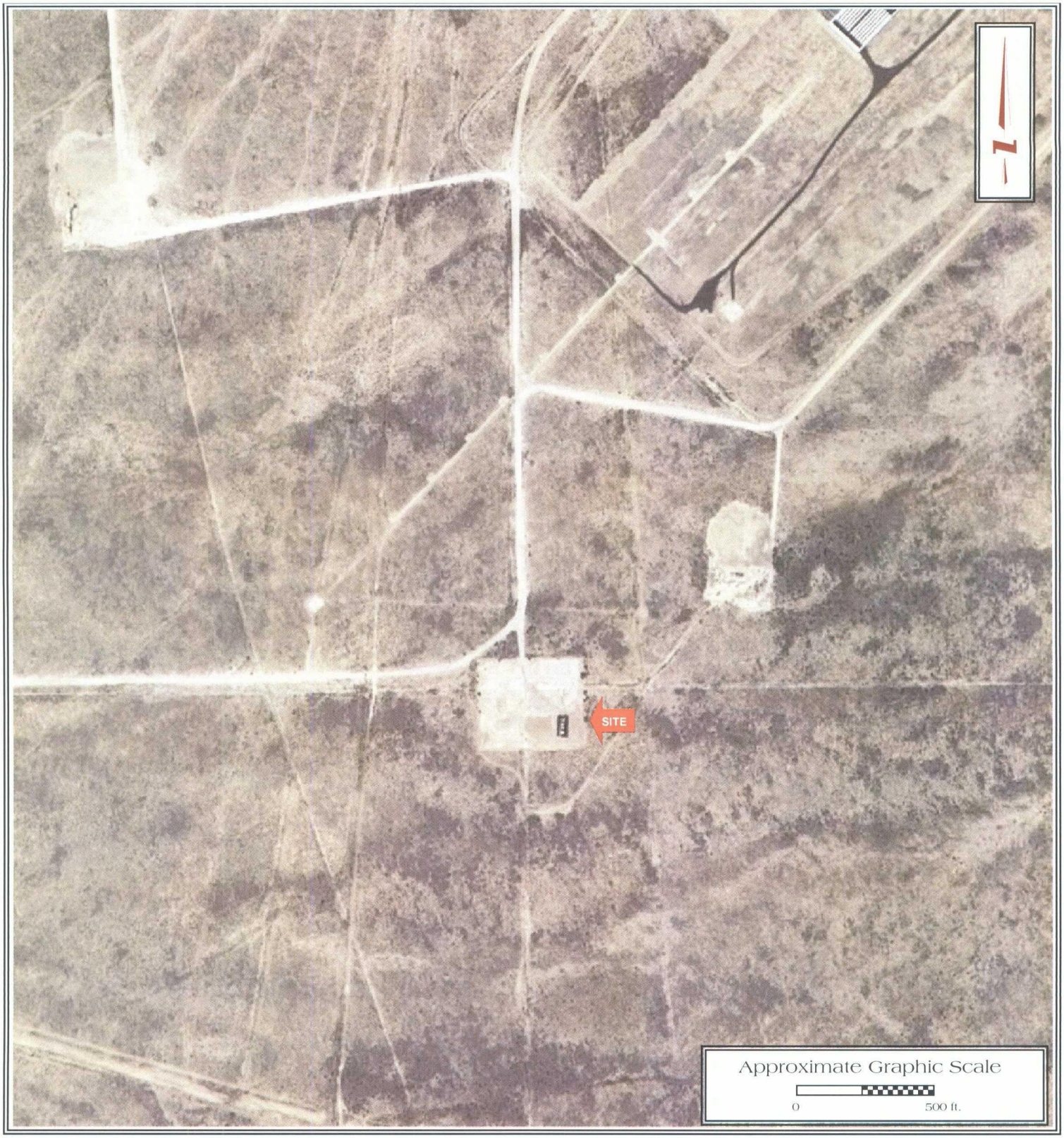
**FIGURE 1**
Topographic Map
Kitchen Cove, NM Quadrangle
Contour Interval - 10 Feet




Stage 1 Abatement Report &
Stage 2 Abatement Plan
Trunk A Separator
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico
SWG Project No. 0210002

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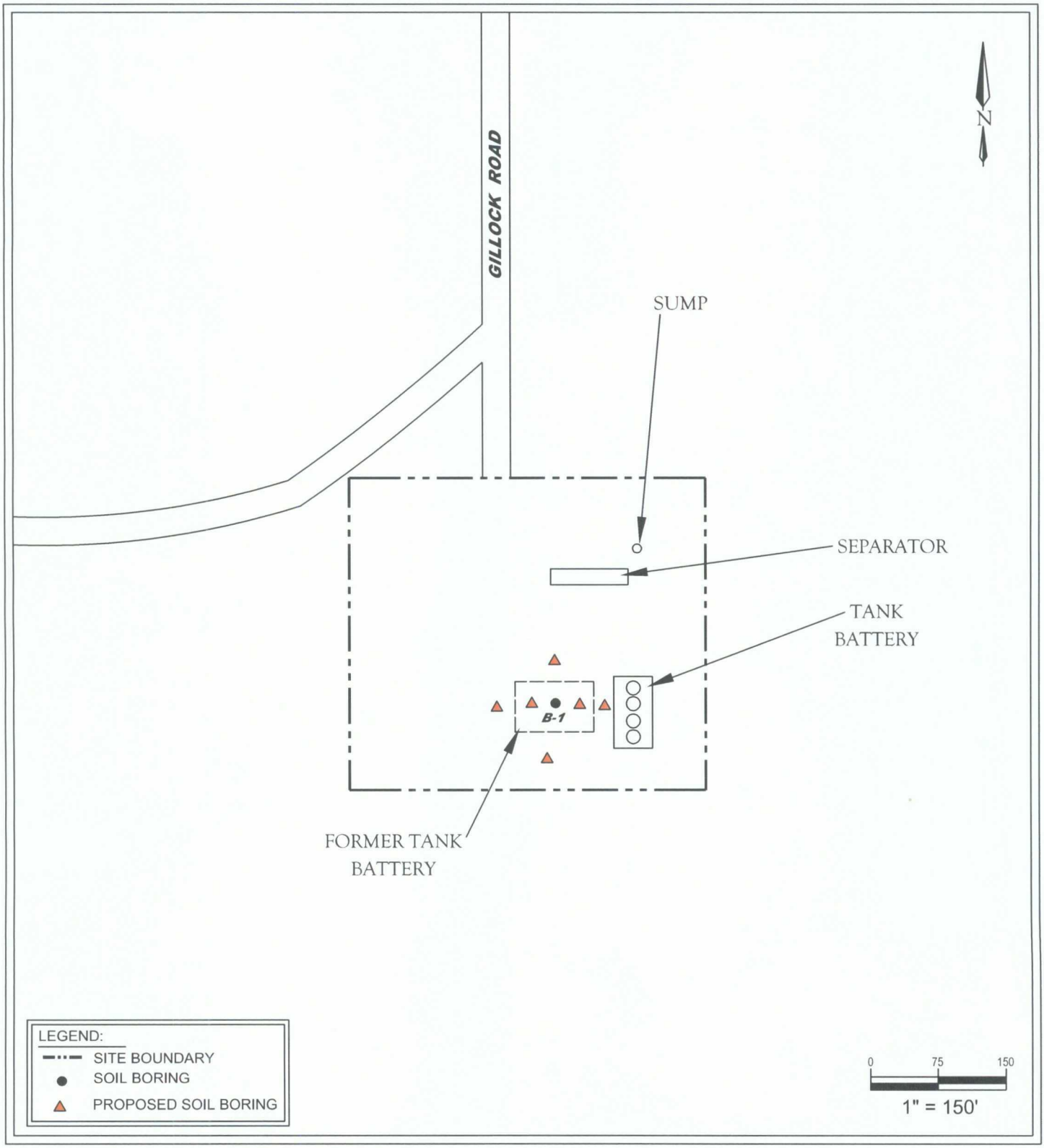
**FIGURE 2**
Site Vicinity Map
2009 Aerial Photograph




Stage 1 Abatement Report &
Stage 2 Abatement Plan
Trunk A Separator
N32° 3.1093'; W104° 2.8187'
Off Gillock Road
Eddy County, New Mexico

SWG Project No. 0210002

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FIGURE 3

SITE PLAN

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# APPENDIX B

## Water Well Records

# *New Mexico Office of the State Engineer*
# Wells with Well Log Information

No wells found.

**Basin/County Search:**

**County:** Eddy

**PLSS Search:**

**Section(s):** 10 **Township:** 23S **Range:** 26E

# *New Mexico Office of the State Engineer*
# Wells Without Well Log Information

No wells found.

**Basin/County Search:**

**County:** Eddy

**PLSS Search:**

**Section(s):** 10 **Township:** 23S **Range:** 26E

# New Mexico Office of the State Engineer
# Wells Without Well Log Information

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

| POD Number | Sub basin | Use | County | Source | q 64 | q 16 | q 4 | Sec | Tws | Rng | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 01324 | | SAN | ED | Shallow | 1 | 3 | 2 | 11 | 23S | 26E | 569409 | 3576366* |
| C 01810 | | DOM | ED | | 2 | 4 | 2 | 11 | 23S | 26E | 570018 | 3576371* |

**Record Count:** 2

**Basin/County Search:**

**County:** Eddy

**PLSS Search:**

**Section(s):** 11 **Township:** 23S **Range:** 26E

***UTM location was derived from PLSS - see Help**

# New Mexico Office of the State Engineer
# Wells with Well Log Information

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (in feet)

| POD Number | Sub basin | Use | County | Source | q q q 64 16 4 | Sec | Tws | Rng | X | Y | Start Date | Finish Date | Log File Date | Depth Well | Depth Water |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 01310 | | DOM | ED | Shallow | 1 3 2 | 11 | 23S | 26E | 569409 | 3576366* | 01/05/1966 | 01/22/1966 | 03/01/1966 | 250 | 220 |
| C 01548 | | DOM | ED | Shallow | 3 2 | 11 | 23S | 26E | 569510 | 3576267* | 09/05/1974 | 10/06/1974 | 08/20/1975 | 250 | |
| C 01635 | | DOM | ED | Shallow | | 11 | 23S | 26E | 569310 | 3576050* | 03/04/1976 | 03/22/1976 | 03/26/1976 | 255 | 205 |
| C 01708 | | DOM | ED | Shallow | 3 2 | 11 | 23S | 26E | 569510 | 3576267* | 05/01/1977 | 06/26/1978 | 06/29/1978 | 275 | 236 |
| C 01843 | | DOM | ED | Shallow | 3 2 | 11 | 23S | 26E | 569510 | 3576267* | 04/04/1979 | 05/03/1979 | 05/15/1979 | 252 | 217 |
| C 01866 | | DOM | ED | Shallow | 2 4 2 | 11 | 23S | 26E | 570018 | 3576371* | 08/08/1979 | 08/31/1979 | 09/21/1979 | 245 | 212 |
| C 02153 | | DOM | ED | Shallow | 1 4 2 | 11 | 23S | 26E | 569818 | 3576371* | 08/04/1987 | 08/20/1987 | 02/22/1988 | 275 | 200 |

**Record Count:** 7

**Basin/County Search:**

**County:** Eddy

**PLSS Search:**

**Section(s):** 11 **Township:** 23S **Range:** 26E

***UTM location was derived from PLSS - see Help**

# *New Mexico Office of the State Engineer*
# Wells with Well Log Information

No wells found.

