

From: Fields, Vanessa, EMNRD
Sent: Friday, January 18, 2019 10:09 AM
To: 'Lindsay Dumas'
Cc: Billings, Bradford, EMNRD; Powell, Brandon, EMNRD; Smith, Cory, EMNRD
Subject: Meeting January 30, 2019 Items needed for meeting

Good morning Lindsay,

Per our phone conversation yesterday the OCD has requested a meeting with HilCorp to address items in HilCorp's Revised Site Remediation Plan for the SJ 28-6 #031 that was submitted to the OCD on January 8, 2019.

Below are the items that will need to be addressed to bring to meeting scheduled January 30, 2019 at 10:30 am.

- The OCD has discussed allowing HilCorp to start remediation activities however, the OCD will require full delineation as requested initially on May 31, 2018.
- Hilcorp will need to submit a complete SVE plan including design as well as entailing a 90% runtime.
- What remedial activities are planned for the historic release area?

Thank you,

Vanessa Fields
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 119
Cell: (505) 419-0463
vanessa.fields@state.nm.us

December 28, 2018

Lindsay Dumas
Hilcorp Energy Company
9 Road 5793, Ste A
Farmington, New Mexico 87401
[Electronic Mail: ldumas@hilcorp.com](mailto:ldumas@hilcorp.com)

NMOC

JAN 08 2019

DISTRICT III

**RE: Revised Site Remediation Plan
San Juan 28-6 #31
API# 30-039-07290
Incident No. NVF 1816655680
SW¼ SW¼, Section 28, T28N, R6W
Rio Arriba County, New Mexico**

Dear Ms. Dumas:

Animas Environmental Services, LLC (AES) has prepared this Revised Remediation Plan for a release which occurred May 25, 2018, at the Hilcorp Energy Company (Hilcorp) San Juan 28-6 #31, located in Rio Arriba County, New Mexico. The release consisted of approximately 11.8 barrels (bbls) of condensate and 2.1 bbls of produced water and was the result of corrosion on the bottom of the production tank.

On May 31, June 27, August 22, October 2, and October 8, 2018, AES completed a release assessment and site delineation at the Hilcorp San Juan 28-6 #31. Petroleum hydrocarbon impacted soils were found to be present near the condensate tank, which was the source of the release, but also extended east and south of the containment berm. While concentrations near the condensate tank reflect the recent release, petroleum hydrocarbon concentrations to the east and south appear to be associated with historic contamination at the site. Remediation of petroleum contaminated soils via soil vapor extraction is proposed for the site. No groundwater was encountered during any of the site work; the maximum vertical extent of soil impacts is approximately about 25 ft bgs (in sandstone) in an area east and south of the secondary containment berm.

A Remediation Plan dated November 6, 2018, was submitted to New Mexico Oil Conservation Division (NMOC) for review, and a project meeting was held with NMOC, Hilcorp and AES on November 14, 2018, to discuss site conditions and the remedial strategy. Based on those discussions, Hilcorp submitted an

604 W. Piñon St.
Farmington, NM 87401
505-564-2281

1911 Main, Ste 206
Durango, CO 81301
970-403-3084

Additional Site Delineation Workplan to NMOCD on November 29, 2018. AES completed additional site work on December 5, 2018, and the results of the field work have been incorporated into this Revised Remediation Plan.

1.0 Site Information

1.1 Location

Site Name – San Juan 28-6 #31

API# – 30-039-07290

Legal Description – SW¼ SW¼, Section 28, T28N, R6W, Rio Arriba County, New Mexico

Release Latitude/Longitude – N36.62757 and W107.47815, respectively

Land Jurisdiction – Bureau of Land Management (BLM)

Figure 1. Topographic Site Location Map

Figure 2. Aerial Site Location Map, May 2018

1.2 NMOCD Ranking

The subject release occurred in May 2018; however, Hilcorp is complying with NMOCD's request to conform to release regulations that were adopted on August 14, 2018. In accordance with NMAC 19.15.29.12 Table I (August 2018), release closure criteria for this location are based on the minimum depth to groundwater within the horizontal extent of the release area and proximity to sensitive receptors:

- **Depth to Groundwater:** A cathodic report dated May 1991 reported groundwater at 250 ft below ground surface (bgs).
- **Sensitive Receptor Determination:** The site does not occur within any of the areas listed within NMAC 19.15.29.12C.4, where releases must be treated as if they occur less than 50 feet bgs to groundwater.

New Action levels are:

- 10 mg/kg benzene and 50 mg/kg total benzene, toluene, ethylbenzene, and xylene (BTEX);
- 1,000 mg/kg total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and diesel range organics (DRO);
- 2,500 mg/kg TPH as GRO/DRO and motor oil range organics (MRO); and
- 20,000 mg/kg chloride.

2.0 Site Assessment and Delineation

AES was initially contacted by Lindsay Dumas of Hilcorp on May 29, 2018. Subsequent field work is summarized as follows:

- May 31 and June 27, 2018 - AES completed the initial release assessment and delineation field work via hand auger.
- August 22, 2018 - AES and GeoMat, Inc. (GeoMat) completed four soil borings (SB-16, SB-17, SB-18, and SB-23).
- October 2, 2018 – AES and GeoMat completed two borings (SB-19 and SB-22).
- October 8, 2018 – AES and GeoMat completed two borings (SB-20 and SB-21).
- December 5, 2018 – AES and EarthWorx installed seven additional borings (SB-4R through SB-8R, SB-24/SVE-4, and SVE-5).

Soil borings installed by GeoMat were completed with a hollow stem auger drilling rig and were terminated between 20 and 30 ft; however, note that dense weathered sandstone was encountered between about 12 to 15 feet below grade, with hard, dense sandstone below. Borings were advanced into sandstone to define the vertical extent of contaminant impact, and three soil vapor extraction wells were installed, including SVE-1 (SB-21), SVE-2 (SB-20), and SVE-3 (SB-19).

Borings installed by EarthWorx in December 2018 were advanced with a track-mounted direct push GeoProbe rig to the top of dense weathered sandstone at about 12 feet below grade, where the direct push rods encountered refusal. Five SVE wells (SB-4R through SB-8R) were installed within the earthen berm containment area, each completed with 5-feet of screen, between 7 and 12 feet below grade. Two additional SVE wells were installed between the berm and the separator, SVE-4 and SVE-5.

Groundwater was not encountered during any site assessment or delineation field work. Soil boring locations are presented on Figure 3.

2.1 Subsurface Lithology

Geologic subsurface lithology encountered included poorly graded fine-grained sand from 0 to approximately 7 ft bgs, transitioning to a sand and clayey sand between 7 and 12 ft bgs, weathered sandstone from about 12 to 15 bgs, and dense sandstone extending to the terminal depths of the borings, between 23 and 35 ft bgs. Geological cross sections of the site are included as Figures 4A and 4B.

2.2 Soil Sampling

For field work through October 2018, 50 soil samples from 23 borings (SB-1 through SB-23) were collected during the assessment and delineation field work. All soil samples were field screened for volatile organic compounds (VOCs), and selected samples were also analyzed for TPH. A total of 35 samples were also submitted for confirmation laboratory analysis.

All soil samples collected during the additional delineation work in December 2018 were field screened for VOCs, and 12 soil samples were submitted for laboratory analysis.

2.2.1 Field Screening

Volatile Organic Compounds

Field screening for VOC vapors was conducted with a photo-ionization detector (PID) organic vapor meter (OVM). Before beginning field screening, the PID-OVM was first calibrated with 100 parts per million (ppm) isobutylene gas in accordance with U.S. Environmental Protection Agency (USEPA) Method 3815.

Total Petroleum Hydrocarbons

Select soil samples were also analyzed in the field for TPH per USEPA Method 418.1 using a Buck Scientific Model HC-404 Total Hydrocarbon Analyzer Infrared Spectrometer (Buck). A 3-point calibration was completed prior to conducting soil analyses. Field analytical protocol followed AES' *Standard Operating Procedure: Field Analysis Total Petroleum Hydrocarbons per USEPA Method 418.1*.

2.2.2 Soil Samples for Laboratory Analyses

The samples collected for laboratory analysis were placed into new, clean, laboratory-supplied containers, which were then labeled, placed on ice, and logged onto sample chain of custody records. The samples were maintained on ice until delivery to the analytical laboratory, Pace Analytical Laboratories (Pace).

Laboratory Analyses

The samples were laboratory analyzed for:

- Benzene, toluene, ethylbenzene, and xylene (BTEX) per USEPA Method 8021B; and
- TPH as gasoline range organics (GRO), diesel range organics (DRO), and motor oil range organics (MRO) per USEPA Method 8015M/D.

2.3 Field Screening and Laboratory Analytical Results

2.3.1 Field Screening Results

May and June 2018 release assessment field screening followed standards found in NMOCD *Guidelines for Remediation of Leaks, Spills, and Releases* (August 1993). Field screening results above the NMOCD action level of 100 ppm VOCs and 5,000 mg/kg TPH were reported in SB-4 through SB-10, SB-12 through SB-15, SB-19 through SB-21, and SB-23. The highest VOC concentration was reported in SB-7 at 20 ft with 31,824 ppm, and the highest TPH concentration was reported in SB-12 at 10 ft with 2,000 mg/kg.

2.3.2 Laboratory Analytical Results

Laboratory analyses were used to confirm field screening results.

- Benzene concentrations were reported below the NMOCD action levels of 10 mg/kg in all samples except SB-10 at 10 ft (19.6 mg/kg); SB-5R at 13 ft (10.8 mg/kg); and SB-24 at 8 ft (30.3 mg/kg) and 12 ft (29.8 mg/kg).
- Total BTEX concentrations exceeded the NMOCD action level of 50 mg/kg in SB-4/4R through SB-6/6R, SB-8R, SB-10, SB-12 through SB-15, with the highest BTEX concentration reported in SB-24 at 8 ft (1226 mg/kg).
- TPH concentrations as GRO/DRO were reported above the NMOCD action level of 1,000 mg/kg in SB-4R, SB-5/5R, SB-6/6R, SB-8R, SB-10, SB-12 through SB-15 and SB-24, with the highest concentration reported in SB-24 at 8 ft bgs with 20,242 mg/kg.
- TPH concentrations as GRO/DRO/MRO were reported above the NMOCD action level of 2,500 mg/kg in SB-4R, SB-5R, SB-6R, SB-8R, SB-10 and SB-12 through SB-15, with the highest concentration reported in SB-10 at 10 ft bgs with 20,242 mg/kg.

Field screening results are summarized on the attached AES Field Screening Reports. Laboratory analytical results are included on Figures 3, 4A and 4B, and laboratory analytical reports are attached.

2.4 Vertical and Lateral Extent of Petroleum Hydrocarbon Impacts

The lateral extents of petroleum hydrocarbon impacts (including historic contamination) extend from the condensate tank to the BGT area as well as outside the berm to the east, including between the separator and meter house. Note that contaminant concentrations outside the berm had higher concentrations of DRO at deeper intervals, indicating heavier and possibly older, historic impacts from petroleum hydrocarbons.

The estimated lateral extent of subsurface petroleum hydrocarbon impacts is included on Figure 3.

Vertically, petroleum hydrocarbon contaminant concentrations in excess of the NMOCD action levels were found at about 10 ft bgs within the clayey sand layer but appear to extend to approximately 25 ft bgs (weathered sandstone and dense sandstone) in the area of SB-10, SB-14, and SB-15. The presence of higher BTEX concentrations near the condensate tank (release location) are indicative of impacts from the recent release.

The additional borings advanced inside the berm in December 2018 allowed for collection and laboratory confirmation of the highest VOC concentrations measured during May and June 2018 field work (in the interval just above weathered sandstone at about 10 to 12 ft). However, the use of the direct push GeoProbe rig did not allow for extending boring depths beyond 12 feet, so vertical extent could not be confirmed in these borings (SB-4R through SB-8R). Note that borings SB-7 and SB-8 (installed in June 2018 and which are 25 ft apart), were advanced to between 25 and 35 ft below grade, and vertical extent was confirmed via laboratory analyses in these borings.