**PLSS Search:**

**Section(s):** 14 **Township:** 23S **Range:** 26E

# New Mexico Office of the State Engineer
# Wells Without Well Log Information

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

| POD Number | Sub basin | Use | County | Source | q 64 | q 16 | q 4 | Sec | Tws | Rng | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 03275 | | DOM | ED | | 4 | 2 | 2 | 14 | 23S | 26E | 570032 | 3574970* |
| C 03322 POD1 | | DOM | ED | | 4 | 4 | 2 | 14 | 23S | 26E | 570060 | 3574487 |
| C 03378 POD1 | | DOM | ED | | 4 | 4 | 3 | 14 | 23S | 26E | 569220 | 3573781 |
| C 03426 POD1 | | DOM | ED | | 4 | 4 | 2 | 14 | 23S | 26E | 570065 | 3574502 |
| C 03439 [POD1 | | DOM | ED | | 1 | 2 | 3 | 14 | 23S | 26E | 569046 | 3574353 |

**Record Count:** 5

**PLSS Search:**

**Section(s):** 14 **Township:** 23S **Range:** 26E

***UTM location was derived from PLSS - see Help**

# *New Mexico Office of the State Engineer*
# Wells with Well Log Information

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (in feet)

| POD Number | Sub basin | Use | County | Source | q q q 6416 4 | Sec | Tws | Rng | X | Y | Start Date | Finish Date | Log File Date | Depth Well | Depth Water |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 00247 | | MUL | ED | Shallow | 4 2 4 | 15 | 23S | 26E | 568406 | 3574119* | 11/10/1950 | 11/25/1950 | 01/14/1952 | 315 | 230 |
| C 01015 | | DOM | ED | Shallow | 4 4 4 | 15 | 23S | 26E | 568408 | 3573714* | | | 12/21/1979 | | |
| C 01140 | | DOM | ED | Shallow | 1 3 3 | 15 | 23S | 26E | 566980 | 3573870* | 06/11/1963 | 07/15/1963 | 10/11/1963 | 325 | |
| C 01639 | | DOM | ED | Shallow | 4 2 4 | 15 | 23S | 26E | 568406 | 3574119* | 11/30/1975 | 06/05/1976 | 01/17/1977 | 300 | 70 |
| C 03238 | | DOM | ED | Shallow | 4 4 4 | 15 | 23S | 26E | 568408 | 3573714* | 10/17/2005 | 12/28/2005 | 01/23/2006 | 323 | 245 |

**Record Count:** 5

**PLSS Search:**

**Section(s):** 15 **Township:** 23S **Range:** 26E

***UTM location was derived from PLSS - see Help**

# New Mexico Office of the State Engineer
# Wells Without Well Log Information

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

| POD Number | Sub basin | Use | County | Source | q 64 | q 16 | q 4 | Sec | Tws | Rng | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 01104 | | SAN | ED | Shallow | 4 | 4 | 15 | 23S | 26E | | 568309 | 3573815* |
| C 02522 | | PRO | ED | | 3 | 3 | 15 | 23S | 26E | | 567081 | 3573771* |

**Record Count:** 2

**PLSS Search:**

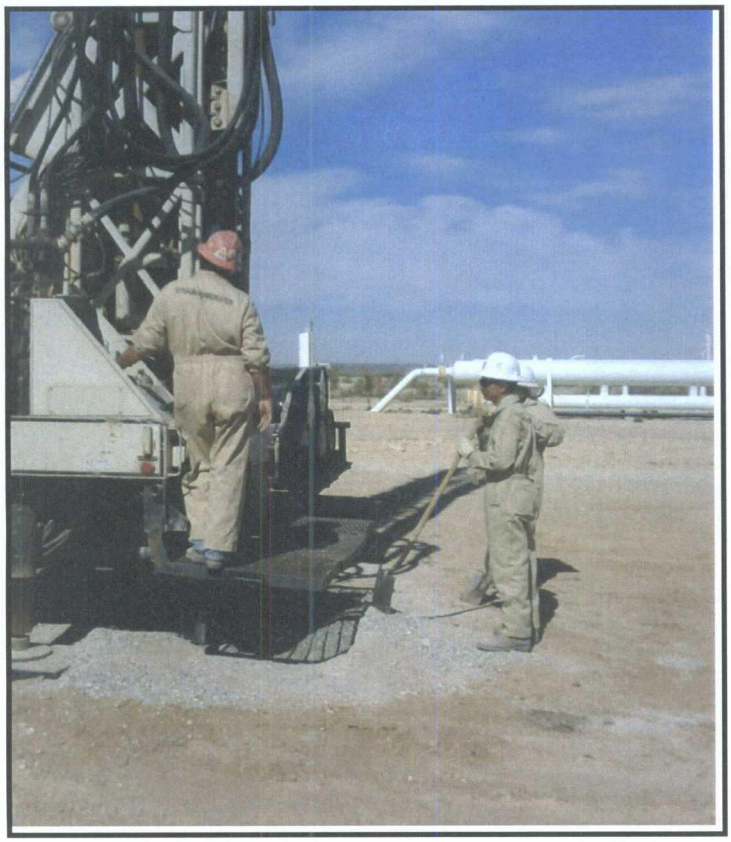
**Section(s):** 15 **Township:** 23S **Range:** 26E

***UTM location was derived from PLSS - see Help**

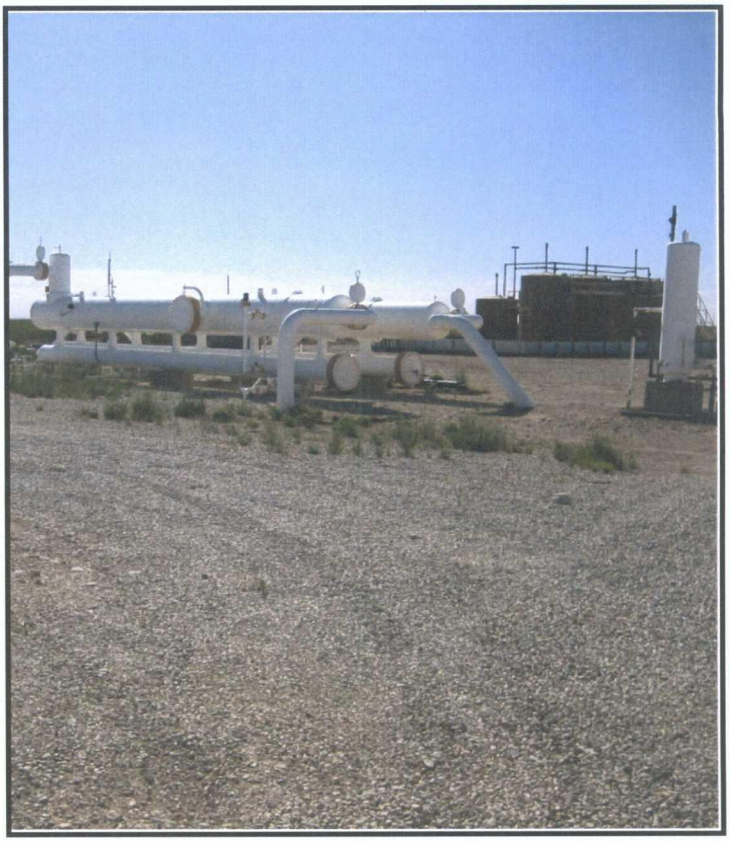
Southwest GEOSCIENCE

# APPENDIX C

## Photographic Documentation

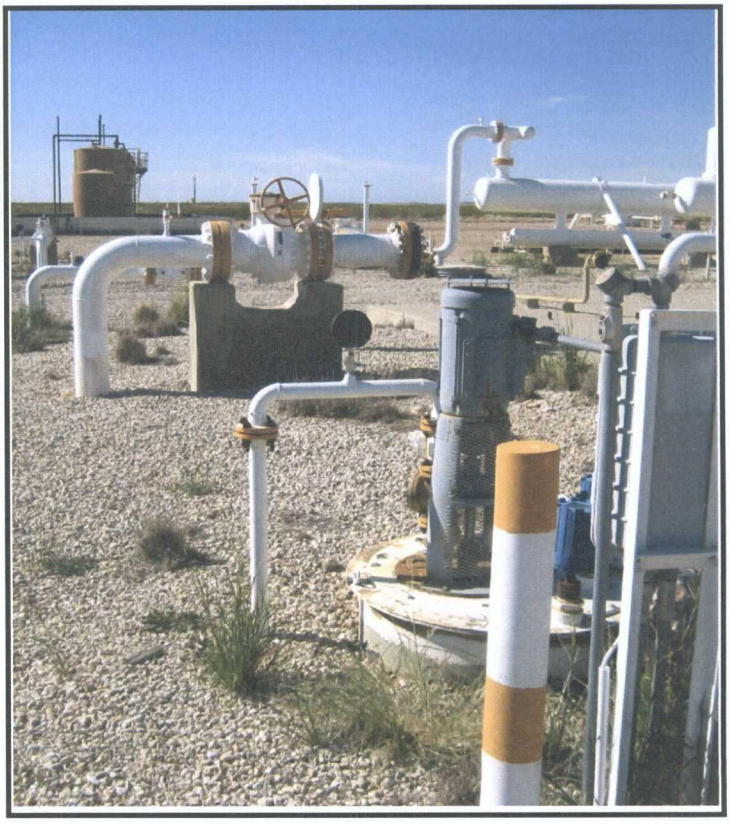


1.) Representative view of the installation of soil boring B-1.



2.) General view of the separation equipment and the current storage tank battery.

3.) General view of the current storage tank battery.



4.) Representative view of the northeast portion of the Site and the Separation equipment.

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# APPENDIX D

## Soil Boring Logs

Client: Enterprise Products Operating, LLC
Project Name: Trunk A Separator
Project Location: Off Gillock Rd, Carlsbad, NM
Project Manager: B. Chris Mitchell, P.G.