No groundwater was encountered during any of the site work, and based on available information, depth to groundwater is anticipated to be at least 100 ft bgs. The estimated vertical extents of petroleum hydrocarbon impacts in soil are found on Figures 4A and 4B.

3.0 Remediation Plan

In October 2018, AES installed three soil vapor extraction (SVE) wells, SVE-1, SVE-2, and SVE-3, as a preliminary mitigation measure. In December 2018, five additional SVE wells were installed inside the secondary containment berm (SB-4R through SB-8R), and two additional SVE wells, SVE-4 and SVE-5, were installed between the berm and the separator. The SVE wells will serve to volatilize and remove contaminants through desorption of contaminants from the surface of soil particles, and through biodegradation of contaminants by moving air through subsurface soil pore spaces.

3.1 Soil Vapor Extraction Well Installation, October 2018

On October 2 and 8, 2018, a CME-75 drill rig was utilized to install three 2-inch diameter PVC SVE wells to a depth of approximately 25 ft bgs in borings SB-19, SB-20 and SB-21. The SVE wells were screened between 10 ft and 25 ft bgs, and the annular space was filled with 10-20 silica sand from the base of the SVE well up to a depth of 8 ft bgs (2 ft above the top of the screened interval). A hydrated bentonite seal was placed from 8 ft

bgs to surface grade. Each SVE was completed with a 3-ft stick up completion with a protective metal shroud.

On December 5, 2018, seven additional SVE wells were installed with a direct push GeoProbe, and each consisted of 2-inch diameter PVC wells screened between 7 and 12 ft bgs (terminal depths of borings, with refusal at top of dense sandstone). SVE well locations are presented on Figure 3, and soil boring logs with SVE well construction details are included as an attachment.

3.2 Soil Vapor Extraction System

Soil vapor extraction (SVE) is proposed to be conducted with an integrated unit which includes the following:

- Ametek Rotron model EN656M5XL (*or equivalent*), rated for Hazardous Location Class I, Group D, Class II Group F&G; aluminum fan regenerative blower capable of approx 100 CFM (+/- 10%), -50 inches W.C.; blower motor will be XP, 230 volt, 3HP, single phase with thermal overload protection;
- Explosion proof power disconnect on/off switch (NEMA 7 Enclosure);
- Manual dilution air valve;
- Two vacuum gauges;
- Duotec model H3A-1SL vacuum switch to protect the blower from overheating (by detecting a blockage in the line); Rated for Hazardous locations, Class I Group B,C & D and Class II Group E,F& G;
- Moisture separator capable of removing vapor from an air flow of up to 350 SCFM with the following features:
 - Integral Mist Eliminator/Particulate Filter
 - 37 gallon capacity, steel canister with epoxy coated interior.
 - High efficiency cyclonic separation.
 - Inherent safe collection design.
 - Outfitted with drain for convenient removal of fluids.
 - W.E. Anderson, Flotect model L-6, high liquid level switch system (will shut down the blower to protect the blower from flooding when the moisture separator is full); rated for Hazardous location, Class I Group A, B, C & D, Class II Group E, F & G.
- Mounted and wired in a metal HazMat Station, with lockable, hinged lid & doors; welded steel construction; 66 gallon sump meets USEPA & NUFC requirements; side vents and added roof vent for passive ventilation; coated with a durable, corrosion and weather resistant finish; four way "forklift-able".

A natural gas generator will be utilized to supply electric power to the SVE System. The anticipated generator will consist of:

- Generac LP/NG generator (*or equivalent*), 3 HP, single phase, 120VAC/240VAC, 3600 RPM, 8kW, 8 NG kVA.

Vapor emission control will be provided by two granulated activated carbon (GAC) drums, connected in series.

3.4 SVE Monitoring and Sampling

AES proposes the following SVE monitoring and sampling plan:

1. **Baseline Soil Vapor Sampling:** AES will conduct initial SVE vapor sampling of each well (SVE-1 through SVE-5 and SB-4R through SB-8R) for field measurement of VOCs using and PID-OVM and for laboratory analysis of BTEX and TPH-GRO. Results will be utilized as baseline readings and help determine remedial progress during SVE operations. Analytical parameters are detailed below.
2. **Vapor Sampling during SVE Operations:** After the initial sampling, AES will measure VOCs from each SVE well twice per month by field screening for VOC concentrations (ppm) using a PID-OVM. VOC readings and total air flow will be also be measured and air samples collected (for total VOCs) pre- and post-GAC.

Samples for laboratory analysis will be collected with Tedlar bags and a vacuum pump and submitted to either Pace Analytical or to Hall Environmental Analysis Laboratory (Hall), Albuquerque, New Mexico, for analysis. Samples will be laboratory analyzed for the following:

Vapor Sampling Laboratory Parameters		
Laboratory Analytical Parameters and Methods	Laboratory Detection Limit	Units
BTEX - USEPA METHOD 8021B		
Benzene, Toluene, Ethylbenzene &	0.10	µg/L
Xylenes, Total	0.30	µg/L
TPH - Gasoline Range Organics (GRO) – USEPA METHOD 8015B	5	µg/L

3.5 Site Re-Evaluation

After approximately seven months of SVE operations, AES and Hilcorp will evaluate site remedial progress in consultation with NMOCD. If supplemental or alternative remedial measures are warranted, AES will prepare and submit a Supplemental Remedial Plan to NMOCD for review and approval.

4.0 Deliverables

Reports detailing remedial activities will be submitted on a quarterly basis to NMOCD and will include the following information:

- SVE system installation and operations records;
- Updated site maps and figures;
- Tabulated field screening and laboratory analytical results for soil and vapors;
- Laboratory analytical reports; and
- Site photographs.

5.0 Proposed Schedule

SVE is proposed as the remedial method for the site; however, in order to mitigate the potential for freezing lines, it is proposed to run the system during non-freezing months (i.e. April through October). The following schedule is anticipated upon approval of the Revised Remediation Plan:

Month:	Task:
February and March 2019	Order and obtain SVE Unit, NG generator, and GAC drums;
April 2019	Installation of SVE System; Completion of baseline vapor sampling;
May 2019	Monthly O&M and vapor sampling;
June 2019	Monthly O&M and vapor sampling;
July 2019	Submit Quarterly Remedial Progress Report; Monthly O&M and vapor sampling;
August 2019	Monthly O&M and vapor sampling;

Laboratory Analytical Results									
Sample ID	Date	Depth (ft)	PID - OVM	Benzene (mg/kg)	Total BTEX (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	
NMOC ACTION LEVEL			--	10	50	1,000		2,500	
SB-1	5/31/18	3	5.4	0.000844	0.004214	<0.112	<4.47	<4.47	
		7	0.0	0.00145	0.020007	<0.114	<4.58	<4.58	
SB-2	5/31/18	7	0.0	0.000724	0.000724	<0.115	<4.59	<4.59	
SB-3	5/31/18	1	30.5	0.00115	0.00719	<0.114	<4.55	<4.55	
		7.5	0.0	0.00795	0.06461	<0.116	<4.64	<4.64	
SB-4	5/31/18	8.5	2,508	2.26	51.25	626	60.9	<4.70	
		8	3,232	0.268	2.3183	11.2		46.1	
SB-4R	12/5/18	12	3,044	5.45	207.15	3,940		251	
SB-5	5/31/18	11.75	2,745	3.02	72.68	1,050	132	<4.36	
		8.5	4.4	0.00427	0.01657	0.180		<4.00	
SB-5R	12/5/18	13	2,799	10.8	381.9	6,020		423	
SB-6	5/31/18	11	2,440	5.84	183.94	2,120	331	<4.37	
SB-6R	12/5/18	8	188	0.0151	0.4797	23.8		9.93	
		12	4,247	8.70	381.5	6,970		385	
SB-7	6/27/18	25	202.6	0.00101	0.004759	0.247	14.2	<4.00	
		8	1.3	<0.000500	<0.0075	<0.100		<4.00	
SB-7R	12/5/18	12	282.1	0.00593	0.0696	3.41		<4.00	
SB-8	6/27/18	15	2,196	0.417	4.946	362	82.6	<4.00	
		4	509	0.0520	1.546	65.7		9.84	
SB-8R	12/5/18	12	2,969	6.09	242.89	4,250		277	
SB-9	6/27/18	10	629.4	<0.000500	0.008139	0.700	<4.00	<4.00	
		10	1,938	19.6	630.6	10,800	1,330	6.67	
SB-10	6/27/18	25	615.1	<0.500	143.5	1,860	15.7	<4.00	
SB-11	6/27/18	10	35.2	0.000664	0.014115	0.119	<4.00	<4.00	
		10	2,482	4.12	232.92	4,970	372	<4.00	
SB-12	6/27/18	25	31.5	0.519	23.949	625	11.4	<4.00	
SB-13	6/27/18	10	2,157	1.65	154.24	3,270	813	<1.00	
		25	360.9	<0.500	46.16	1,020	6.49	<4.00	
SB-14	6/27/18	10	2,173	5.82	342.12	5,810	932	<4.00	
		25	51.0	<0.500	77.38	1,240	10.4	<4.00	
SB-15	6/27/18	10	1,550	4.05	364.75	6,130	877	<4.00	
		25	205.6	<0.500	109.26	1,800	4.19	<4.00	
SB-16	8/22/18	12	60.8	<0.000500	0.00176	0.325	6.00	<4.00	
		20	33.9	0.000586	0.000586	<0.100	10.0	<4.00	
SB-17	8/22/18	15	0.7	<0.000500	<0.007500	<0.100	<4.00	<4.00	
		25	NR	<0.000500	<0.007500	<0.100	10.4	<4.00	
SB-18	8/22/18	15	14.0	<0.000500	0.003209	0.182	10.7	<4.00	
		25	9.3	<0.000500	<0.007500	<0.100	5.47	<4.00	
SB-19	10/2/18	30	43.7	0.000670	0.000670	<0.100	50.5	10.3	
SB-20	10/8/18	30	135	0.000841	0.008052	0.278	32.5	5.95	
SB-21	10/8/18	30	505	0.00102	0.02874	1.42	15.4	<4.00	
SB-22	10/2/18	10	0.0	0.000591	0.001105	<0.100	<4.00	<4.00	
		25	25.9	0.000842	0.002572	<0.100	120	26.5	
SB-23	8/22/18	15	1,100	0.562	3.162	825	81.1	<4.00	
		30	325.5	0.000883	0.027552	0.988	15.8	<4.00	
SB-24	12/5/18	8	4,750	30.3	1,226.3	20,200		41.6	
		12	4,594	29.8	1,091.1	15,500		1,710	

Samples were analyzed per USEPA Method 8021 and 8015.