# SOIL BORING LOG

**DRILLING & SAMPLING INFORMAITON**

Date Started: November 5, 2009
Date Completed: November 5, 2009
Drilling Company: Straub Corporation
Driller: Marty Straub
Geologist: BCM
Boring Method: AR
Bore Hole Dia: 6-inch

Well Diam: N/A
Screen Size: N/A
Screen Length: N/A
Casing Length: N/A

Soil Boring / Monitor Well Number: B-1
Project #: 02110002
Drawn By: BCM
Aprroved By: BCM

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
GP - GEOPROBE
AR - AIR ROTARY

**SAMPLER TYPE**
CB - FIVE FOOT CORE BARREL
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE

**GROUNDWATER DEPTH**
▽ AT COMPLETION
▼ AT WELL STABILIZATION

| Approx Well Detail | SOIL CLASSIFICATION | Stratum Depth | Depth Scale | Sample No. | Sample Interval | % Recovery | Groundwater Depth | PID/FID Readings (ppm) | BORING AND SAMPLING NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | SURFACE ELEVATION: | | | | | | | | |
| | Silty Sand, Brown & Orange, Dry, Petroleum Odor | | | | | | | 226 | |
| | | | | | | | | 214 | |
| | | | | | | | | 315 | |
| | | | | | | | | 224 | |
| | | | | | | | | 152 | |
| | Sand & Gravel, Poorly Sorted, Gray, Dry, Petroleum Odor | | 5 | | | 100 % | | 252 | |
| | | | | | | | | 211 | |
| | | | | | | 100 % | | 356 | |
| | | | | | | | | 331 | |
| | | | 10 | | | | | 330 | |
| | | | | | | | | 194 | |
| | | | | | | 100 % | | 331 | |
| | | | | B-1 (0-5') | | | | 316 | |
| | | | | | | | | 366 | |
| | | | 15 | | | | | 334 | |
| | | | | | | 100 % | | 297 | |
| | | | | | | | | 128 | |
| | | | | | | | | 144 | |
| | | | | | | | | 128 | |
| | | | 20 | | | | | 244 | |
| | | | | | | 100 % | | 265 | |
| | | | | | | | | 120 | |
| | | | | | | | | 145 | |
| | | | | | | | | 161 | |
| | | | 25 | | | | | 80 | |
| | | | | | | 100 % | | 154 | |
| | | | | | | | | 186 | |
| | | | | | | | | 117 | |
| | | | | | | | | 84 | |
| | | | 30 | | | | | 344 | |
| | | | | | | 100 % | | 249 | |
| | | | | | | | | 285 | |
| | | | | | | | | 148 | |
| | | | | | | | | 152 | |
| | | | 35 | | | | | 214 | |
| | | | | | | 100 % | | 240 | |
| | | | | | | | | 334 | |
| | | | | | | | | 379 | |
| | | | | | | | | 453 | |
| | | | 40 | | | | | 210 | |
| | | | | | | 100 % | | 156 | |
| | | | | | | | | 247 | |
| | | | | | | | | 536 | |
| | | | | | | | | 369 | |
| | | | 45 | | | | | 371 | |
| | | | | | | 100 % | | 375 | |
| | | | | | | | | 418 | |
| | | | | | | | | 290 | |
| | | | | | | | | 217 | |
| | | | 50 | | | | | 488 | |
| | | | | | | | | 268 | |
| | | | | | | 100 % | | 217 | |
| | | | | | | | | 285 | |
| | | | | | | | | 299 | |
| | | | | | | | | 307 | |

Southwest GEOSCIENCE

Client: Enterprise Products Operating, LLC
Project Name: Trunk A Separator
Project Location: Off Gillock Rd, Carlsbad, NM
Project Manager: B. Chris Mitchell, P.G.

# SOIL BORING LOG

Soil Boring / Monitor Well Number: B-1 (Con't)
Project #: 02110002
Drawn By: BCM
Approved By: BCM

**DRILLING & SAMPLING INFORMATION**

Date Started: November 5, 2009
Date Completed: November 5, 2009
Drilling Company: Straub Corporation
Driller: Marty Straub
Geologist: BCM
Boring Method: AR
Bore Hole Dia: 6-inch
Well Diam: N/A
Screen Size: N/A
Screen Length: N/A
Casing Length: N/A

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
GP - GEOPROBE
AR - AIR ROTARY

**SAMPLER TYPE**
CB - FIVE FOOT CORE BARREL
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE

**GROUNDWATER DEPTH**
▽ AT COMPLETION
▼ AT WELL STABILIZATION

| Screened Interval | SOIL CLASSIFICATION | Stratum Depth | Depth Scale | Sample No. | Sample Interval | % Recovery | Groundwater Depth | FID/PID Readings (ppm) | BORING AND SAMPLING NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | SURFACE ELEVATION: | | | | | | | | |
| | Sand & Gravel, Poorly Sorted, Gray, Dry, Petroleum Odor | | 60 | B-1 (55-57) | B-1 | 100 % | | 240 | |
| | | | | | | | | 623 | |
| | | | | | | | | 219 | |
| | | | | | | | | 307 | |
| | | | 65 | | | 100 % | | 252 | |
| | | | | | | | | 280 | |
| | | | | | | | | 336 | |
| | | | | | | | | 294 | |
| | | | | | | | | 242 | |
| | | | 70 | | | 100 % | | 178 | |
| | | | | | | | | 250 | |
| | | | | | | | | 268 | |
| | | | | | | | | 124 | |
| | | | 75 | | | 100 % | | 159 | |
| | | | | | | | | 252 | |
| | | | | | | | | 221 | |
| | | | | | | | | 94 | |
| | | | 80 | | | 100 % | | 233 | |
| | | | | | | | | 266 | |
| | | | | | | | | 290 | |
| | | | | | | | | 107 | |
| | | | 85 | | | 100 % | | 132 | |
| | | | | | | | | 181 | |
| | | | | | | | | 92 | |
| | | | | | | | | 82 | |
| | | | 90 | | | 100 % | | 134 | |
| | | | | | | | | 127 | |
| | | | | | | | | 67 | |
| | | | | | | | | 59 | |
| | | | 95 | | | 100 % | | 51 | |
| | | | | | | | | 45 | |
| | | | | | | | | 183 | |
| | | | | | | | | 74 | |
| | | | | | | | | 94 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | | | | | | | | 0 | |
| | Sandy Silt, Pale Tan, Dry, Slight Petroleum Odor | | 100 | B-1 (99-100) | B-1 | 100 % | | 0 | |
| | Sandy Silt w/ Gravel, Very Fine, Well Sorted, Pale Tan & Gray, Dry, No Odor | | | | | | | | |
| | BOTTOM OF BORING | | 105 | | | | | | |

Southwest GEOSCIENCE

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# APPENDIX E

## Tables

Southwest GEOSCIENCE

## TABLE 1
SOIL ANALYTICAL RESULTS

| Sample I.D. | Date | Sample Depth (feet) | Benzene (mg/kg) | Toluene (mg/kg) | Ethylbenzene (mg/kg) | Xylenes (mg/kg) | Total BTEX (mg/kg) | TPH GRO (mg/kg) | TPH DRO (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| New Mexico Energy, Minerals & Natural Resources Department, Oil Conservation Division, Remediation Action Level | | | 10 | NE | NE | NE | 50 | 5,000 | |
| Non-Residential Site Specific Risk-Based Screening Level | | | NE | NE | NE | NE | NE | 72,000 | |
| B-1 | 11/5/2009 | 13 to 14 | 0.063 (j) | 6 | 0.21 | 35 | 41 | 250 | 1,600 |
| | 11/5/2009 | 56 to 57 | 3.2 | 35 | 12 | **230** | 280 | **2,100** | **4,000** |
| | 11/5/2009 | 99 to 100 | <0.0017 | <0.0018 | <0.0019 | 0.011(j) | 0.011(j) | 0.32 | 70 |

Note: Concentrations in **bold** and yellow exceed the applicable OCD Remediation Action Level

NE = Not Established

## TABLE 2
SOIL ANALYTICAL RESULTS
PETROLEUM HYDROCARBON MASS FRACTIONS

| Sample ID | Date | Sample Depth | (TX 1005) TPH Result $C_6$ - $C_{35}$ (mg/Kg) | Hydrocarbon Fraction | Observed Concentration (mg/Kg) | Mass Fraction (mg/Kg) | Mass Fraction Total |
|---|---|---|---|---|---|---|---|
| B-1 | 11.5.09 | 56 to 57 | <60 | Aliphatic C6 | <67 | 0.00E+00 | 1.00E+00 |
| | | | | Aliphatic C6-C8 | 120.0 | 2.80E-02 | |
| | | | | Aliphatic >C8-C10 | 1,590.0 | 3.71E-01 | |
| | | | | Aliphatic >C10-C12 | 430.0 | 1.00E-01 | |
| | | | | Aliphatic >C12-C16 | 950.0 | 2.21E-01 | |
| | | | | Aliphatic >C16-C21 | 410.0 | 9.56E-02 | |
| | | | | Aliphatic >C21-C35 | 620.0 | 1.45E-01 | |
| | | | | Aromatic C7-C8 | <67 | 0.00E+00 | |
| | | | | Aromatic >C8-C10 | <67 | 0.00E+00 | |
| | | | | Aromatic >C10-C12 | <67 | 0.00E+00 | |
| | | | | Aromatic >C12-C16 | <67 | 0.00E+00 | |
| | | | | Aromatic >C16-C21 | <67 | 0.00E+00 | |
| | | | | Aromatic >C21-C35 | 170.0 | 3.96E-02 | |

# Site-Specific TPH RBSLs in Soil

**Trunk A**

**Residential Soil RBSLs**

| Pathway: | **Surface Soil** Ingestion, dermal contact, and inhalation pathways **mg/kg** | **Soil Leaching to GW** (receptor located beneath source) **Tier 1** **mg/kg** | **Soil Leaching to GW** (receptor located downgradient) **Tier 2** **mg/kg** | **Surface Soil to Outdoor Air** |
|---|---|---|---|---|
| **RBSL for TPH (mg/kg)** | 6.5E+03 | **Soil res** | **Soil res** | **Soil Res** |

**Non-Residential Soil RBSLs**

| Pathway: | **Surface Soil** Ingestion, dermal contact, and inhalation pathways **mg/kg** | **Soil Leaching to GW** (receptor located beneath source) **Tier 1** **mg/kg** | **Soil Leaching to GW** (receptor located downgradient) **Tier 2** **mg/kg** | **Surface Soil to Outdoor Air** |
|---|---|---|---|---|
| **RBSL for TPH (mg/kg)** | 7.2E+04 | **Soil res** | **Soil res** | **Soil Res** |

**"Soil Res"** indicates that the target hazard index could not be reached at any concentration for this mixture.

Main Menu | Site-Specific TPH RBSLs in Soil | Crude Oils and Condensates Database

Select Sample Type:
- ○ Oil
- ◉ Soil

Clear Concentrations

## Site-Specific TPH Data in Soil
**Site Description: Trunk A**

| TPH Fractions | Concentration (mg/kg soil) | Fraction of Total TPH | Adjusted Mass Fraction | Mass Fraction$_i$ / Mole Fraction$_i$ | Mole Fraction$_i$ (adj. for mass balance), $X_i$ |
|---|---|---|---|---|---|
| **Aliphatics:** | | | | | |
| >6-8 C aliphatics | **1.2E+02** | 2.8E-02 | 2.8E-02 | 2.8E-04 | 4.7E-02 |
| >8-10 C aliphatics | **1.6E+03** | 3.7E-01 | 3.7E-01 | 2.9E-03 | 4.8E-01 |
| >10-12 C aliphatics | **4.3E+02** | 1.0E-01 | 1.0E-01 | 6.3E-04 | 1.1E-01 |
| >12-16 C aliphatics | **9.5E+02** | 2.2E-01 | 2.2E-01 | 1.1E-03 | 1.9E-01 |
| >16-44 C aliphatics | **1.0E+03** | 2.4E-01 | 2.4E-01 | 8.9E-04 | 1.5E-01 |
| **Aromatics:** | | | | | |
| >7-8 C Aromatics | **0.0E+00** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| >8-10 C aromatics | **0.0E+00** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| >10-12 C aromatics | **0.0E+00** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| > 12-16 C aromatics | **0.0E+00** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| > 16-21 C aromatics | **0.0E+00** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| > 21-44 C aromatics | **1.7E+02** | 4.0E-02 | 4.0E-02 | 1.5E-04 | 2.5E-02 |
| **Sum of >C6 to <C44** | | **1.0E+00** | **1.0E+00** | **5.9E-03** | **1.0E+00** |
| > 44 C | **NA** | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **Totals for all TPH fractions** | **4.29E+03** | **1.0E+00** | **1.0E+00** | **5.9E-03** | **1.0E+00** |

| | |
|---|---|
| **Total TPH (mg/kg)** | **4.29E+03** |
| **Mass Balance Error:** | **0.00E+00** |

Southwest GEOSCIENCE

# APPENDIX F

## Laboratory Data Reports & Chain-of-Custody Documentation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 560-17997-1

Job Description: 0209011- Trunk A Separator

For:
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Attention: Mr. Chris Mitchell

Erica H Padilla

Approved for release.
Erica Padilla
Project Manager I
11/24/2009 8:22 PM

Erica Padilla
Project Manager I
erica.padilla@testamericainc.com
11/24/2009

The test results entered in this report meet all NELAC requirements for accredited parameters. Any exceptions to NELAC requirements are noted in the report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. TestAmerica Corpus Christi Certifications and Approvals: NELAC TX T104704210-TX, NELAC KS E-10362, Oklahoma 9968, USDA Soil Permit P330-08-00033.

**Job Narrative**
**560-17997-1**

**Comments**
No additional comments.

**Receipt**
All samples were received in good condition within temperature requirements.

**GC VOA**
Samples 560-17997-1, 2, and 3 were analyzed for BTEX using EPA Method 8021B. The client provided full Terra Core kits for each sample. Analysis was attempted on the VOA vials containing soil plugs. After foaming during direct purge of two vials from sample 1 and one vial from sample 2, the instrument was stopped and the used vials were checked. The septa in all three vials were found to be torn. The septa appeared to have torn upon injection of the instrument needle. The septa of all remaining vials were intact. The client was notified and due to septum failure, samples 1, 2, and 3 were analyzed using the bulk jar provided with each Terra Core kit.

Additionally, the percent recoveries of both surrogates were above acceptable limits for samples 1 and 2. Matrix interference was evident. The LCS was within acceptable limits. Therefore, data are reported.

Sample 560-17997-3 was analyzed for GRO using EPA Method 8015 Modified. GRO was detected in the method blank (MB) associated with this sample. However, the amount detected was below the reporting limit. Therefore, data are reported.

No other analytical or quality issues were noted.

**GC Semi VOA**
Samples 560-17997-1, 2, and 3 were analyzed for DRO using EPA Method 8015D. DRO was detected in the method blank (MB) associated with these samples. However, the amount detected was below the reporting limit. Therefore, data are reported.

Additionally, the percent recovery of DRO was above acceptable limits in the MS/MSD associated with sample 1. However, due to the concentration of DRO detected in this sample, control limits do not apply.

No other analytical or quality issues were noted.

**General Chemistry**
No analytical or quality issues were noted.

**Organic Prep**
No analytical or quality issues were noted.

**VOA Prep**
No analytical or quality issues were noted.

## EXECUTIVE SUMMARY - Detections

Client: Southwest Geoscience

Job Number: 560-17997-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **560-17997-1** | **B-1 (13-14)** | | | | | |
| Gasoline Range Organics (GRO)-C6-C12 | | 250 | | 11 | mg/Kg | 8015M |
| Benzene | | 0.063 | J | 0.10 | mg/Kg | 8021B |
| Toluene | | 5.6 | | 0.10 | mg/Kg | 8021B |
| Ethylbenzene | | 0.21 | | 0.10 | mg/Kg | 8021B |
| Xylenes, Total | | 35 | | 0.31 | mg/Kg | 8021B |
| Diesel (C10-C28) | | 1600 | B | 53 | mg/Kg | 8015D |
| Percent Moisture | | 6.4 | | 0.010 | % | Moisture |
| Percent Solids | | 94 | | 0.010 | % | Moisture |
| **560-17997-2** | **B-1 (56-57)** | | | | | |
| Gasoline Range Organics (GRO)-C6-C12 | | 2100 | | 110 | mg/Kg | 8015M |
| Benzene | | 3.2 | | 0.99 | mg/Kg | 8021B |
| Toluene | | 35 | | 0.99 | mg/Kg | 8021B |
| Ethylbenzene | | 12 | | 0.99 | mg/Kg | 8021B |
| Xylenes, Total | | 230 | | 3.0 | mg/Kg | 8021B |
| Diesel (C10-C28) | | 4000 | B | 110 | mg/Kg | 8015D |
| Percent Moisture | | 10 | | 0.010 | % | Moisture |
| Percent Solids | | 90 | | 0.010 | % | Moisture |
| **560-17997-3** | **B-1 (99-100)** | | | | | |
| Gasoline Range Organics (GRO)-C6-C12 | | 0.32 | B | 0.10 | mg/Kg | 8015M |
| Xylenes, Total | | 0.011 | J | 0.013 | mg/Kg | 8021B |
| Diesel (C10-C28) | | 70 | B | 10 | mg/Kg | 8015D |
| Percent Moisture | | 1.0 | | 0.010 | % | Moisture |
| Percent Solids | | 99 | | 0.010 | % | Moisture |

# METHOD SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-1

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Solid** | | | |
| GRO by 8015M | TAL PEN | SW846 8015M | |
| Closed System Purge and Trap | TAL PEN | | SW846 5035 |
| Volatile Organic Compounds (GC) | TAL CC | SW846 8021B | |
| Purge and Trap | TAL CC | | SW846 5030B |
| Diesel Range Orgnics (DRO) (GC) | TAL CC | SW846 8015D | |
| Ultrasonic Extraction | TAL CC | | SW846 3550B |
| Percent Moisture | TAL CC | EPA Moisture | |
| **Matrix: Water** | | | |
| Volatile Organic Compounds (GC) | TAL CC | SW846 8021B | |
| Purge and Trap | TAL CC | | SW846 5030B |

**Lab References:**

TAL CC = TestAmerica Corpus Christi

TAL PEN = TestAmerica Pensacola

**Method References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

## METHOD / ANALYST SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-1

| Method | Analyst | Analyst ID |
|---|---|---|
| SW846 8015M | Lee, Jefferson | JL |
| SW846 8015M | Potts, Charles | CP |
| SW846 8021B | Alvarez, Tracy L | TLA |
| SW846 8021B | Hernandez, Mark | MH |
| SW846 8015D | Craig, Bronson | BC |
| EPA Moisture | Mbipeh, Brenda | BM |

# SAMPLE SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-1

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 560-17997-1 | B-1 (13-14) | Solid | 11/05/2009 1635 | 11/07/2009 0848 |
| 560-17997-2 | B-1 (56-57) | Solid | 11/05/2009 1645 | 11/07/2009 0848 |
| 560-17997-3 | B-1 (99-100) | Solid | 11/05/2009 1650 | 11/07/2009 0848 |
| 560-17997-4TB | Trip Blank | Water | 11/05/2009 0000 | 11/07/2009 0848 |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-1

**Client Sample ID: B-1 (13-14)**
**Lab Sample ID: 560-17997-1**

Date Sampled: 11/05/2009 1635
Date Received: 11/07/2009 0848
Client Matrix: Solid
Percent Solids: 94

| Analyte | Result/Qualifier | | Unit | MDL | RL | Dilution |
|---|---|---|---|---|---|---|
| **Method: 8015M** | | | Date Analyzed: | | 11/17/2009 1900 | |
| **Prep Method: 5035** | | | Date Prepared: | | 11/17/2009 0800 | |
| Gasoline Range Organics (GRO)-C6-C12 | 250 | | mg/Kg | 3.5 | 11 | 100 |
| Surrogate | | | | | Acceptance Limits | |
| a,a,a-Trifluorotoluene (fid) | 80 | | % | | 67 - 130 | |
| **Method: 8021B** | | | Date Analyzed: | | 11/10/2009 1729 | |
| **Prep Method: 5030B** | | | Date Prepared: | | 11/10/2009 0818 | |
| Benzene | 0.063 | J | mg/Kg | 0.020 | 0.10 | 50 |
| Toluene | 5.6 | | mg/Kg | 0.020 | 0.10 | 50 |
| Ethylbenzene | 0.21 | | mg/Kg | 0.020 | 0.10 | 50 |
| Xylenes, Total | 35 | | mg/Kg | 0.061 | 0.31 | 50 |
| Surrogate | | | | | Acceptance Limits | |
| 4-Bromofluorobenzene (Surr) | 248 | X | % | | 36 - 158 | |
| Trifluorotoluene (Surr) | 273 | X | % | | 31 - 138 | |
| **Method: 8015D** | | | Date Analyzed: | | 11/11/2009 1849 | |
| **Prep Method: 3550B** | | | Date Prepared: | | 11/11/2009 1100 | |
| Diesel (C10-C28) | 1600 | B | mg/Kg | 6.2 | 53 | 5.0 |
| Surrogate | | | | | Acceptance Limits | |
| o-Terphenyl | 90 | | % | | 55 - 120 | |

Mr. Chris Mitchell
Southwest Geoscience
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Job Number: 560-17997-1

**Client Sample ID: B-1 (13-14)**
**Lab Sample ID: 560-17997-1**

Date Sampled: 11/05/2009 1635
Date Received: 11/07/2009 0848
Client Matrix: Solid

| Analyte | Result/Qualifier | Unit | RL | RL | Dilution |
|---|---|---|---|---|---|
| **Method: Moisture** | | Date Analyzed: | 11/09/2009 1645 | | |
| Percent Moisture | 6.4 | % | 0.010 | 0.010 | 1.0 |

Mr. Chris Mitchell
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San Antonio, TX 78217