SAN JUAN 28-6 UNIT #31 WELLHEAD

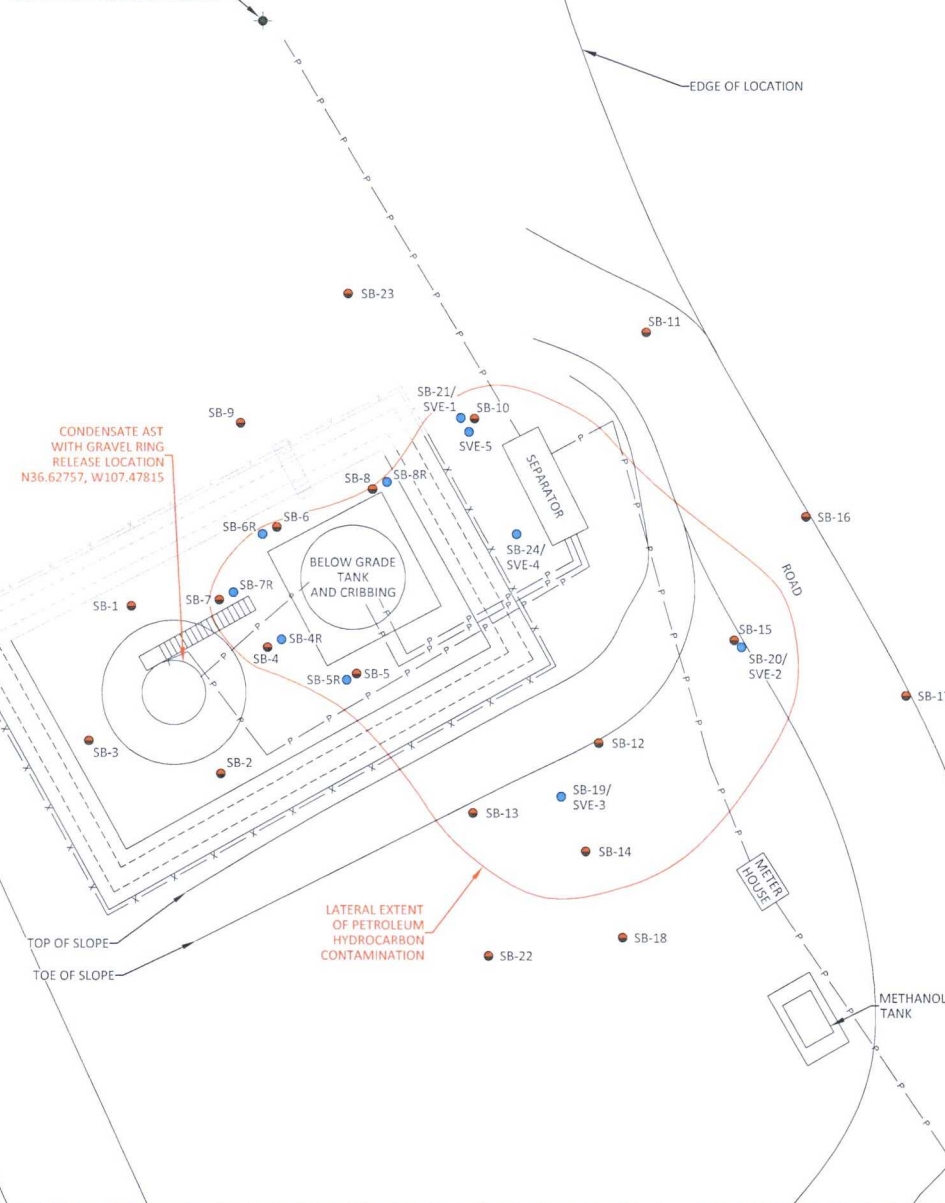


FIGURE 3

RELEASE ASSESSMENT AND SITE DELINEATION SAMPLE LOCATIONS AND RESULTS MAY, JUNE, AUGUST, OCTOBER, AND DECEMBER 2018

HILCORP ENERGY
SAN JUAN 28-6 UNIT #31
API:30-039-07290
INCIDENT NO. NVF 1816655680
SW¼, SW¼, SECTION 28, T28N, R6W
RIO ARriba COUNTY, NEW MEXICO
N36.62780, W107.47811



animas
environmental
services
Farmington, NM • Durango, CO
animasenvironmental.com

DRAWN BY:
C. Lameman

DATE DRAWN:
June 6, 2018

REVISIONS BY:
C. Lameman

DATE REVISED:
December 10, 2018

CHECKED BY:
E. McNally

DATE CHECKED:
December 10, 2018

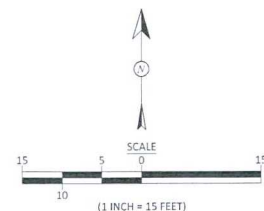
APPROVED BY:
E. McNally

DATE APPROVED:
December 10, 2018

LEGEND

- SOIL BORING SAMPLE LOCATION
- SVE WELL AND SOIL BORING SAMPLE LOCATION
- SECONDARY CONTAINMENT BERM
- FENCE
- APPROXIMATE PIPELINE

NOTE:
DEPTH LAYERS ARE AVERAGED AND APPROXIMATE.
SAND LAYER FROM SURFACE TO 10 FEET;
CLAYEY SAND FROM 10 TO 15 FEET;
WEATHERED SANDSTONE FROM 15 TO 25 FEET.
NO GROUNDWATER WAS ENCOUNTERED.



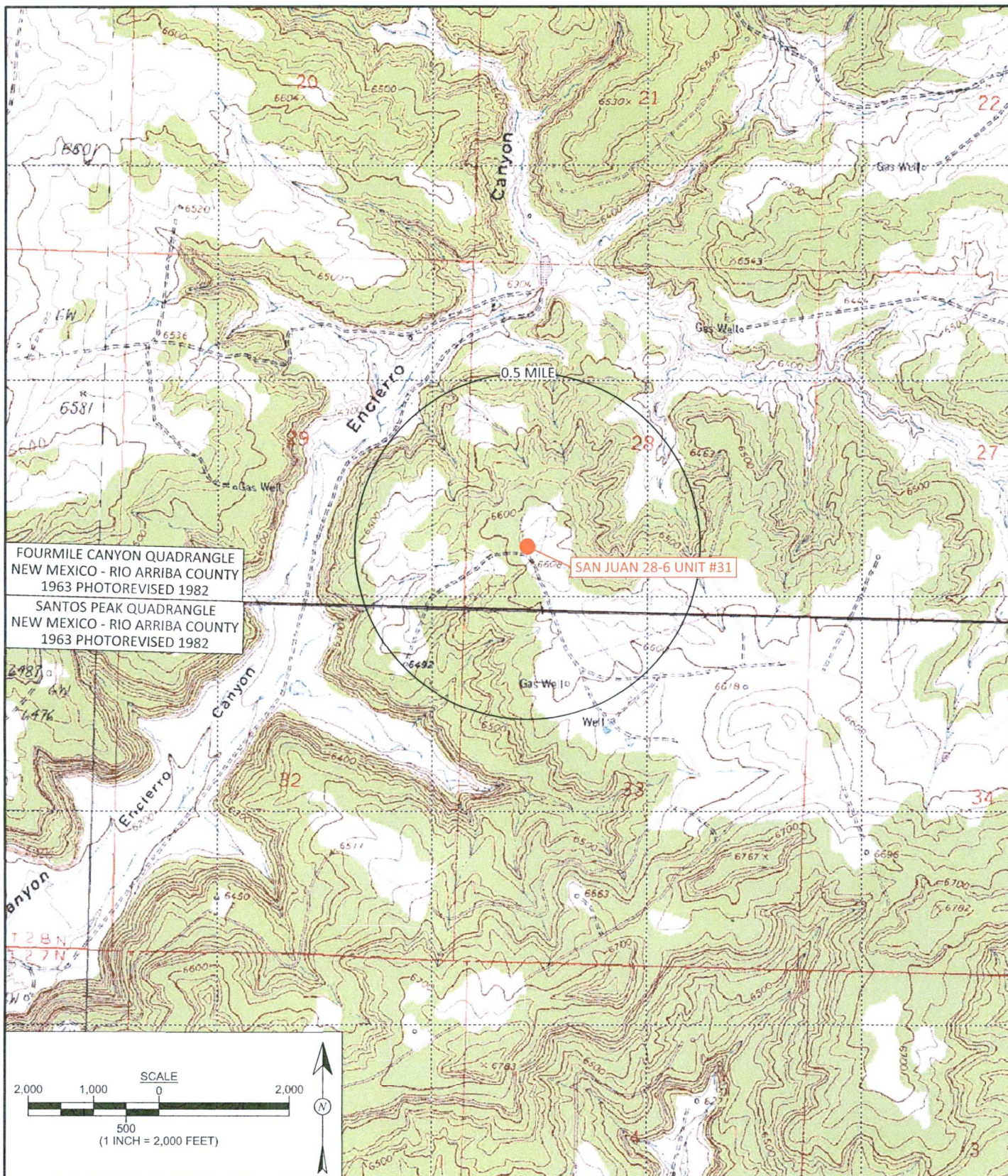


FIGURE 1

TOPOGRAPHIC SITE LOCATION MAP

HILCORP ENERGY
 SAN JUAN 28-6 UNIT #31
 API:30-039-07290
 INCIDENT NO. NVF 1816655680
 SW¼ SW¼, SECTION 28, T28N, R6W
 RIO ARRIBA COUNTY, NEW MEXICO
 N36.62780, W107.47811