Job Number: 560-17997-1

**Client Sample ID: B-1 (56-57)**
**Lab Sample ID: 560-17997-2**

Date Sampled: 11/05/2009 1645
Date Received: 11/07/2009 0848
Client Matrix: Solid
Percent Solids: 90

| Analyte | Result/Qualifier | | Unit | MDL | RL | Dilution |
|---|---|---|---|---|---|---|
| **Method: 8015M** | | | Date Analyzed: | | 11/19/2009 0936 | |
| **Prep Method: 5035** | | | Date Prepared: | | 11/17/2009 0800 | |
| Gasoline Range Organics (GRO)-C6-C12 | 2100 | | mg/Kg | 35 | 110 | 1000 |
| Surrogate | | | | | Acceptance Limits | |
| a,a,a-Trifluorotoluene (fid) | 78 | | % | | 67 - 130 | |
| **Method: 8021B** | | | Date Analyzed: | | 11/11/2009 1226 | |
| **Prep Method: 5030B** | | | Date Prepared: | | 11/11/2009 0914 | |
| Benzene | 3.2 | | mg/Kg | 0.20 | 0.99 | 400 |
| Toluene | 35 | | mg/Kg | 0.20 | 0.99 | 400 |
| Ethylbenzene | 12 | | mg/Kg | 0.20 | 0.99 | 400 |
| Xylenes, Total | 230 | | mg/Kg | 0.59 | 3.0 | 400 |
| Surrogate | | | | | Acceptance Limits | |
| 4-Bromofluorobenzene (Surr) | 205 | X | % | | 36 - 158 | |
| Trifluorotoluene (Surr) | 492 | X | % | | 31 - 138 | |
| **Method: 8015D** | | | Date Analyzed: | | 11/11/2009 1942 | |
| **Prep Method: 3550B** | | | Date Prepared: | | 11/11/2009 1100 | |
| Diesel (C10-C28) | 4000 | B | mg/Kg | 13 | 110 | 10 |
| Surrogate | | | | | Acceptance Limits | |
| o-Terphenyl | 81 | | % | | 55 - 120 | |

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Job Number: 560-17997-1

**Client Sample ID: B-1 (56-57)**
**Lab Sample ID: 560-17997-2**

Date Sampled: 11/05/2009 1645
Date Received: 11/07/2009 0848
Client Matrix: Solid

| Analyte | Result/Qualifier | Unit | RL | RL | Dilution |
|---|---|---|---|---|---|
| **Method: Moisture** | | Date Analyzed: | 11/09/2009 1645 | | |
| Percent Moisture | 10 | % | 0.010 | 0.010 | 1.0 |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-1

**Client Sample ID: B-1 (99-100)**
**Lab Sample ID: 560-17997-3**

Date Sampled: 11/05/2009 1650
Date Received: 11/07/2009 0848
Client Matrix: Solid
Percent Solids: 99

| Analyte | Result/Qualifier | | Unit | MDL | RL | Dilution |
|---|---|---|---|---|---|---|
| **Method: 8015M** | | | Date Analyzed: | | 11/18/2009 0058 | |
| **Prep Method: 5035** | | | Date Prepared: | | 11/17/2009 0943 | |
| Gasoline Range Organics (GRO)-C6-C12 | 0.32 | B | mg/Kg | 0.033 | 0.10 | 1.0 |
| Surrogate | | | | | Acceptance Limits | |
| a,a,a-Trifluorotoluene (fid) | 100 | | % | | 67 - 130 | |
| **Method: 8021B** | | | Date Analyzed: | | 11/09/2009 1716 | |
| **Prep Method: 5030B** | | | Date Prepared: | | 11/09/2009 1716 | |
| Benzene | <0.0017 | | mg/Kg | 0.0017 | 0.0044 | 1.0 |
| Toluene | <0.0018 | | mg/Kg | 0.0018 | 0.0044 | 1.0 |
| Ethylbenzene | <0.0019 | | mg/Kg | 0.0019 | 0.0044 | 1.0 |
| Xylenes, Total | 0.011 | J | mg/Kg | 0.0059 | 0.013 | 1.0 |
| Surrogate | | | | | Acceptance Limits | |
| 4-Bromofluorobenzene (Surr) | 97 | | % | | 25 - 142 | |
| Trifluorotoluene (Surr) | 85 | | % | | 32 - 139 | |
| **Method: 8015D** | | | Date Analyzed: | | 11/11/2009 1823 | |
| **Prep Method: 3550B** | | | Date Prepared: | | 11/11/2009 1100 | |
| Diesel (C10-C28) | 70 | B | mg/Kg | 1.2 | 10 | 1.0 |
| Surrogate | | | | | Acceptance Limits | |
| o-Terphenyl | 85 | | % | | 55 - 120 | |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-1

**Client Sample ID: B-1 (99-100)**
**Lab Sample ID: 560-17997-3**

Date Sampled: 11/05/2009 1650
Date Received: 11/07/2009 0848
Client Matrix: Solid

| Analyte | Result/Qualifier | Unit | RL | RL | Dilution |
|---|---|---|---|---|---|
| **Method: Moisture** | | Date Analyzed: | 11/09/2009 1645 | | |
| Percent Moisture | 1.0 | % | 0.010 | 0.010 | 1.0 |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-1

**Client Sample ID: Trip Blank**
**Lab Sample ID: 560-17997-4**

Date Sampled: 11/05/2009 0000
Date Received: 11/07/2009 0848
Client Matrix: Water

| Analyte | Result/Qualifier | Unit | MDL | RL | Dilution |
|---|---|---|---|---|---|
| **Method: 8021B** | | Date Analyzed: | 11/10/2009 1947 | | |
| **Prep Method: 5030B** | | Date Prepared: | 11/10/2009 1947 | | |
| Benzene | <0.000096 | mg/L | 0.000096 | 0.0020 | 1.0 |
| Toluene | <0.00020 | mg/L | 0.00020 | 0.0020 | 1.0 |
| Ethylbenzene | <0.000087 | mg/L | 0.000087 | 0.0020 | 1.0 |
| Xylenes, Total | <0.00034 | mg/L | 0.00034 | 0.0060 | 1.0 |

| Surrogate | | | Acceptance Limits |
|---|---|---|---|
| 4-Bromofluorobenzene (Surr) | 94 | % | 58 - 129 |
| Trifluorotoluene (Surr) | 96 | % | 62 - 128 |

# DATA REPORTING QUALIFIERS

Client: Southwest Geoscience Job Number: 560-17997-1

| Lab Section | Qualifier | Description |
|---|---|---|
| GC VOA | | |
| | B | Compound was found in the blank and sample. |
| | J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| | X | Surrogate exceeds the control limits |
| GC Semi VOA | | |
| | B | Compound was found in the blank and sample. |
| | 4 | MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable. |
| | J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

# QUALITY CONTROL RESULTS

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 400-99301**

**Method: 8015M**
**Preparation: 5035**

Lab Sample ID: MB 400-99301/1-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/12/2009 0949
Date Prepared: 11/11/2009 1320

Analysis Batch: 400-99001
Prep Batch: 400-99301
Units: mg/Kg

Instrument ID: GC/PID/FID
Lab File ID: R111201.D
Initial Weight/Volume: 5.00 g
Final Weight/Volume: 5.00 g
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Gasoline Range Organics (GRO)-C6-C12 | <1.6 | | 1.6 | 5.0 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| a,a,a-Trifluorotoluene (fid) | 88 | 67 - 130 |

**Lab Control Sample - Batch: 400-99301**

**Method: 8015M**
**Preparation: 5035**

Lab Sample ID: LCS 400-99301/2-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/11/2009 2327
Date Prepared: 11/11/2009 1320

Analysis Batch: 400-99001
Prep Batch: 400-99301
Units: mg/Kg

Instrument ID: GC/PID/FID
Lab File ID: R111127.D
Initial Weight/Volume: 5.00 g
Final Weight/Volume: 5.00 g
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Gasoline Range Organics (GRO)-C6-C12 | 10.0 | 11.2 | 112 | 73 - 126 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| a,a,a-Trifluorotoluene (fid) | 84 | 67 - 130 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 400-99378**

**Method: 8015M**
**Preparation: 5035**

Lab Sample ID: MB 400-99378/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/17/2009 1054
Date Prepared: 11/17/2009 0943

Analysis Batch: 400-99377
Prep Batch: 400-99378
Units: mg/Kg

Instrument ID: GC/PID/FID
Lab File ID: B111702.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 g
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Gasoline Range Organics (GRO)-C6-C12 | 0.0363 | J | 0.033 | 0.10 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| a,a,a-Trifluorotoluene (fid) | 100 | 67 - 130 |

**Lab Control Sample - Batch: 400-99378**

**Method: 8015M**
**Preparation: 5035**

Lab Sample ID: LCS 400-99378/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/17/2009 0943
Date Prepared: 11/17/2009 0943

Analysis Batch: 400-99377
Prep Batch: 400-99378
Units: mg/Kg

Instrument ID: GC/PID/FID
Lab File ID: B111701.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 g
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Gasoline Range Organics (GRO)-C6-C12 | 1.00 | 0.928 | 93 | 73 - 126 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| a,a,a-Trifluorotoluene (fid) | 100 | 67 - 130 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 560-41947**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: MB 560-41947/3
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/09/2009 1046
Date Prepared: 11/09/2009 1046

Analysis Batch: 560-41947
Prep Batch: N/A
Units: mg/Kg

Instrument ID: VGC#2
Lab File ID: 11090903.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Benzene | <0.0019 | | 0.0019 | 0.0050 |
| Toluene | <0.0021 | | 0.0021 | 0.0050 |
| Ethylbenzene | <0.0022 | | 0.0022 | 0.0050 |
| Xylenes, Total | <0.0067 | | 0.0067 | 0.015 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 88 | 25 - 142 |
| Trifluorotoluene (Surr) | 84 | 32 - 139 |

**Lab Control Sample - Batch: 560-41947**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: LCS 560-41947/2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/09/2009 1017
Date Prepared: 11/09/2009 1017

Analysis Batch: 560-41947
Prep Batch: N/A
Units: mg/Kg

Instrument ID: VGC#2
Lab File ID: 11090902.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Benzene | 0.0200 | 0.0183 | 91 | 73 - 120 | |
| Toluene | 0.0200 | 0.0197 | 98 | 71 - 125 | |
| Ethylbenzene | 0.0200 | 0.0202 | 101 | 74 - 123 | |
| Xylenes, Total | 0.0400 | 0.0417 | 104 | 77 - 129 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 107 | 25 - 142 |
| Trifluorotoluene (Surr) | 103 | 32 - 139 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 560-41995**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: MB 560-41995/2-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/10/2009 0941
Date Prepared: 11/10/2009 0818

Analysis Batch: 560-41994
Prep Batch: 560-41995
Units: mg/Kg

Instrument ID: VGC#1
Lab File ID: 11100903.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Benzene | <0.020 | | 0.020 | 0.10 |
| Toluene | <0.020 | | 0.020 | 0.10 |
| Ethylbenzene | <0.020 | | 0.020 | 0.10 |
| Xylenes, Total | <0.060 | | 0.060 | 0.30 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 107 | 36 - 158 |
| Trifluorotoluene (Surr) | 91 | 31 - 138 |

**Lab Control Sample - Batch: 560-41995**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: LCS 560-41995/1-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/10/2009 0912
Date Prepared: 11/10/2009 0818