**animas
 environmental
 services**
 Farmington, NM • Durango, CO
animasenvironmental.com

DRAWN BY:
 C. Lameman

DATE DRAWN:
 June 5, 2018

REVISIONS BY:
 C. Lameman

DATE REVISED:
 December 14, 2018

CHECKED BY:
 E. McNally

DATE CHECKED:
 December 14, 2018

APPROVED BY:
 E. McNally

DATE APPROVED:
 December 14, 2018



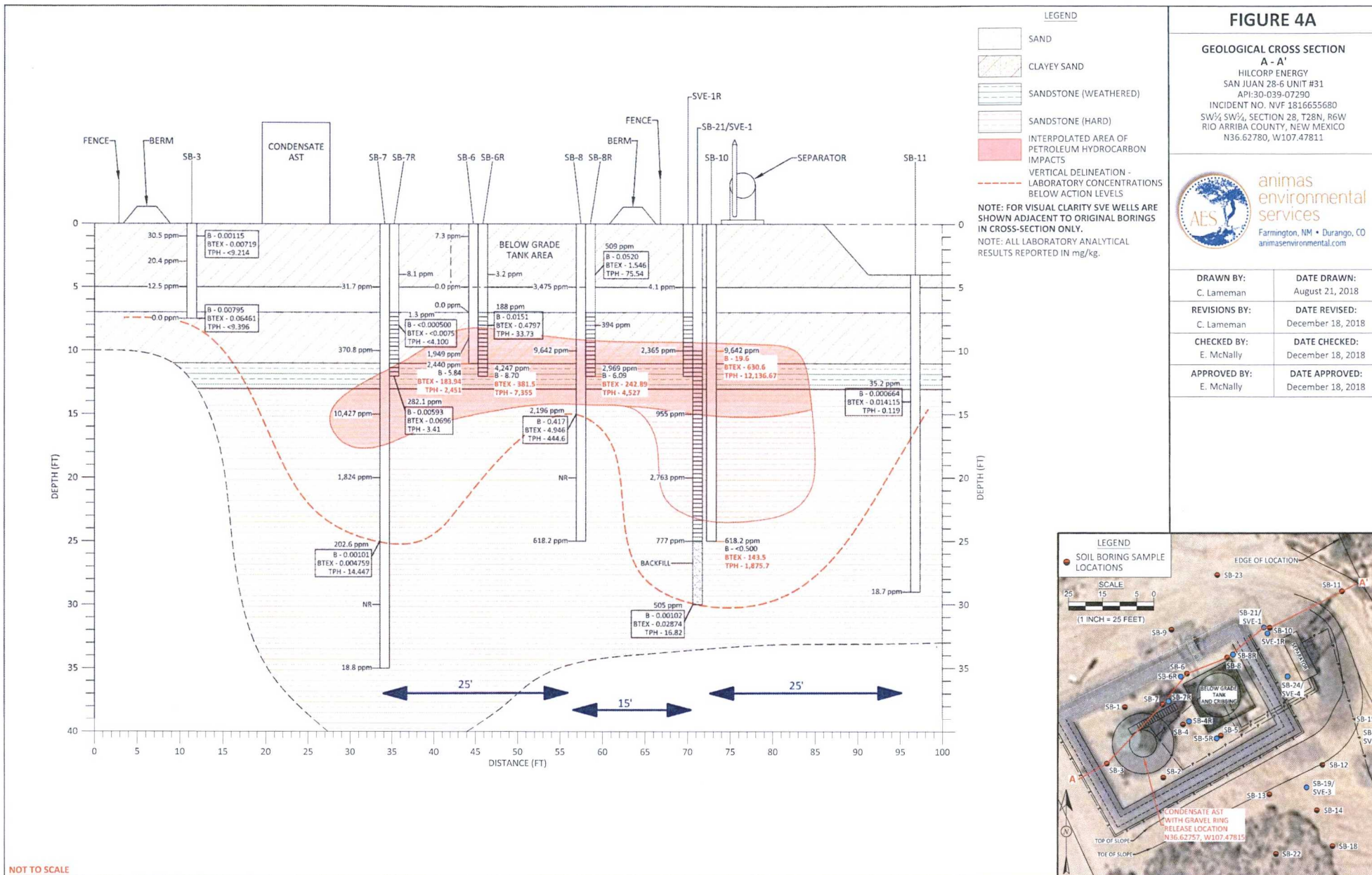
FIGURE 2

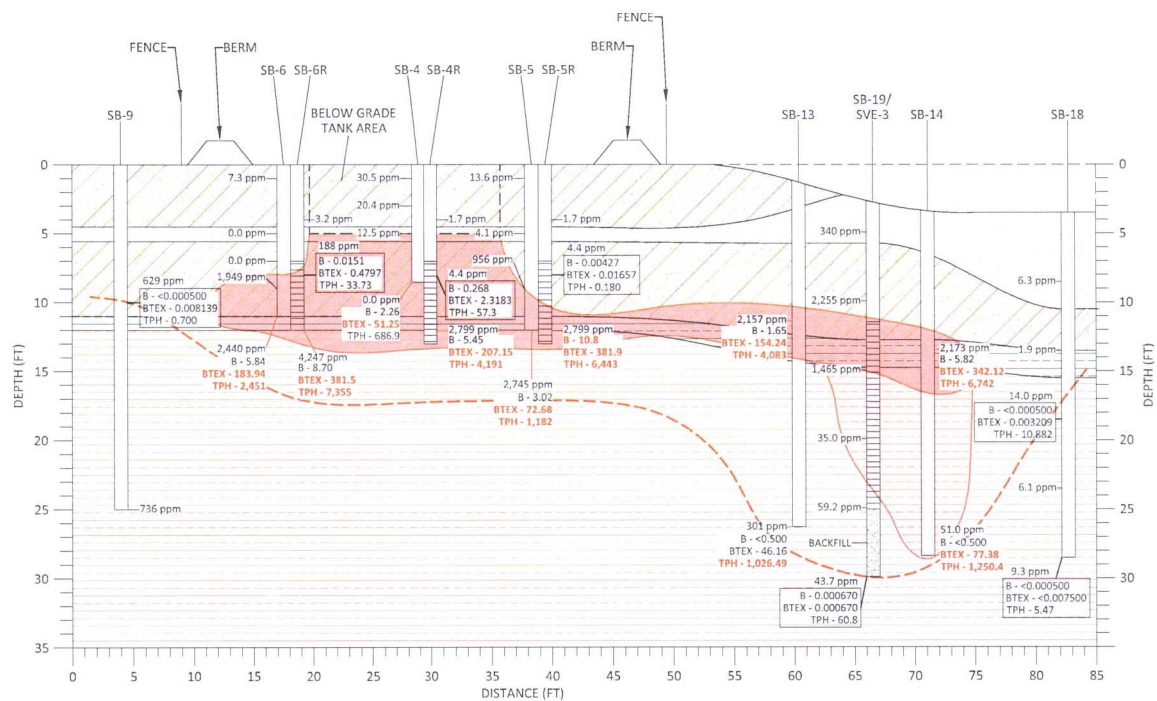
AERIAL SITE LOCATION MAP
 HILCORP ENERGY
 SAN JUAN 28-6 UNIT #31
 API:30-039-07290
 INCIDENT NO. NVF 1816655680
 SW¼ SW¼, SECTION 28, T28N, R6W
 RIO ARriba COUNTY, NEW MEXICO
 N36.62780, W107.47811



**animas
environmental
services**
 Farmington, NM • Durango, CO
 animasenvironmental.com

DRAWN BY: C. Lameman	DATE DRAWN: June 5, 2018
REVISIONS BY: C. Lameman	DATE REVISED: November 7, 2018
CHECKED BY: E. McNally	DATE CHECKED: November 7, 2018
APPROVED BY: E. McNally	DATE APPROVED: November 7, 2018





NOT TO SCALE

FIGURE 4B

GEOLOGICAL CROSS SECTION

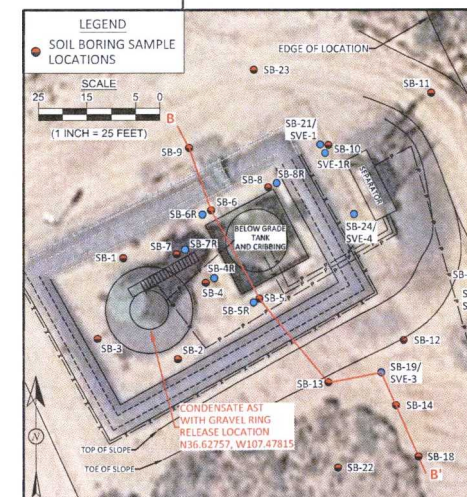
B - B'

HILCORP ENERGY
 SAN JUAN 28-6 UNIT #31
 API:30-039-07290
 INCIDENT NO. NVF 1816655680
 SW¼ SW¼, SECTION 28, T28N, R6W
 RIO ARRIBA COUNTY, NEW MEXICO
 N36.62780, W107.47811



animas environmental services
 Farmington, NM • Durango, CO
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DRAWN BY: C. Lameman	DATE DRAWN: August 21, 2018
REVISIONS BY: C. Lameman	DATE REVISED: December 18, 2018
CHECKED BY: E. McNally	DATE CHECKED: December 18, 2018
APPROVED BY: E. McNally	DATE APPROVED: December 18, 2018



Oil and Gas Release Assessment Field Form

Name of Operator: Hilcorp Date: 5-31-18
Facility or Pipeline Name: San Juan 28-6 #31 County and State: Rio Arriba AES Personnel: C. Lameman
Onsite Contact Person: Kurt Hekstra Land Jurisdiction: BLM S. Blases
Release Source: Condensate tank Site Rank: 0 Arrival Time: 8:45
Release Lat/Long: 36.62757, -107.47815 Depart Time: 14:45
Wellhead Lat/Long: 36.62780, -107.47811 Begin Miles: 56775
End Miles: _____
Groundwater Present? ☐ Yes ☒ No
Surface Water present? ☐ Yes ☒ No
Excavation prior to arrival? ☐ Yes ☒ No
Regulatory Representatives: None
Areas affected by release: Inside the containment berm
Has the release been removed prior to arrival?: ☐ Yes ☒ No

Project Details: 13.9 BBLs released from condensate tank.

Site Limitations: Anger refusal ranging from 7-11.75'.

Photos taken: ☒ Yes ☐ No

Facility or Pipeline Name: San Juan 28-6 #31

Date: 5-31-18

AES personnel: C. Laneman, S. Glasses

Buck Machine # _____			
Concentration	50 mg/kg	100 mg/kg	500 mg/kg
Calibration ABS Values			

* was in process of prepping a TPH sample when Kurt said that Lindsay said no TPH field, only OVM-PID. Confirmed looking @ email.

Sample ID	Collection Date	Time of Sample Collection	Sample Location	Sample Depth (ft)	Composite	PID-OVM (ppm)	PID-OVM Time	Field TPH (mg/kg)	Field TPH Analysis Time	ABS	NOTES (i.e. Soil Type, Color, Odor, Staining)
SB-1	5-31-18	9:30	N. of Prod. tank	1'	N	0.0	9:56	234*	10:12		Sand w/ Clay, Brown, No Staining, No Odor
		9:36		3'	N	5.4	9:57	-	-	-	S.A.A.
		9:41		5'	N	2.9	9:58	-	-	-	S.A.A.
		9:55		7'	N	0.0	10:16	-	-	-	Auger refusal. Clayey Sand, Dk Brown, No odor, No Staining
SB-2		9:59	S. of Prod. tank	1'	N	0.0	10:17	-	-	-	Sand, Brown, No Staining, No Odor, Coarse-Med., Moist
		10:05		3'	N	0.0	10:33	-	-	-	S.A.A.
		10:11		5'	N	0.0	10:49	-	-	-	S.A.A.
		10:25		7'	N	0.0	10:50	-	-	-	Auger Refusal. Clayey Sand, Dk Brown, No Staining, No odor
SB-3		10:30	W of prod. tank	1'	N	30.5	11:03	-	-	-	Sand, Brown, No Staining, Sl. Odor, Coarse-Med., Moist
		10:36		3'	N	20.4	11:04	-	-	-	S.A.A.
		10:38		5'	N	12.5	11:05	-	-	-	Sand, Red-Brown, No Staining, Sl. Odor, Fine-Med., Moist
		10:46		7.5'	N	0.0	11:06	-	-	-	Clayey Sand, Dk. Brown, No Staining, No Odor, Auger Refusal, Moist
SB-4		10:58	E. of prod. tank	1'	N	2385	11:22	-	-	-	Sand, Brown, No Staining, V. Strong odor, Coarse-Med., Moist
		11:01		3'	N	2009	11:23	-	-	-	S.A.A.
		11:08		5'	N	1996	11:24	-	-	-	Sand, Red-Brown, No Staining, V. Strong Odor, Fine-Med., Moist
		11:15		8.5'	N	2508	11:34	-	-	-	Clayey Sand, Dk. Brown, V. Strong odor, No Staining, Auger Refusal, Moist
SB-5		11:41	S of BGT	1'	N	13.6	11:55				Sand w/ silt/clay, Brown, No Odor, No Staining, Med., Moist
		11:50		5'	N	4.1	12:09				Sand, Tan-Brown, No Odor, No Stain, Med., Moist
		12:08		9'	N	956	12:24				Historic Contam: c. 8'. Brown, Clayey Sand, Sl. Odor, Some Staining

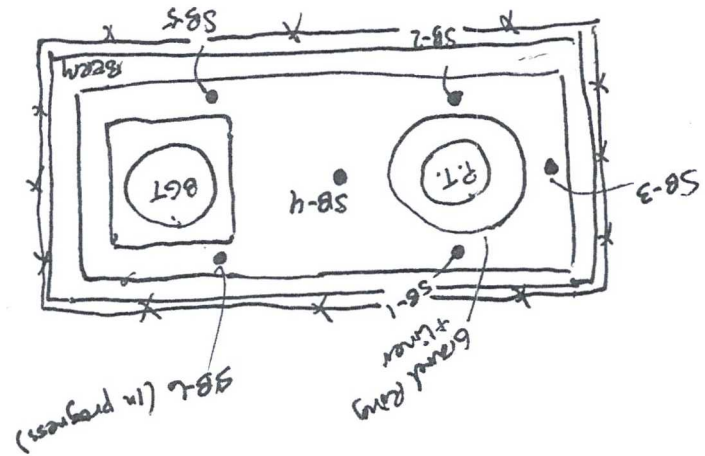
Type of Sample collection?:

name: Histone pull sample. for them to know. Characterize.
Delineate old? let DCD know to be addressed.
Hilcorp to address the old.

Depends - run from 0.0 from
step out. N, W, S

Type of Sample collection?:

W.H.



R. A. P. E. S.

Rectangular

SB-1 1 - 0.0
3 - 5.4
4 - 2.9
7 - 0.0

SB-3 1 - 30.5
3 - 20.4
5 - 12.5
7.5 - 0.0

SB-5 1 - 13.6
5 - 4.1
7 - 0.0
9 - 9.56
11.75 - 2.745

SB-2 1 - 0.0
3 - 0.0
5 - 0.0
7 - 0.0

SB-4 1 - 2.385
3 - 2.009
5 - 19.96
6.5 - 2.528

Oil and Gas Release Assessment Field Form

Name of Operator: Hilcorp
Facility or Pipeline Name: San Juan 28-6 31
Onsite Contact Person: Lindsay Dumas
Release Source: Condensate Tank
+ Historic Release
Release Lat/Long: 36.62757, -107.47815
Wellhead Lat/Long: 36.62780, -107.47811

County and State: Rio Arriba
Land Jurisdiction: BLM
Site Rank: 0

Date: 6-27-18
AES Personnel: Clameman
Arrival Time: 900
Depart Time: 1815
Begin Miles: 57091
End Miles: 57197

Groundwater Present? ☐ Yes ☒ No
Surface Water present? ☐ Yes ☒ No
Excavation prior to arrival? ☐ Yes ☒ No
Areas affected by release: Inside the containment Berm
+ HISTORIC
Has the release been removed prior to arrival?: ☐ Yes ☒ No

Regulatory Representatives: none

Project Details: OCO requested that Hilcorp find the extent of Historic Contamination. GeoMat onsite to
Soil drag and collect w/ Hollow Stem Auger and split spoon.

Site Limitations: Edge of location, parking and equipment

Photos taken: ☒ Yes ☐ No

Alexandra 505-606-6061

Facility or Pipeline Name: San Juan 286 #31

Date: 6-27-18

AES personnel: C. Lamenan

Buck Machine # 2			
Concentration	50 mg/kg	100 mg/kg	500 mg/kg
Calibration ABS Values	0.091	0.141	0.725

Sample ID	Collection Date	Time of Sample Collection	Sample Location	Sample Depth (ft)	Composite	PID-OVM (ppm)	PID-OVM Time	Field TPH (mg/kg)	Field TPH Analysis Time	ABS	NOTES (i.e. Soil Type, Color, Odor, Staining)
SB-7	6-27-18	9:45	N of SB-4	5'	N	31.7	10:16	—	—	—	Red, Sand, No Odor, N. Stain, Dry
		9:51		10'	N	370.8	10:17	—	—	—	Sl. Gray, Sl. odor, Shale or Clay
		9:59		15'	N	10,427	10:20	—	—	—	SS, Gray, odor
		10:07		20'	N	8,824	10:25	—	—	—	SS, Gray, odor
		10:19		25'	N	202.6	10:39	—	—	—	SS, Lt tan Gray, odor
		10:28		30'	N	—	—	—	—	—	No Recovery
		10:41		35'	N	18.8	10:52	221	10:56	0.167	SS, Lt. Gray, Shallow, Dry
SB-8		11:27	N of B&T	5'	N	8475	11:53	—	—	—	Red, Sand, Str. odor, No Staining
		11:35		10'	N	9642	11:59	—	—	—	Clayey Sand, Gray, Strong odor
		12:13		15'	N	2196	12:22	—	—	—	SS, weathered, Str. odor, SL stain
		12:24		25'	N	618.2	12:32	168.	12:40	Wh. 0.128	SS, tan, odor, No staining
SB-9		13:09	N of B&T outside fence	10'	N	629.4	13:22	—	—	—	Clayey Sand, odor, SL Gray
		13:15		15'	N	735.5	13:29	145	14:41	0.113	SS, tan, odor, No staining, Dry
SB-10		13:55	N of B&T outside fence	10'	N	1938	14:13	—	—	—	Clayey Sand, Str. odor, Gray, No stain
		14:11		25'	N	615.1	14:14	—	—	—	SL, tan, odor, No staining, Dry
SB-11		14:34	E of sep e edge of location	10'	N	35.2	14:55	—	—	—	Red Sand to Gray Clay Sand, odor
		14:51		25'	N	18.7	15:19	—	—	—	Lt tan, 100m, No staining, Dry
SB-12		15:17	S of B&T corner	10'	N	2482	15:34	2,000	15:45	1.444	Clay, Gray, odor, No staining
		15:30		25'	N	31.5	15:38	—	—	—	lt tan, SS, SL odor, No staining, Dry

Type of Sample collection?:

Well or Lease Name: *San Juan 28-6 #31*

Date: *6-27-18*

AES personnel: *C. Lameman*

Sample ID	Collection Date	Time of Sample Collection	Sample Location	OVM (ppm)	OVM Time	Field TPH (mg/kg)	Field TPH Analysis Time	ABS	NOTES
<i>SB-13 e 10'</i>	<i>6-27-18</i>	<i>16:02</i>	<i>SB 13 E 10' outside fence</i>	<i>2157</i>	<i>16:20</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>gray, sand w/ clay, odor, odorist</i>
<i>• 25'</i>		<i>16:17</i>	<i>↓</i>	<i>360.9</i>	<i>16:22</i>	<i>—</i>	<i>—</i>	<i>—</i>	<i>SS, fine white, dry, fl. odor, no stain</i>
<i>SB-14 e 16'</i>		<i>16:41</i>	<i>Midway of SB-13 & 12</i>	<i>2173</i>	<i>16:59</i>	<i>—</i>	<i>—</i>	<i>—</i>	
		<i>17:15</i>	<i>↓</i>	<i>51.0</i>	<i>17:23</i>	<i>—</i>	<i>—</i>	<i>—</i>	
<i>SB-15 e 10'</i>		<i>17:28'</i>	<i>E of Berr SE corner</i>	<i>1550</i>	<i>17:35</i>	<i>—</i>	<i>—</i>	<i>—</i>	
		<i>17:42'</i>	<i>↓</i>	<i>205.6</i>	<i>17:49</i>	<i>—</i>	<i>—</i>	<i>—</i>	

*Include Benzene readings in the notes section initially and transfer to Limitations if Benzene is a problem on the location.

Depth to Water (ft): —

Total Depth (ft): 25

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: 17

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: -

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 8-22-18

Client: Hilcorp

Latitude/Longitude: 36.62757, -107.47784

Location: San Juan 28-6 Unit #31

Datum:

Driller: Geo Mat - KP4FE

Elevation:

Drilling Method: Continuous to split spm - HSA

Logged by: C. Lammann

Depth to Water (ft): -

Time Recorded: 1040

Total Depth (ft): 25

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OMV (ppm)	OMV Time	MW Schematic and Description
0					Loose, Brown, Poorly graded Sand, Dry, nonplastic non cohesive (0-4')	SP			
5			10:47		Very Loose, Tan, Poorly Graded Sand, Dry, nonplastic non cohesive (4-5')	SP	1.7	11:38	
5					Loose, Tan-Red, Poorly Graded Sand, Dry, nonplast. non cohesive (5-8')	SP			
10			10:55		Stiff, Brown, Lean clay with sand, Moist Med. Plast., cohesive (8-10')	CL	4.5	11:39	
10					Very Dense, Tan, Well Graded Sand, Dry, nonplast. non cohesive. Weathered SS	SW			
12			11:01		Very Dense, Tan, SS	SS	5.2	11:40	
15			11:07		Unable to continue CONTINUOUS, SWITCH to SPLIT SPM				
					Weathered SS, Dry, Tan-White, Small Recov.	SS	0.7	11:41	
					[Rig Broken down @ 11:13]				
20			13:20		Very Dense, Tan-White, Sandstone, Dry	SS	18.0	13:34	
25			13:30		S.A.A., Very Small Recovery	SS	NR	NR	
					Total Depth - 25'				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: 18

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: -

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 8-22-18

Client: Hilcorp

Latitude/Longitude: 36.62748, -107.47796

Location: San Juan 28-6 Unit #31

Datum:

Driller: Geo Mat: KP & FE

Elevation:

Drilling Method: Continuous to Split Spoon

Logged by: C. Lammann

Depth to Water (ft): -

Time Recorded: 13:49

Total Depth (ft): 25'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Loose, Brown, Poorly graded sand, Dry, nonplast. non cohesive (0-5')	SP			
5			13:58				6.3	14:39	
5					Loose, Brown, Poorly graded sand, Dry, nonplast. non cohesive (5-7')	SP			
10			14:04		Stiff, Brown, Lean clay w/ sand, Moist, Med. Plast. cohesive (8-10')	CL	1.9 4.5	14:40	
10					Stiff, Brown, Lean clay w/ sand, Moist, Med. Plast. cohesive (10-10.5')	CL			
12'					Very Dense, Tan, Well Graded Sand, Dry, nonplast. noncohesive (10-12')	SW			
					Very Dense, SS, Tan	SS			
15'			14:12		Unable to Continue CONTINUOUS, Switch to SPLIT SPOON Weathered SS, Dry, Tan, Very Dense, odor	SS	14.0	14:41	
20'			14:27		Very Dense, Tan-White, Sandstone, Dry, odor	SS	6.1	14:42	
25'			14:36		Very Dense, Tan-White, Sandstone, Dry, No odor	SS	9.3	14:50	
Total Depth - 25'									

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: 23

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: -

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 8-22-18

Client: H&I Corp

Latitude/Longitude: 36.62770, -107.47807

Location: San Juan 28-L Unit #31

Datum:

Driller: GeoMat - KP & FE

Elevation:

Drilling Method: Continuous to Split Spmn - H&A

Logged by: C. Laine-Mar

Depth to Water (ft): -

Time Recorded: 15:04

Total Depth (ft): 30

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Loose, Red-Tan, Poorly Graded Sand, Moist, nonplastic	SP			
5			15:15				9.0	15:39	
5					Loose, Tan, Poorly Graded Sand, Dry, non-plast.	SP			
					non cohesive (5-6.5')				
					Loose, Brown, Poorly Graded Sand, Dry, non-plast	SP			
					non-cohesive (6-9')				
10			15:20		Stiff, Brown, lean clay w/ sand, moist, med-plast., cohesive. (9-12')	CL	9.2	15:39	
10									
					Very Dense, SS, Grey, Strong odor	SS			
14									
					Unable to continue CONTINUOUS, Switched to SPLIT SPDM				
15			15:30		Very Dense, SS, Grey, Strong odor	SS	1,100	15:41	
20			15:38		Very Dense, SS, Tan-white, Strong odor	SS	538.4	15:49	
25'			15:47		S.A.A.		1,484	16:05	
30			16:09		Very Dense, Tan, SS, Strong odor	SS	325.5	16:12	
					Total Depth - 30'				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-19

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: BV-3

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 10-2-18

Client: Hilcorp

Latitude/Longitude: 30.62755, -107.47797

Location: San Juan 28-6 Unit #31

Datum:

Driller: Goa Mat - Keeley Padilla & Fernando Errigun

Elevation:

Drilling Method: Continuous to Split Spoon - HEA

Logged by: C. Lameman

Depth to Water (ft): —

Time Recorded: 10:58

Total Depth (ft): 30' Backfill to 25'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Very loose, Brown, Poorly Graded Sand, Dry Nonplasticity, non cohesive (1-3')	SP			Stick up +3'
5			11:06		Stiff, Brown, Lean clay with Sand, Moist, odor High Plasticity, cohesive (3-5')	CL	340	11:36	
5					Stiff, Brown, Lean clay with Sand, Moist, High Plasticity, cohesive, odor (5-8')	CL			
10			11:13		Soft, Gray, Lean clay with Sand, Moist High Plasticity, cohesive, Strong odor (8-10')	CL	2,255	11:37	+10' PVC Well + 3'
10			11:20		to S.A.A (10-10.25') Loose, Tan, Poorly Graded Sand, Dry, Non-Plast, non-cohesive, Strong odor, Light Gray (to 25' (10.25 - 15')	SP	1,465	11:38	
15					UNABLE TO CONTINUE WITH CONTINUOUS BORING. SWITCHED TO SPLIT SPOON-1 Dense, Tan, Sandstone, Dry, Slight odor Small Recovery	SS	35.0	11:48	
25			11:47		Very Dense, Tan-White, Dry, No Odor No Staining	SS	59.2	11:53	15' Screen
30'			11:59		S.A.A.	SS	43.7	12:05	
					Total Depth @ 30'. Backfilled to 25' to set Bottom of well @ 25'.				
					17' Sand Pack, 8' Bentonite				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-22

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: BV

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 10-2-18

Client: Hillcorp

Latitude/Longitude: 36.6749, -107.47801

Location: San Juan 28-b Unit #31

Datum:

Driller: Geo Mat - Kelly Padilla and Friends Enrriquez

Elevation:

Drilling Method: Continuous Boring to Split Spoon - HSA

Logged by: C. Laneman

Depth to Water (ft): —

Time Recorded: 9:20

Total Depth (ft): 30 ft B

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Very loose, Brown, Poorly Graded Sand, Dry Non plastic, non cohesive (1-5')	SP			
5			9:35				0.0	10:34	
5					Very loose, Brown, Poorly Graded Sand, Dry non plastic, non cohesive (5-6')	SP			
10			9:41		Stiff, Brown, lean clay with sand, Dry High plasticity, cohesive (6-10')	CL	0.0	10:35	
10					Dense, Tan-Gray, Well Graded Sand, Dry non-plasticity, non-cohesive (10-11.5')	SW			
11.5			9:48		Very Dense, Tan, Sandstone, Strong odor (11-11.5')	SS	17.2	10:35	
15			9:56		UNABLE TO CONTINUE WITH CONTINUOUS BORINGS. SWITCHED TO SPLIT SPOON Very Dense, Tan, Sandstone, Dry, Slight odor	SS	9.2	10:36	
20			10:10		Very S.A.A.	SS	1.4	10:36	
25			10:27		Very Dense, Tan-Pink, Sandstone, Dry, No odor	SS	25.9	10:37	
					Total Depth @ 25'				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-20

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: BV-2

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 10-8-18Client: H/I CorpLatitude/Longitude: 36.62740, -107.47790Location: San Juan 2B-6 Unit #31

Datum:

Driller: Geo Mat - Kelley Padilla & Fernando Enrriquez

Elevation:

Drilling Method: Continuous to Split Spoon - HSALogged by: C. LamemanDepth to Water (ft): —Time Recorded: 11:44Total Depth (ft): 30' Backfilled to 25'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Very loose, Red-Tan, Poorly Graded Sand, Moist, Non plastic, noncohesive (0-5')	SP			↑ Stick OP
5			11:55		S.A.A.	SP	5.6	12:36	+3' Stick OP
5					S.A.A (5-6.5')	SP			
					Stiff, Brown, Lean clay w/ Sand, Moist, Med-Plast, Cohesive (6.5-10')	CL			
			11:59		Dense, Tan-Gray, Weathered Sandstone, Strong odor, Dry (10-11.5')	SS	3,050 3,140	12:37 12:38	10' Blend PVC
10					UNABLE TO CONTINUE W/ CONTINUOUS BORING. SWITCHED TO SPLIT SPOON				↑ Screen
15'			12:06		Very Dense, Tan, Sandstone, Dry, Strong odor small Recovery	SS	3,460	12:38	15' Screen
20			12:15		Very Dense, Tan, Sandstone, Dry, odor, small Recovery	SS	312	12:39	
25			12:24		S.A.A.	SS	186	12:41	
30			12:33		S.A.A.	SS	135	12:43	
					Total Depth @ 30'. Backfilled to 25' to set bottom of well @ 25' 17' Sand Pack, 8' Bentonite				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-21

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: BV-1

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 10-8-18

Client: Hilcorp

Latitude/Longitude: 36.62748, -107.47802

Location: San Juan 28-b Unit #31

Datum:

Driller: GeoMat-Kelley Padilla & Fernando Enriquez

Elevation:

Drilling Method: Continuous to Split Spoon - HSA

Logged by: C. Llameman

Depth to Water (ft): -

Time Recorded: 10:00

Total Depth (ft): 30' Backfilled to 25'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Very loose, Red-Brown, Poorly Graded Sand, Moist Non-plastic, non-cohesive, (0-0.5')	SP			Stick up
5			10:18		Stiff, Brown, lean clay w/ Sand, Moist, High Plast, Cohesive, (0.5 to 5')	CL	4.1	10:48	
5					Loose, Brown, Poorly Graded Sand, Moist Non-plastic non-cohesive, Strong odor (5-7.5')	SP			Blank PVC + 3'
10			10:23		Dense, Brown, Poorly Graded Sand w/ clay, Moist, Med-Plast, noncohesive, v. Strong odor, Gray (7.5-10')	SP-SC	2,365	10:49	
10					S.A.A. (10-14')	SP-SC			Screen
15			10:28		Dense, Tan, Weathered Sandstone, v. Strong, Dry odor (14-15')	SS	955	10:50	
20			10:36		UNABLE TO CONTINUE WITH CONTINUOUS BORING. SWITCHED TO SPLIT SPOON Dense, Tan, Weathered Sandstone, Strong odor, dry	SS	2,763	10:51	15' Screen
25			10:47		S.A.A.	SS	777	10:52	
30			11:07		Very Dense, Tan, Sandstone, Dry, Strong odor	SS	505	11:15	
					Total Depth @ 30'. Back-filled to 25' to set Bottom of Well @ 25'.				
					17' Sand Pack; 8' Bentonite				



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LOG OF: SVE-1

(Page 1 of 1)

HILCORP ENERGY
SAN JUAN 28-6 UNIT #31
API: 30-039-07290
INCIDENT NO. NVK 1816655680
SW1/4 SW1/4, SEC. 28, T28N, R6W

Date Started : 10/8/2018
Date Completed : 10/8/2018
Hole Diameter : 7.25 in.
Drilling Method : CME 75 HSA
Sampling Method : CONTINUOUS/SPLIT-SPOON

Latitude : 36.62768
Longitude : -107.47802
GPS By : C. Lameman
Logged By : C. Lameman

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	PID (ppm)	SVE-1
0		SP		Very Loose, Red-Brown, Poorly Graded Sand, Moist, Non-Plasticity, Non-Cohesive		
2		SP-SC		Stiff, Brown, Lean Clay with Sand, Moist, High-Plasticity, Non-Cohesive		
4					4.1	
6		SP		Loose, Brown, Poorly Graded Sand, Moist, Non-Plasticity, Non-Cohesive, Strong Odor		
8						
10		SP-SC		Dense, Brown, Poorly Graded Sand with Clay, Moist, Medium-Plasticity, Non-Cohesive, Very Strong Odor, Gray	2,365	
12						
14						
16		SS		Dense, Tan, Weathered Sandstone, Dry, Very Strong Odor UNABLE TO CONTINUE WITH CONTINUOUS BORING. SWITCHED TO SPLIT SPOON AT 15 FEET.	955	
18						
20					2,763	
22						
24		SS		Dense, Tan, Weathered Sandstone, Dry, Strong Odor		
26					777	
28						
30				Very Dense, Tan, Sandstone, Dry, Strong Odor @ 30'	505	

Bentonite Plug

2" PVC Casing

2" PVC Screen

Sand Pack

Backfill



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LOG OF: SVE-2

(Page 1 of 1)

HILCORP ENERGY
SAN JUAN 28-6 UNIT #31
API: 30-039-07290
INCIDENT NO. NVK 1816655680
SW1/4 SW1/4, SEC. 28, T28N, R6W

Date Started : 10/8/2018
Date Completed : 10/8/2018
Hole Diameter : 7.25 in.
Drilling Method : CME 75 HSA
Sampling Method : CONTINUOUS/SPLIT-SPOON

Latitude : 36.62760
Longitude : -107.47790
GPS By : C. Lameman
Logged By : C. Lameman

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	PID (ppm)	SVE-2
0		SP		Very Loose, Red-Tan, Poorly Graded Sand, Moist, Non-Plasticity, Non-Cohesive	5.6	
2						
4		SP-SC		Stiff, Brown, Lean Clay with Sand, Moist, Medium-Plasticity, Cohesive	3,050	
6						
8		SS		Dense, Tan-Gray, Weathered Sandstone, Dry, Strong Odor UNABLE TO CONTINUE WITH CONTINUOUS BORING. SWITCHED TO SPLIT SPOON AT 11.5 FEET.	3,460	
10						
12		SS		Very Dense, Tan, Sandstone, Dry, Strong Odor, Poor Recovery	312	
14						
16		SS		Very Dense, Tan, Sandstone, Dry, Odor, Poor Recovery	186	
18						
20		SS		Very Dense, Tan, Sandstone, Dry, Odor, Poor Recovery	135	
22						
24		SS		Very Dense, Tan, Sandstone, Dry, Odor, Poor Recovery		
26						
28		SS		Very Dense, Tan, Sandstone, Dry, Odor, Poor Recovery		
30						



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LOG OF: SVE-3

(Page 1 of 1)

HILCORP ENERGY
SAN JUAN 28-6 UNIT #31
API: 30-039-07290
INCIDENT NO. NVK 1816655680
SW1/4 SW1/4, SEC. 28, T28N, R6W

Date Started : 10/2/2018
Date Completed : 10/2/2018
Hole Diameter : 7.25 in.
Drilling Method : CME 75 HSA
Sampling Method : CONTINUOUS/SPLIT-SPOON

Latitude : 36.62755
Longitude : -107.47797
GPS By : C. Lameman
Logged By : C. Lameman

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	PID (ppm)	SVE-3
0		SP		Very Loose, Brown, Poorly Graded Sand, Dry, Non-Plasticity, Non-Cohesive		
2						
4		SP-SC		Stiff, Brown, Lean Clay with Sand, Moist, Odor, High-Plasticity, Cohesive, Odor	5.6	
6						
8		SP-SC		Soft, Gray, Lean Clay with Sand, Moist, High-Plasticity, Cohesive, Strong Odor		
10					3,050	
12		SP		Loose, Tan, Poorly Graded Sand, Dry, Non-Plasticity, Non-Cohesive, Strong Odor, Light Gray		
14				UNABLE TO CONTINUE WITH CONTINUOUS BORING. SWITCHED TO SPLIT-SPOON AT 15 FEET.	3,460	
16				Dense, Tan, Sandstone, Dry, Slight Odor		
18						
20		SS			312	
22						
24						
26				Very Dense, Tan-White, Sandstone, Dry, No Odor	186	
28		SS				
30					135	

Bentonite Plug

2" PVC Casing

2" PVC Screen

Sand Pack

Backfill

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-4R

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: ~~SW~~ SVE-4

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 12-5-18 .62759 .47811

Client: Hicorp

Latitude/Longitude: 36.62758, -107.47807

Location: San Juan 28-6 Unit #31

Datum:

Driller: Louis Trujillo Earth Worx

Elevation:

Drilling Method: Geo Probe Push Rig

Logged by: C. Lamenan

Depth to Water (ft): —

Time Recorded: 1100-1136

Total Depth (ft): 12'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Brown, medium, High Plasticity, Fine grain, w/ sand, moist, cohesive, No odor (0-4')	CL			
3-4'	Grab	11:21			S.A.A (4-5')	CL	32.0	1133	
5					Brown, loose, Fine Grained, Moist, sl. odor. (5-6.5')	SW			
7-8'	Grab	11:19			Brown, medium, Fine Grained & High Plast., Moist (cohesive, strong odor. (6.5-8')	CL	3,232	1134	
8					S.A.A. (8-10.5')				
11-12'	Grab	11:16			Dense, Tan Light Gray staining, Medium Grain Dry, strong odor (10.5-12')	SS	3,044	11:35	
12					Auger Refusal @ 12' on Sandstone				
					Total Depth @ 12'				
					Install well				
					2" screen @ 12 to 7'				
					Sand Pack @ 12 to 6'				
					Bentonite @ 6' to surface				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-5R

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: SVE-5 & SVE-5R

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 12-5-18

Client: Hilcorp

Latitude/Longitude: 36.6258, -107.47807

Location: San Juan 28-6 Unit #31

Datum:

Driller: Louis Trujillo w/ Earth Work

Elevation:

Drilling Method: GeoProbe Push Rig

Logged by: C. Lameman

Depth to Water (ft): —

Time Recorded: 1000-1057

Total Depth (ft): 13' and 10'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Brown, Soft, Fine, med. Plastic, moist, High Plasticity. (0-5') Clayey Sand	CL			
7.5			10:34		Brown, loose, Fine Sand, moist, Non Plastic (5-7.5')	SW	1.7	10:41	
7.5		7.5-8.5 Grab	10:32		Brown, soft, High Plasticity, moist, Cohesive, Blk staining (7.5'-8.5') odor	CL	4.4	10:40	
10.75					Brown, soft, High Plasticity, moist, Cohesive (8.5-10.75') odor	CL			
10.75					Tan, Dense, Slight Grey, Medium Grained, Dry, Non Plastic, noncohesive, SS (10.75-13')	SS	2,799	10:39	
13		12-13' Grab	10:19		Auger Refusal. Stop Geoprobe. Install Well.				
					Total Depth = 13' onto SS				
					Well Construction				
					2" screen @ 13' to 8'				
					Sand Pack @ 13' to 7'				
					Bentonite @ 7' to surface.				
					Additional 2" screen installed as SVE. 2" screen @ 10' to 5'				
					Sand Pack @ 10 to 4'				
					Bentonite @ 4 to surface				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-6R

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: SVE-6

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 12-5-18

Client: Hilcorp

Latitude/Longitude: 36.62763, -107.47810

Location: San Juan 28-6 Unit #1

Datum:

Driller: Louis Trujillo Earth Work

Elevation:

Drilling Method: Geoprobe Push Rig

Logged by: C. Lameman

Depth to Water (ft): —

Time Recorded: 1230-

Total Depth (ft): 12'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0					Surface - Gravel				
4.5	4	Grab	12:51		Very Soft, Brown, Fine Grained Sand, High Plast., Moist, High Plast, Cohesive, (0-4) No odor	CL			
4.5					S.A.A. (4-4.5')	CL	3.2	12:55	
4.5					Loose, Brown, Fine Grained, Moist, Non Plast., non cohesive, No odor (4.5-5.5')	SW			
8	7-8	Grab	12:50		Stiff, Brown, Fine Grained Sand, High Plast, Moist, Cohesive (5.5-8')	CL	188	12:56	
8					S.A.A (8-11') strong odor				
12	12	Grab	12:46		Dense, Tan light gray, Medium Grained, Dry, non cohesive, strong odor (11-12')	SS	4,247	12:59	
					Total Depth @ 12' on Sandstone				
					Auger Refused				
					Install Well				
					2" screen @ 12' to 7'				
					Sand Pack @ 12' to 6'				
					Bentonite @ 6' to surface.				

SOIL BORING LOG

Animas Environmental Services

Soil Boring No: SB-7R

604 W. Piñon St., Farmington, NM 87401

Monitor Well No: SVE-7

Tel. (505) 564-2281 animasenvironmental.com

Project:

Date: 12-5-18

Client: Hilcorp

Latitude/Longitude: 36.62761, -107.47812

Location: San Juan 28-6 #31

Datum:

Driller: Laz Trujillo w/ Earth Nrrx

Elevation:

Drilling Method: GeoProbe Push Rig

Logged by: C. Lameman

Depth to Water (ft): —

Time Recorded: 1135 - 11:58

Total Depth (ft): 12'

Depth (ft)	Sample Interval	Sample Type (SPT, Grab, etc)	Sample Time	Blow Count (per 3x6" intervals)	Soil Description TYPE, density/consistency, color, grain size, moisture, other (i.e. odor, staining)	USCS Symbol	OVM (ppm)	OVM Time	MW Schematic and Description
0	3-4	Grab	11:36		Medium, Brown, Fine Grain Sand, High Plast, Moist, Cohesive, No odor (0-4')	CL	8.1	11:53	
5					S.A.A. (4-5')	CL			
5					Loose, Fine Grain, Moist, Non Plastic, Non cohesive, Dry, No Odor (5-5.5')	SW			
8	8'	Grab	11:40		Brown, Medium, High Plasticity, Moist, Cohesive, No odor (5.5-8')	CL	1.3	11:54	
8					S.A.A. @ 10' Slight Gray staining odor (8-11')	CL			
11					Dense, Tan Light Gray, medium grain, Dry, Non plastic, non cohesive, slight strong odor (11-12')	SS			
12	11-12'	Grab	11:45		Total Depth @ 12' on Sandstone Auger Refusal Install well 2" screen @ 12' to 7' Sand pack @ 12' to 6' Bentonite @ 6' to surface		282.1	11:58	

Animas Environmental Services

604 W. Piñon St., Farmington, NM 87401

Tel. (505) 564-2281 animasenvironmental.com

Date: 12-5-18

Latitude/Longitude: 36.62765, -107.47806

Datum:

Elevation:

Logged by: C. Lamenem

Time Recorded: 12:56 - 13:27

Total Depth (ft): 17'

✱

SOIL BORING LOG: SB-24 SVE-9

Facility or Pipeline Name: Hikoop ST 28 to Unit 31

Date: 12-5-18

AES personnel: C. Larneman

Buck Machine # _____			
Concentration	50 mg/kg	100 mg/kg	500 mg/kg
Calibration ABS Values			

Sample ID	Collection Date	Time of Sample Collection	Sample Location	Sample Depth (ft)	Composite	PID-OVM (ppm)	PID-OVM Time	Field TPH (mg/kg)	Field TPH Analysis Time	ABS	NOTES (i.e. Soil Type, Color, Odor, Staining)
SB-24	12-5-18										Brown, Medium, Fine Grained Sand, High Plasticity, Moist Cohesive, Strong odor @ 4' (0-4')
		13:50		3-4 13:50		324	13:52				Tan, Very stiff, High Plasticity, Moist, Gray Staining Cohesive, Strong odor (4-6')
				7-8 13:48		4,750	13:53				Tan, loose, Medium Grained, Non Plasticity, Moist, non cohesive, Strong odor, Gray Staining (6-8')
											Tan, Very stiff, High Plasticity, Moist, Gray Staining Cohesive, Extremely Strong odor @ 9-11.5' (8-11.5')
											Dense, Tan Gray Staining, Medium Grained, non cohesive Dry, V. Strong odor (11.5-12')
		13:46		11-12'		4,594	13:54				Total Depth @ 12' on Sandstone. Auger Refusal 1" Well install 1" screen @ 12' to 7' Sand pack @ 12' to 6'; Bentonite @ 6' to Surface

Type of Sample collection?:

Soil Boring Log: SVE-1R

Facility or Pipeline Name: San Juan 28-6 #31

Date: 12-5-18

AES personnel: C. Lamenman

Buck Machine # _____			
Concentration	50 mg/kg	100 mg/kg	500 mg/kg
Calibration ABS Values			

Sample ID	Collection Date	Time of Sample Collection	Sample Location	Sample Depth (ft)	Composite	PID-OVM (ppm)	PID-OVM Time	Field TPH (mg/kg)	Field TPH Analysis Time	ABS	NOTES (i.e. Soil Type, Color, Odor, Staining)
SVE-1R	12-5-18	NS	NS	NS	N	NA	NA	No BORING. LOGS.			
								Total Depth installed @ 12' Deep			
								1" Well			
								1" screen @ 12' to 7'			
								Sand Pack @ 12' to 6'			
								Bentonite @ 6' to Surface			
								NO LABS			

Type of Sample collection?:

June 04, 2018

HilCorp-Farmington, NM

Sample Delivery Group: L998202
Samples Received: 06/01/2018
Project Number: AFE# 1851542
Description: Hilcorp San Juan 28-6 #31

Report To: Lindsay Dumas
382 Road 3100
Aztec, NM 87401

Entire Report Reviewed By:



Daphne Richards
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	5	
Sr: Sample Results	6	³ Ss
SB-1 3' L998202-01	6	⁴ Cn
SB-1 7' L998202-02	7	
SB-2 7' L998202-03	8	⁵ Sr
SB-3 1' L998202-04	9	
SB-3 7.5' L998202-05	10	⁶ Qc
SB-4 8.5' L998202-06	11	⁷ Gl
SB-5 11.75' L998202-07	12	
SB-6 11' L998202-08	13	⁸ Al
Qc: Quality Control Summary	14	⁹ Sc
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Wet Chemistry by Method 300.0	15	
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Semi-Volatile Organic Compounds (GC) by Method 8015	19	
Gl: Glossary of Terms	20	
Al: Accreditations & Locations	21	
Sc: Sample Chain of Custody	22	

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB-1 3' L998202-01 Solid

Collected by
CL / SG

Collected date/time
05/31/18 09:36

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	1	06/01/18 11:10	06/01/18 23:52	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 00:29	DMW

1 Cp

2 Tc

SB-1 7' L998202-02 Solid

Collected by
CL / SG

Collected date/time
05/31/18 09:55

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	1	06/01/18 11:10	06/02/18 00:14	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 02:17	DMW

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

SB-2 7' L998202-03 Solid

Collected by
CL / SG

Collected date/time
05/31/18 10:25

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	1	06/01/18 11:10	06/02/18 00:37	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 02:29	DMW

SB-3 1' L998202-04 Solid

Collected by
CL / SG

Collected date/time
05/31/18 10:30

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855-1	1	06/01/18 11:10	06/04/18 00:28	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 02:41	DMW

SB-3 7.5' L998202-05 Solid

Collected by
CL / SG

Collected date/time
05/31/18 10:46

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	1	06/01/18 11:10	06/02/18 01:21	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 02:53	DMW

SB-4 8.5' L998202-06 Solid

Collected by
CL / SG

Collected date/time
05/31/18 11:15

Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Wet Chemistry by Method 300.0	WG1118594	1	06/01/18 11:11	06/01/18 20:02	MAJ
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	500	06/01/18 11:10	06/02/18 01:44	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 03:05	DMW

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB-5 11.75' L998202-07 Solid

Collected by
CL / SGCollected date/time
05/31/18 12:21Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	500	06/01/18 11:10	06/02/18 05:05	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 03:17	DMW

¹ Cp² Tc

SB-6 11' L998202-08 Solid

Collected by
CL / SGCollected date/time
05/31/18 13:02Received date/time
06/01/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1118680	1	06/01/18 13:11	06/01/18 13:22	JD
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118855	1000	06/01/18 11:10	06/02/18 05:27	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118768	1	06/01/18 19:24	06/02/18 03:29	DMW

⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Technical Service Representative

¹ Cp² Tc³ Ss⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

SB-1 3'

Collected date/time: 05/31/18 09:36

SAMPLE RESULTS - 01

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	89.4		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	0.000844		0.000559	1	06/01/2018 23:52	WG1118855
Toluene	ND		0.00559	1	06/01/2018 23:52	WG1118855
Ethylbenzene	ND		0.000559	1	06/01/2018 23:52	WG1118855
Total Xylene	0.00337		0.00168	1	06/01/2018 23:52	WG1118855
TPH (GC/FID) Low Fraction	ND		0.112	1	06/01/2018 23:52	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	96.1		77.0-120		06/01/2018 23:52	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	96.6		75.0-128		06/01/2018 23:52	WG1118855

6 Qc

7 Gl

8 Al

9 Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	ND	<u>J6</u>	4.47	1	06/02/2018 00:29	WG1118768
C28-C40 Oil Range	ND		4.47	1	06/02/2018 00:29	WG1118768
(S) o-Terphenyl	71.8		18.0-148		06/02/2018 00:29	WG1118768

SB-1 7'

Collected date/time: 05/31/18 09:55

SAMPLE RESULTS - 02

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	87.4		1	06/01/2018 13:22	WG1118680

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00145		0.000572	1	06/02/2018 00:14	WG1118855
Toluene	0.00684		0.00572	1	06/02/2018 00:14	WG1118855
Ethylbenzene	0.000917		0.000572	1	06/02/2018 00:14	WG1118855
Total Xylene	0.0108		0.00172	1	06/02/2018 00:14	WG1118855
TPH (GC/FID) Low Fraction	ND		0.114	1	06/02/2018 00:14	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	96.3		77.0-120		06/02/2018 00:14	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	97.0		75.0-128		06/02/2018 00:14	WG1118855

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.58	1	06/02/2018 02:17	WG1118768
C28-C40 Oil Range	ND		4.58	1	06/02/2018 02:17	WG1118768
(S) o-Terphenyl	62.7		18.0-148		06/02/2018 02:17	WG1118768