Analysis Batch: 560-41994
Prep Batch: 560-41995
Units: mg/Kg

Instrument ID: VGC#1
Lab File ID: 11100902.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Benzene | 1.00 | 1.01 | 101 | 78 - 124 | |
| Toluene | 1.00 | 1.06 | 106 | 80 - 126 | |
| Ethylbenzene | 1.00 | 1.03 | 103 | 80 - 124 | |
| Xylenes, Total | 2.00 | 2.03 | 101 | 80 - 135 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 103 | 36 - 158 |
| Trifluorotoluene (Surr) | 86 | 31 - 138 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 560-42017**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: MB 560-42017/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/10/2009 1413
Date Prepared: 11/10/2009 1413

Analysis Batch: 560-42017
Prep Batch: N/A
Units: mg/L

Instrument ID: VGC#3
Lab File ID: 11100904.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Benzene | <0.000096 | | 0.000096 | 0.0020 |
| Toluene | <0.00020 | | 0.00020 | 0.0020 |
| Ethylbenzene | <0.000087 | | 0.000087 | 0.0020 |
| Xylenes, Total | <0.00034 | | 0.00034 | 0.0060 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 94 | 58 - 129 |
| Trifluorotoluene (Surr) | 95 | 62 - 128 |

**Lab Control Sample - Batch: 560-42017**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: LCS 560-42017/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/10/2009 1312
Date Prepared: 11/10/2009 1312

Analysis Batch: 560-42017
Prep Batch: N/A
Units: mg/L

Instrument ID: VGC#3
Lab File ID: 11100902.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Benzene | 0.0200 | 0.0206 | 103 | 75 - 120 | |
| Toluene | 0.0200 | 0.0212 | 106 | 79 - 120 | |
| Ethylbenzene | 0.0200 | 0.0217 | 109 | 79 - 120 | |
| Xylenes, Total | 0.0400 | 0.0438 | 109 | 80 - 120 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 100 | 58 - 129 |
| Trifluorotoluene (Surr) | 99 | 62 - 128 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 560-42058**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: MB 560-42058/2-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/11/2009 1030
Date Prepared: 11/11/2009 0914

Analysis Batch: 560-42054
Prep Batch: 560-42058
Units: mg/Kg

Instrument ID: VGC#1
Lab File ID: 11110903.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Benzene | <0.020 | | 0.020 | 0.10 |
| Toluene | <0.020 | | 0.020 | 0.10 |
| Ethylbenzene | <0.020 | | 0.020 | 0.10 |
| Xylenes, Total | <0.060 | | 0.060 | 0.30 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 99 | 36 - 158 |
| Trifluorotoluene (Surr) | 84 | 31 - 138 |

**Lab Control Sample - Batch: 560-42058**

**Method: 8021B**
**Preparation: 5030B**

Lab Sample ID: LCS 560-42058/1-A
Client Matrix: Solid
Dilution: 50
Date Analyzed: 11/11/2009 1001
Date Prepared: 11/11/2009 0914

Analysis Batch: 560-42054
Prep Batch: 560-42058
Units: mg/Kg

Instrument ID: VGC#1
Lab File ID: 11110902.D
Initial Weight/Volume: 5 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Benzene | 1.00 | 1.14 | 114 | 78 - 124 | |
| Toluene | 1.00 | 1.16 | 116 | 80 - 126 | |
| Ethylbenzene | 1.00 | 1.08 | 108 | 80 - 124 | |
| Xylenes, Total | 2.00 | 2.18 | 109 | 80 - 135 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| 4-Bromofluorobenzene (Surr) | 108 | 36 - 158 |
| Trifluorotoluene (Surr) | 96 | 31 - 138 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Method Blank - Batch: 560-42080**

**Method: 8015D**
**Preparation: 3550B**

Lab Sample ID: MB 560-42080/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/11/2009 1724
Date Prepared: 11/11/2009 1100

Analysis Batch: 560-42095
Prep Batch: 560-42080
Units: mg/Kg

Instrument ID: SVGC#4
Lab File ID: 11110903.D
Initial Weight/Volume: 30.02 g
Final Weight/Volume: 5 mL
Injection Volume: 1 uL

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Diesel (C10-C28) | 3.13 | J | 1.2 | 10 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| o-Terphenyl | 87 | 55 - 120 |

**Lab Control Sample - Batch: 560-42080**

**Method: 8015D**
**Preparation: 3550B**

Lab Sample ID: LCS 560-42080/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/11/2009 1732
Date Prepared: 11/11/2009 1100

Analysis Batch: 560-42095
Prep Batch: 560-42080
Units: mg/Kg

Instrument ID: SVGC#4
Lab File ID: 11110904.D
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 5 mL
Injection Volume: 1 uL

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Diesel (C10-C28) | 167 | 153 | 92 | 38 - 131 | |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| o-Terphenyl | 91 | 55 - 120 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 560-42080**

**Method: 8015D**
**Preparation: 3550B**

| | | | |
|---|---|---|---|
| MS Lab Sample ID: | 560-17997-1 | Analysis Batch: 560-42095 | Instrument ID: SVGC#4 |
| Client Matrix: | Solid | Prep Batch: 560-42080 | Lab File ID: 11110916.D |
| Dilution: | 5.0 | | Initial Weight/Volume: 29.97 g |
| Date Analyzed: | 11/11/2009 1925 | | Final Weight/Volume: 5 mL |
| Date Prepared: | 11/11/2009 1100 | | Injection Volume: 1 uL |

| | | | |
|---|---|---|---|
| MSD Lab Sample ID: | 560-17997-1 | Analysis Batch: 560-42095 | Instrument ID: SVGC#4 |
| Client Matrix: | Solid | Prep Batch: 560-42080 | Lab File ID: 11110917.D |
| Dilution: | 5.0 | | Initial Weight/Volume: 29.98 g |
| Date Analyzed: | 11/11/2009 1934 | | Final Weight/Volume: 5 mL |
| Date Prepared: | 11/11/2009 1100 | | Injection Volume: 1 uL |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Diesel (C10-C28) | 213 | 136 | 38 - 131 | 7.2 | 30.0 | 4 | 4 |

| Surrogate | MS % Rec | MSD % Rec | Acceptance Limits |
|---|---|---|---|
| o-Terphenyl | 96 | 91 | 55 - 120 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2.8 °C
4.6 °C
4.5 °C seal IR5

No. 28065

NEW MEXICO
TRUNK A SEPARATOR

# CHAIN OF CUSTODY RECORD

17997

| CUSTOMER INFORMATION | | PROJECT INFORMATION | |
|---|---|---|---|
| COMPANY: | SOUTHWEST GEOSCIENCE | PROJECT NAME/NUMBER: | 0209011- TRUNK A |
| SEND REPORT TO: | CHRIS MIRTHEL | BILLING INFORMATION | |
| ADDRESS: | 8620 N. NEW BRAUNFELS | BILL TO: | |
| | SUITE 531 | ADDRESS: | |
| | SA TX 78217 | | |
| PHONE: | (210) 804-9922 | PHONE: | |
| FAX: | (210) 804-9944 | FAX: PO NO: | |

| SAMPLE NO | SAMPLE DESCRIPTION | SAMPLE DATE | SAMPLE TIME | SAMPLE MATRIX | CONTAINER | PRESERV. | NUMBER OF CONTAINERS | ANALYSIS/METHOD REQUEST: TPH (SW-846 # 8015) Modified; BTEX (SW-846 # 8021) | LAB JOB NO. | REMARKS/PRECAUTIONS |
|---|---|---|---|---|---|---|---|---|---|---|
| | B-1 (13-14) | 11.5.09 | 1635 | SOIL | 4 | 4°C/MeOH | | ✓ ✓ | | |
| | B-1 (56-57) | 11.5.09 | 1645 | SOIL | 4 | 4°C/MeOH | | ✓ ✓ | | |
| | B-1 (99-100) | 11.5.09 | 1650 | SOIL | 4 | 4°C/MeOH | | ✓ ✓ | | |

No Further Entries

SAMPLER: Chris Mirthel

SHIPMENT METHOD: Greyhound

AIRBILL NO.: GLI 3055163628

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☒ ROUTINE ☐ OTHER

| 1. RELINQUISHED BY: | DATE | 2. RELINQUISHED BY: | DATE | 3. RELINQUISHED BY: | DATE |
|---|---|---|---|---|---|
| SIGNATURE: | 11-6-09 | SIGNATURE: | 11-6-09 | SIGNATURE: | |
| PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: | TIME |
| 1. RECEIVED BY: | DATE | 2. RECEIVED BY: | DATE | 3. RECEIVED BY: | DATE |
| SIGNATURE: | 11-6-09 | SIGNATURE: | 11/7/09 | SIGNATURE: | |
| PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: Paul Ortiz TAL | TIME 0848 | PRINTED NAME/COMPANY: | TIME |

TAL-8222-560 (0808)


TestAmerica
1733 N. Padre Island Drive
Corpus Christi, TX 78408
Phone: 361.289.2673 /Fax: 361.289.2471

# Login Sample Receipt Check List

Client: Southwest Geoscience

Job Number: 560-17997-1

**Login Number: 17997**
**Creator: Ortiz, Paul**
**List Number: 1**

**List Source: TestAmerica Corpus Christi**

| Question | T / F/ NA | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | 2.8, 4.6, 4.0 C |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | True | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Is the Field Sampler's name present on COC? | True | |
| Sample Preservation Verified | True | |

# Login Sample Receipt Check List

Client: Southwest Geoscience

Job Number: 560-17997-1

**Login Number: 17997**
**Creator: Hedaria, Raven**
**List Number: 1**

**List Source: TestAmerica Pensacola**
**List Creation: 11/17/09 11:34 AM**

| Question | T / F/ NA | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | 0.6°C |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time. | True | Samples received with >50% hold time expired. |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | Volatile soils received in bulk jar. |
| Sample bottles are completely filled. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | N/A | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Is the Field Sampler's name present on COC? | True | |
| Sample Preservation Verified | True | |

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 560-17997-2

Job Description: 0209011- Trunk A Separator TX TPH

For:
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Attention: Mr. Chris Mitchell

Erica H Padilla

Approved for release.
Erica Padilla
Project Manager I
12/11/2009 3:21 PM

Erica Padilla
Project Manager I
erica.padilla@testamericainc.com
12/11/2009

The test results entered in this report meet all NELAC requirements for accredited parameters. Any exceptions to NELAC requirements are noted in the report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. TestAmerica Corpus Christi Certifications and Approvals: NELAC TX T104704210-TX, NELAC KS E-10362, Oklahoma 9968, USDA Soil Permit P330-08-00033.

**Job Narrative**
**560-17997-2**

**Comments**
A deviation from the chain-of-custody has occurred. Following the completion of analyses requested on the COC, the client requested that sample 560-17992-2 (B-1 (56-57)) be analyzed for TCEQ method TX 1006. TCEQ method TX 1005 is a precursory requirement for TX 1006 analysis. Therefore, the current report contains both TX 1005 and TX 1006 data. This report is intended to be used in conjunction with and not as a replacement for report 560-17997-1.

No additional comments.

**Receipt**
All samples were received in good condition within temperature requirements.

**GC Semi VOA**
Sample 560-17997-2 was analyzed for TPH using TCEQ Method TX 1005. Percent recovery of 1-chlorooctane surrogate was outside acceptable limits. Matrix interference was evident. The LCS was within acceptable limits. Therefore, data are reported.

TPH was detected in the TX 1005 method blank (MB) associated with this sample. However, the amount detected was less than the reporting limit (RL). Therefore, data are reported.

Sample 560-17997-2 was analyzed for TPH fractions using TCEQ Method TX 1006. Per the method, solid samples have a holding time of 28 days after sampling. Please note that analysis occurred within the 28 day holding time window. Therefore, TX 1006 data are not flagged as analyzed out-of-holding time.

TPH was detected in the TX 1006 method blank (MB) associated with this sample. However, the amount detected was less than the reporting limit (RL). Therefore, data are reported.

No other analytical or quality issues were noted.

**Organic Prep**
Sample 560-17997-2 was prepped for TPH using TCEQ Method TX 1005. Per the method, solids should be prepped or frozen within 48 hours of sampling. Frozen samples should be prepped within 14 days of sampling. Samples were not frozen within 48 hours and the request for analysis was placed after the 14 day holding time expired. Data generated after holding time expires should be considered estimated and used at the client's discretion.

No other analytical or quality issues were noted.

## EXECUTIVE SUMMARY - Detections

Client: Southwest Geoscience

Job Number: 560-17997-2

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **560-17997-2** | **B-1 (56-57)** | | | | | |
| Over C12-C28 | | 3900 | H B | 560 | mg/Kg | TX 1005 |
| Over C28-C35 | | 360 | J H B | 560 | mg/Kg | TX 1005 |
| C6-C12 | | 1100 | H | 560 | mg/Kg | TX 1005 |
| C6-C35 | | 5400 | H B | 560 | mg/Kg | TX 1005 |
| Over C6-C8 aliphatics | | 120 | J | 560 | mg/Kg | TX 1006 |
| Over C8-C10 aliphatics | | 590 | | 560 | mg/Kg | TX 1006 |
| Over C10-C12 aliphatics | | 430 | J | 560 | mg/Kg | TX 1006 |
| Over C12-C16 aliphatics | | 950 | | 560 | mg/Kg | TX 1006 |
| Over C16-C21 aliphatics | | 410 | J | 560 | mg/Kg | TX 1006 |
| Over C21-C35 aliphatics | | 620 | B | 560 | mg/Kg | TX 1006 |
| Over C21-C35 aromatics | | 170 | J B | 560 | mg/Kg | TX 1006 |
| Over C6-C35 aliphatics | | 3100 | B | 560 | mg/Kg | TX 1006 |
| Over C6-C35 aromatics | | 230 | J B | 560 | mg/Kg | TX 1006 |
| Over C6-C35 | | 3300 | B | 560 | mg/Kg | TX 1006 |

# METHOD SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-2

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Solid** | | | |
| Texas - Total Petroleum Hydrocarbon (GC) | TAL CC | TCEQ TX 1005 | |
| Extraction - Texas Total petroleum Hyrdocarbons | TAL CC | | TCEQ TX_1005_S_Prep |
| Texas - Total Petroleum Hydrocarbon Fractions (GC) | TAL CC | TCEQ TX 1006 | |
| Extraction - Texas Total petroleum Hyrdocarbons | TAL CC | | TCEQ TX_1005_S_Prep |
| Texas - Fractionation | TAL CC | | TCEQ TX 1006 Frac |

**Lab References:**

TAL CC = TestAmerica Corpus Christi

**Method References:**

TCEQ = Texas Commission of Environmental Quality

## METHOD / ANALYST SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-2

| Method | Analyst | Analyst ID |
|---|---|---|
| TCEQ TX 1005 | Craig, Bronson | BC |
| TCEQ TX 1006 | Kurz, Shauna | SK |

## SAMPLE SUMMARY

Client: Southwest Geoscience

Job Number: 560-17997-2

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 560-17997-2 | B-1 (56-57) | Solid | 11/05/2009 1645 | 11/07/2009 0848 |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-2

**Client Sample ID: B-1 (56-57)**
**Lab Sample ID: 560-17997-2**

Date Sampled: 11/05/2009 1645
Date Received: 11/07/2009 0848
Client Matrix: Solid
Percent Solids: 90

| Analyte | Result/Qualifier | | Unit | MDL | MQL | Dilution |
|---|---|---|---|---|---|---|
| **Method: TX 1005** | | | Date Analyzed: | | 12/01/2009 1118 | |
| **Prep Method: TX_1005_S_Prep** | | | Date Prepared: | | 11/30/2009 1041 | |
| Over C12-C28 | 3900 | H B | mg/Kg | 67 | 560 | 10 |
| Over C28-C35 | 360 | J H B | mg/Kg | 67 | 560 | 10 |
| C6-C12 | 1100 | H | mg/Kg | 67 | 560 | 10 |
| C6-C35 | 5400 | H B | mg/Kg | 67 | 560 | 10 |
| Surrogate | | | | | Acceptance Limits | |
| o-Terphenyl (Surr) | 100 | | % | | 70 - 130 | |
| 1-Chlorooctane (Surr) | 133 | X | % | | 70 - 130 | |

Mr. Chris Mitchell
Southwest Geoscience
8620 N. New Braunfels Ave.
Suite 531
San Antonio, TX 78217

Job Number: 560-17997-2

**Client Sample ID: B-1 (56-57)**
**Lab Sample ID: 560-17997-2**

Date Sampled: 11/05/2009 1645
Date Received: 11/07/2009 0848
Client Matrix: Solid
Percent Solids: 90

| Analyte | Result/Qualifier | | Unit | MDL | RL | Dilution |
|---|---|---|---|---|---|---|
| **Method: TX 1006** | | | Date Analyzed: | | 12/02/2009 1551 | |
| **Prep Method: TX 1006 Frac** | | | Date Prepared: | | 12/02/2009 0830 | |
| nC6 Aliphatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C6-C8 aliphatics | 120 | J | mg/Kg | 67 | 560 | 10 |
| Over C8-C10 aliphatics | 590 | | mg/Kg | 67 | 560 | 10 |
| Over C10-C12 aliphatics | 430 | J | mg/Kg | 67 | 560 | 10 |
| Over C12-C16 aliphatics | 950 | | mg/Kg | 67 | 560 | 10 |
| Over C16-C21 aliphatics | 410 | J | mg/Kg | 67 | 560 | 10 |
| Over C21-C35 aliphatics | 620 | B | mg/Kg | 67 | 560 | 10 |
| Over C21-C35 aromatics | 170 | J B | mg/Kg | 67 | 560 | 10 |
| Over C6-C35 aliphatics | 3100 | B | mg/Kg | 67 | 560 | 10 |
| Over C7-C8 aromatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C8-C10 aromatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C10-C12 aromatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C12-C16 aromatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C16-C21 aromatics | <67 | | mg/Kg | 67 | 560 | 10 |
| Over C6-C35 aromatics | 230 | J B | mg/Kg | 67 | 560 | 10 |
| Over C6-C35 | 3300 | B | mg/Kg | 67 | 560 | 10 |

## DATA REPORTING QUALIFIERS

Client: Southwest Geoscience

Job Number: 560-17997-2

| Lab Section | Qualifier | Description |
|---|---|---|
| GC Semi VOA | | |
| | B | Compound was found in the blank and sample. |
| | J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| | H | Sample was prepped or analyzed beyond the specified holding time |
| | X | Surrogate exceeds the control limits |

# QUALITY CONTROL RESULTS

Client: Southwest Geoscience

Job Number: 560-17997-2

**Method Blank - Batch: 560-42692**

**Method: TX 1005**
**Preparation: TX_1005_S_Prep**

Lab Sample ID: MB 560-42692/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/30/2009 1521
Date Prepared: 11/30/2009 0915

Analysis Batch: 560-42710
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: SVGC#4
Lab File ID: 11300913.D
Initial Weight/Volume: 9.99 g
Final Weight/Volume: 10 mL
Injection Volume: 1 uL

| Analyte | Result | Qual | MDL | MQL |
|---|---|---|---|---|
| Over C12-C28 | 7.04 | J | 6.0 | 50 |
| Over C28-C35 | 7.42 | J | 6.0 | 50 |
| C6-C12 | <6.0 | | 6.0 | 50 |
| C6-C35 | 14.5 | J | 6.0 | 50 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| o-Terphenyl (Surr) | 102 | 70 - 130 |
| 1-Chlorooctane (Surr) | 100 | 70 - 130 |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 560-42692**

**Method: TX 1005**
**Preparation: TX_1005_S_Prep**

LCS Lab Sample ID: LCS 560-42692/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/30/2009 1530
Date Prepared: 11/30/2009 0915

Analysis Batch: 560-42710
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: SVGC#4
Lab File ID: 11300914.D
Initial Weight/Volume: 9.99 g
Final Weight/Volume: 10 mL
Injection Volume: 1 uL

LCSD Lab Sample ID: LCSD 560-42692/3-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/30/2009 1540
Date Prepared: 11/30/2009 0915

Analysis Batch: 560-42710
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: SVGC#4
Lab File ID: 11300915.D
Initial Weight/Volume: 10.01 g
Final Weight/Volume: 10 mL
Injection Volume: 1 uL

| Analyte | % Rec. LCS | LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
|---|---|---|---|---|---|---|---|
| C6-C35 | 108 | 105 | 75 - 125 | 3 | 20 | | |

| Surrogate | LCS % Rec | LCSD % Rec | Acceptance Limits |
|---|---|---|---|
| o-Terphenyl (Surr) | 97 | 93 | 70 - 130 |
| 1-Chlorooctane (Surr) | 98 | 94 | 70 - 130 |

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Southwest Geoscience

Job Number: 560-17997-2

**Method Blank - Batch: 560-42692**

**Method: TX 1006**
**Preparation: TX 1006 Frac**

Lab Sample ID: MB 560-42692/1-B
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/02/2009 1551
Date Prepared: 12/02/2009 0830

Analysis Batch: 560-42912
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 9.99 g
Final Weight/Volume: 10 mL
Injection Volume:

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| nC6 Aliphatics | <6.0 | | 6.0 | 50 |
| Over C6-C8 aliphatics | <6.0 | | 6.0 | 50 |
| Over C8-C10 aliphatics | <6.0 | | 6.0 | 50 |
| Over C10-C12 aliphatics | <6.0 | | 6.0 | 50 |
| Over C12-C16 aliphatics | <6.0 | | 6.0 | 50 |
| Over C16-C21 aliphatics | <6.0 | | 6.0 | 50 |
| Over C21-C35 aliphatics | 8.93 | J | 6.0 | 50 |
| Over C21-C35 aromatics | 9.08 | J | 6.0 | 50 |
| Over C6-C35 aliphatics | 8.93 | J | 6.0 | 50 |
| Over C7-C8 aromatics | <6.0 | | 6.0 | 50 |
| Over C8-C10 aromatics | <6.0 | | 6.0 | 50 |
| Over C10-C12 aromatics | <6.0 | | 6.0 | 50 |
| Over C12-C16 aromatics | <6.0 | | 6.0 | 50 |
| Over C16-C21 aromatics | <6.0 | | 6.0 | 50 |
| Over C6-C35 aromatics | 9.08 | J | 6.0 | 50 |
| Over C6-C35 | 18.0 | J | 6.0 | 50 |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 560-42692**

**Method: TX 1006**
**Preparation: TX 1006 Frac**

LCS Lab Sample ID: LCS 560-42692/2-B
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/02/2009 1551
Date Prepared: 12/02/2009 0830

Analysis Batch: 560-42912
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 9.99 g
Final Weight/Volume: 10 mL
Injection Volume:

LCSD Lab Sample ID: LCSD 560-42692/3-B
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/02/2009 1551
Date Prepared: 12/02/2009 0830

Analysis Batch: 560-42912
Prep Batch: 560-42692
Units: mg/Kg

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10.01 g
Final Weight/Volume: 10 mL
Injection Volume:

| Analyte | % Rec. LCS | % Rec. LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
|---|---|---|---|---|---|---|---|
| Over C6-C35 | 73 | 88 | 60 - 140 | 16 | 20 | | |

Calculations are performed before rounding to avoid round-off errors in calculated results.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2.8 °C
4.6 °C
4.5 °C

No. 28065

NEW MEXICO
TRUNK A SEPARATOR

Seal IRS

# CHAIN OF CUSTODY RECORD

17997

| CUSTOMER INFORMATION | | PROJECT INFORMATION | |
|---|---|---|---|
| COMPANY: | SOUTHWEST GEOSCIENCE | PROJECT NAME/NUMBER: | 0209011- TRUNK A |
| SEND REPORT TO: | CHRIS MIRHEL | **BILLING INFORMATION** | |
| ADDRESS: | 8620 N. NEW BRAUNFELS | BILL TO: | |
| | SUITE 531 | ADDRESS: | |
| | SA TX 78217 | | |
| PHONE: | (210) 804-9922 | PHONE: | |
| FAX: | (210) 804-9944 | FAX: | PO NO: |

NUMBER OF CONTAINERS

ANALYSIS/METHOD REQUEST

TPH (SW-846 #8015 Diesel)
BTEX (SW-846 #8021)

LAB JOB NO.

| SAMPLE NO | SAMPLE DESCRIPTION | SAMPLE DATE | SAMPLE TIME | SAMPLE MATRIX | CONTAINER | PRESERV. | REMARKS/PRECAUTIONS |
|---|---|---|---|---|---|---|---|
| | B-1 (13-14) | 11.5.09 | 1635 | SOIL | 4 | 4°C/METH | |
| | B-1 (56-57) | 11.5.09 | 1645 | SOIL | 4 | 4°C/METH | |
| | B-1 (99-100) | 11.5.09 | 1650 | SOIL | 4 | 4°C/METH | |

No Further Entries

SAMPLER: C. Chris Mirhel

SHIPMENT METHOD: Greyhound

AIRBILL NO.: GLI 3055163628

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☒ ROUTINE ☐ OTHER

| 1. RELINQUISHED BY: | DATE | 2. RELINQUISHED BY: | DATE | 3. RELINQUISHED BY: | DATE |
|---|---|---|---|---|---|
| SIGNATURE: | 11-6-09 | SIGNATURE: | 11-6-09 | SIGNATURE: | |
| PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: | TIME |
| 1. RECEIVED BY: | DATE | 2. RECEIVED BY: | DATE | 3. RECEIVED BY: | DATE |
| SIGNATURE: | 11-6-09 | SIGNATURE: | 11/7/09 | SIGNATURE: | |
| PRINTED NAME/COMPANY: | TIME 13:11 | PRINTED NAME/COMPANY: Paul Ortiz TAL | TIME 0848 | PRINTED NAME/COMPANY: | TIME |





TestAmerica
1733 N. Padre Island Drive
Corpus Christi, TX 78408
Phone: 361.289.2673 /Fax: 361.289.2471

# Login Sample Receipt Check List

Client: Southwest Geoscience

Job Number: 560-17997-2

**Login Number: 17997**
**Creator: Ortiz, Paul**
**List Number: 1**

**List Source: TestAmerica Corpus Christi**

| Question | T / F/ NA | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | 2.8, 4.6, 4.0 C |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | True | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Is the Field Sampler's name present on COC? | True | |
| Sample Preservation Verified | True | |

Southwest GEOSCIENCE

# APPENDIX G

# Remedy® Information

# MATERIAL SAFETY DATA SHEET

REMEDY MICROBIAL PRODUCT

**MSDS DATE:** 12/1/2009

## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| PRODUCT NAME: | REMEDY Spill Solution |
| COMMON NAME: | Remediation Product, Bacterial Growth Additive |
| MANUFACTURER: | Lighthouse Environmental Services Inc. |
| ADDRESS: | 4218 Pasadena Blvd.<br>Pasadena, Texas 77503 |
| EMERGENCY PHONE: | (281) 476-0030 |
| CHEMTREC PHONE: | 1-800-262-8200 |

## SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: All ingredients are organic and completely biodegradable. Does not contain hazardous components or ingredients.

| | |
|---|---|
| CAS No.: | N/A |
| %: | N/A |
| OSHA PEL: | N/A |
| ACGIH TLV : | N/A |

## SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

| | |
|---|---|
| Health Rating: | 0 - None |
| Flammability Rating: | 0 - None |
| Reactive Rating: | 1 - Slight |
| Contact Rating: | 1 – Slight |
| Protective Equipment: | Goggles; Apron: Proper Gloves |
| Storage Color Code: | Green (General Storage) |

ROUTES OF ENTRY:

POTENTIAL HEALTH EFFECTS

| | |
|---|---|
| EYES: | No adverse effects expected, but contact may cause mechanical irritation. |
| SKIN: | No adverse effects expected. |
| INGESTION: | Extremely large oral dosages may produce gastrointestinal disturbances. |
| INHALATION: | No adverse effects expected, but inhalation may cause slight nausea. |
| ACUTE HEALTH HAZARDS: | No information found. |
| CHRONIC HEALTH HAZARDS: | No information found. |

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Supersensitive individuals with skin or eye problems.

## SECTION 4: FIRST AID MEASURES

| | |
|---|---|
| EYES: | Immediately flush eyes for 15 minutes with water. |
| SKIN: | Wash exposed areas with soap and water. |

| | |
|---|---|
| INGESTION: | Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention. |
| INHALATION: | Remove victim to fresh air or oxygen supply. Seek medical attention if breathing difficulty persists. |

## SECTION 5: FIRE-FIGHTING MEASURES

| | |
|---|---|
| FLASH POINT: | Non-flammable |
| FLAMMABLE LIMITS: | Non-flammable |
| AUTOIGNITION TEMPERATURE: | Non-flammable |
| EXTINGUISHING MEDIA: | N/A |
| SPECIAL FIRE FIGHTING PROCEDURES: | None |
| UNUSUAL FIRE AND EXPLOSION HAZARDS: | None; Non-flammable |

## SECTION 6: ACCIDENTAL RELEASE MEASURES

| | |
|---|---|
| ACCIDENTAL RELEASE MEASURES: | Ventilate area of leak or spill and wear appropriate personal protective equipment as specified in Section 8. Containerize material for reclamation or disposal. |

## SECTION 7: HANDLING AND STORAGE

| | |
|---|---|
| HANDLING AND STORAGE: | To preserve product integrity, avoid temperatures under 32° or over 120°. Store in a tightly closed container and protect the container from physical damage. |
| OTHER PRECAUTIONS: | Do not freeze. |

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| | |
|---|---|
| VENTILATION : | Dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered. |
| RESPIRATORY PROTECTION: | In areas of concentration, dust mask recommended. |
| EYE PROTECTION: | Safety goggles. |
| SKIN PROTECTION: | Wear protective gloves, apron, and clean body-covering clothing. |
| WORK HYGIENIC PRACTICES: | Wash hand or skin contact areas thoroughly after use. |

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| APPEARANCE: | Clear to slightly tan |
| ODOR: | Develops odor of ammonia |
| PHYSICAL STATE: | Liquid |
| pH AS SUPPLIED: | 6.0 to 9.0 |
| BOILING POINT: | 100 °C |

| | |
|---|---|
| MELTING POINT: | N/A |
| VAPOR PRESSURE (mmHg): | 17.5 @ 20 °C |
| VAPOR DENSITY (AIR = 1): | N/A |
| SPECIFIC GRAVITY (H2O = 1): | 1.0 |
| EVAPORATION RATE: | N/A |
| SOLUBILITY IN WATER: | 100% Soluble |

## SECTION 10: STABILITY AND REACTIVITY

| | |
|---|---|
| STABILITY: | Stable under normal conditions |
| CONDITIONS TO AVOID: | Excessive Heat |
| INCOMPATIBILITY (MATERIAL TO AVOID): | Strong acids or alkali compounds may inactivate biological cultures. |
| HAZARDOUS POLYMERIZATION: | Will not occur. |
| OTHER REACTIVITIY CONCERNS: | Avoid incompatibilities. |

## SECTION 11: TOXICOLOGICAL INFORMATION

| | | |
|---|---|---|
| CARCINOGENICITY: | By NIP: | N/A |
| | By IAEC: | N/A |
| | OSHA Regulated: | N/A |

## SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: This material will 100% biodegrade when release to soil or water. When release to the air, this material is expected to have a half-life of less than 1 day.

## SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. If container cannot be reused, dispose of container and unused contents in accordance with federal, state and local requirements.

RCRA HAZARD CLASS: N/A

## SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

| | |
|---|---|
| PROPER SHIPPING NAME: | Not Regulated by U.S. Department of Transportation |
| HAZARD CLASS: | N/A |
| ID NUMBER: | N/A |
| PACKING GROUP: | N/A |
| LABEL STATEMENT: | N/A |

## SECTION 15: REGULATORY INFORMATION

| | |
|---|---|
| U.S. FEDERAL REGULATIONS | |
| TSCA (TOXIC SUBSTANCE CONTROL ACT): | N/A |
| CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): | N/A |
| SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT): | N/A |
| 311/312 HAZARD CATEGORIES: | N/A |
| 313 REPORTABLE INGREDIENTS: | N/A |
| STATE REGULATIONS: | N/A |
| INTERNATIONAL REGULATIONS: | N/A |

## SECTION 16: OTHER INFORMATION

**PREPARATION INFORMATION:** The information contained herein is based on data considered accurate in light of current information. The technical information and recommendations herein are reliable, but they are provided without warranty or guarantee of any kind, expressed or implied. This material safety data sheet was prepared to comply with 24 CFR 1910.1200.