1 Cp

2 Tc

3 Ss

4 Cn

6 Qc

7 Gl

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	87.2		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	0.000724		0.000574	1	06/02/2018 00:37	WG1118855
Toluene	ND		0.00574	1	06/02/2018 00:37	WG1118855
Ethylbenzene	ND		0.000574	1	06/02/2018 00:37	WG1118855
Total Xylene	ND		0.00172	1	06/02/2018 00:37	WG1118855
TPH (GC/FID) Low Fraction	ND		0.115	1	06/02/2018 00:37	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	96.6		77.0-120		06/02/2018 00:37	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	97.1		75.0-128		06/02/2018 00:37	WG1118855

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	ND		4.59	1	06/02/2018 02:29	WG1118768
C28-C40 Oil Range	ND		4.59	1	06/02/2018 02:29	WG1118768
(S) o-Terphenyl	58.8		18.0-148		06/02/2018 02:29	WG1118768

6 Qc

7 Gl

8 Al

9 Sc

SB-3 1'

Collected date/time: 05/31/18 10:30

SAMPLE RESULTS - 04

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	87.9		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00115		0.000569	1	06/04/2018 00:28	WG1118855-1
Toluene	ND		0.00569	1	06/04/2018 00:28	WG1118855-1
Ethylbenzene	ND		0.000569	1	06/04/2018 00:28	WG1118855-1
Total Xylene	0.00604		0.00171	1	06/04/2018 00:28	WG1118855-1
TPH (GC/FID) Low Fraction	ND		0.114	1	06/04/2018 00:28	WG1118855-1
(S) a,a,a-Trifluorotoluene(FID)	99.6		77.0-120		06/04/2018 00:28	WG1118855-1
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/04/2018 00:28	WG1118855-1

6 Qc

7 Gl

8 Al

9 Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.55	1	06/02/2018 02:41	WG1118768
C28-C40 Oil Range	ND		4.55	1	06/02/2018 02:41	WG1118768
(S) o-Terphenyl	69.5		18.0-148		06/02/2018 02:41	WG1118768

SB-3 7.5'

Collected date/time: 05/31/18 10:46

SAMPLE RESULTS - 05

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	86.3		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	0.00795		0.000580	1	06/02/2018 01:21	WG1118855
Toluene	0.0280		0.00580	1	06/02/2018 01:21	WG1118855
Ethylbenzene	0.00226		0.000580	1	06/02/2018 01:21	WG1118855
Total Xylene	0.0264		0.00174	1	06/02/2018 01:21	WG1118855
TPH (GC/FID) Low Fraction	ND		0.116	1	06/02/2018 01:21	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	96.2		77.0-120		06/02/2018 01:21	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	96.7		75.0-128		06/02/2018 01:21	WG1118855

6 Qc

7 Gl

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	ND		4.64	1	06/02/2018 02:53	WG1118768
C28-C40 Oil Range	ND		4.64	1	06/02/2018 02:53	WG1118768
(S) o-Terphenyl	54.8		18.0-148		06/02/2018 02:53	WG1118768

8 Al

9 Sc

SB-4 8.5'

Collected date/time: 05/31/18 11:15

SAMPLE RESULTS - 06

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.2		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	67.0		11.7	1	06/01/2018 20:02	WG1118594

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	2.26		0.293	500	06/02/2018 01:44	WG1118855
Toluene	12.9		2.93	500	06/02/2018 01:44	WG1118855
Ethylbenzene	4.09		0.293	500	06/02/2018 01:44	WG1118855
Total Xylene	32.0		0.880	500	06/02/2018 01:44	WG1118855
TPH (GC/FID) Low Fraction	626		58.7	500	06/02/2018 01:44	WG1118855
(S) o,a,a-Trifluorotoluene(FID)	84.4		77.0-120		06/02/2018 01:44	WG1118855
(S) o,a,a-Trifluorotoluene(PID)	98.7		75.0-128		06/02/2018 01:44	WG1118855

6 Qc

7 Gl

8 Al

9 Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	60.9		4.70	1	06/02/2018 03:05	WG1118768
C28-C40 Oil Range	ND		4.70	1	06/02/2018 03:05	WG1118768
(S) o-Terphenyl	74.5		18.0-148		06/02/2018 03:05	WG1118768

SB-5 11.75'

Collected date/time: 05/31/18 12:21

SAMPLE RESULTS - 07

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	91.8		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	3.02		0.272	500	06/02/2018 05:05	WG1118855
Toluene	21.0		2.72	500	06/02/2018 05:05	WG1118855
Ethylbenzene	5.06		0.272	500	06/02/2018 05:05	WG1118855
Total Xylene	43.6		0.817	500	06/02/2018 05:05	WG1118855
TPH (GC/FID) Low Fraction	1050		54.5	500	06/02/2018 05:05	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	76.9	<u>J2</u>	77.0-120		06/02/2018 05:05	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	97.0		75.0-128		06/02/2018 05:05	WG1118855

6 Qc

7 Gl

8 Al

9 Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	132		4.36	1	06/02/2018 03:17	WG1118768
C28-C40 Oil Range	ND		4.36	1	06/02/2018 03:17	WG1118768
(S) o-Terphenyl	71.8		18.0-148		06/02/2018 03:17	WG1118768

SB-6 11'

Collected date/time: 05/31/18 13:02

SAMPLE RESULTS - 08

L998202

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	91.5		1	06/01/2018 13:22	WG1118680

1 Cp

2 Tc

3 Ss

4 Cn

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Benzene	5.84		0.546	1000	06/02/2018 05:27	WG1118855
Toluene	49.3		5.46	1000	06/02/2018 05:27	WG1118855
Ethylbenzene	12.8		0.546	1000	06/02/2018 05:27	WG1118855
Total Xylene	116		1.64	1000	06/02/2018 05:27	WG1118855
TPH (GC/FID) Low Fraction	2120		109	1000	06/02/2018 05:27	WG1118855
(S) a,a,a-Trifluorotoluene(FID)	79.3		77.0-120		06/02/2018 05:27	WG1118855
(S) a,a,a-Trifluorotoluene(PID)	98.4		75.0-128		06/02/2018 05:27	WG1118855

6 Qc

7 Gl

8 Al

9 Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
C10-C28 Diesel Range	331		4.37	1	06/02/2018 03:29	WG1118768
C28-C40 Oil Range	ND		4.37	1	06/02/2018 03:29	WG1118768
(S) o-Terphenyl	73.3		18.0-148		06/02/2018 03:29	WG1118768

WG1118680

Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

[L998202-01,02,03,04,05,06,07,08](#)

Method Blank (MB)

(MB) R3315059-1 06/01/18 13:22

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.000			

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr

L998202-01 Original Sample (OS) • Duplicate (DUP)

(OS) L998202-01 06/01/18 13:22 • (DUP) R3315059-3 06/01/18 13:22

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	89.4	89.2	1	0.193		5

Laboratory Control Sample (LCS)

(LCS) R3315059-2 06/01/18 13:22

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

⁷ Gl⁸ Al⁹ Sc

WG1118594

Wet Chemistry by Method 300.0

QUALITY CONTROL SUMMARY

L998202-06

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3314607-1 06/01/18 11:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	U		0.795	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L998025-02 Original Sample (OS) • Duplicate (DUP)

(OS) L998025-02 06/01/18 14:17 • (DUP) R3314607-4 06/01/18 14:33

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	55.3	51.4	1	7.30		20

L998025-13 Original Sample (OS) • Duplicate (DUP)

(OS) L998025-13 06/01/18 18:24 • (DUP) R3314607-7 06/01/18 18:40

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	267	240	1	10.4		20

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314607-2 06/01/18 11:52 • (LCSD) R3314607-3 06/01/18 12:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	500	527	522	105	104	90.0-110			1.02	20

L998025-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L998025-06 06/01/18 15:35 • (MS) R3314607-5 06/01/18 15:50 • (MSD) R3314607-6 06/01/18 16:05

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	500	369	977	956	122	117	1	80.0-120	J5		2.19	20

WG1118855

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L998202-01,02,03,05,06,07,08

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3314803-5 06/01/18 18:18

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S)				
a,a,a-Trifluorotoluene(FID)	99.9			77.0-120
(S)				
a,a,a-Trifluorotoluene(PID)	99.6			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314803-2 06/01/18 16:48 • (LCSD) R3314803-1 06/01/18 14:32

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0521	0.0519	104	104	71.0-121			0.323	20
Toluene	0.0500	0.0538	0.0534	108	107	72.0-120			0.615	20
Ethylbenzene	0.0500	0.0537	0.0532	107	106	76.0-121			0.951	20
Total Xylene	0.150	0.163	0.162	108	108	75.0-124			0.246	20
(S)										
a,a,a-Trifluorotoluene(FID)				99.2	98.9	77.0-120				
(S)										
a,a,a-Trifluorotoluene(PID)				98.6	97.9	75.0-128				

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314803-3 06/01/18 17:11 • (LCSD) R3314803-4 06/01/18 17:33

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	4.97	4.82	90.3	87.6	70.0-136			3.08	20
(S)										
a,a,a-Trifluorotoluene(FID)				102	102	77.0-120				
(S)										
a,a,a-Trifluorotoluene(PID)				107	107	75.0-128				

WG1118855

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L998202-01,02,03,05,06,07,08

ONE LAB. NATIONWIDE.



L998202-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L998202-06 06/02/18 01:44 • (MS) R3314803-6 06/02/18 09:10 • (MSD) R3314803-7 06/02/18 09:33

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0587	2.26	32.2	31.8	102	101	500	10.0-146			1.22	29
Toluene	0.0587	12.9	42.6	42.1	101	99.6	500	10.0-143			1.19	30
Ethylbenzene	0.0587	4.09	34.4	33.5	103	100	500	10.0-147			2.85	31
Total Xylene	0.176	32.0	122	119	102	99.0	500	10.0-149			2.05	30
(S) a,a,a-Trifluorotoluene(FID)					91.7	91.8		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					98.3	98.8		75.0-128				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L998202-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L998202-06 06/02/18 01:44 • (MS) R3314803-8 06/02/18 09:56 • (MSD) R3314803-9 06/02/18 10:18

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	6.46	626	4130	4390	108	116	500	10.0-147			6.06	30
(S) a,a,a-Trifluorotoluene(FID)					103	104		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					110	111		75.0-128				

7 GI

8 Al

9 Sc

WG118855-1

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L998202-04

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3315019-5 06/03/18 20:52

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000406	J	0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	103			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	107			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315019-1 06/03/18 19:07 • (LCSD) R3315019-2 06/03/18 19:28

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0494	0.0494	98.9	98.8	71.0-121			0.0431	20
Toluene	0.0500	0.0489	0.0486	97.8	97.2	72.0-120			0.598	20
Ethylbenzene	0.0500	0.0540	0.0539	108	108	76.0-121			0.335	20
Total Xylene	0.150	0.164	0.163	109	108	75.0-124			0.736	20
(S) a,a,a-Trifluorotoluene(FID)				97.9	98.5	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				103	103	75.0-128				

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315019-3 06/03/18 19:49 • (LCSD) R3315019-4 06/03/18 20:10

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.34	5.34	97.0	97.2	70.0-136			0.159	20
(S) a,a,a-Trifluorotoluene(FID)				94.2	92.9	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				114	114	75.0-128				

WG1118768

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.



Semi-Volatile Organic Compounds (GC) by Method 8015

[L998202-01,02,03,04,05,06,07,08](#)

Method Blank (MB)

(MB) R3314806-1 06/01/18 23:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	74.3			18.0-148

1
Cp2
Tc3
Ss4
Cn5
Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314806-2 06/02/18 00:06 • (LCSD) R3314806-3 06/02/18 00:17

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	50.0	27.6	27.3	55.2	54.6	50.0-150			1.08	20
(S) o-Terphenyl				102	103	18.0-148				

7
Gl8
Al9
Sc

L998202-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L998202-01 06/02/18 00:29 • (MS) R3314806-4 06/02/18 00:41 • (MSD) R3314806-5 06/02/18 00:53

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	55.9	ND	26.4	30.4	47.3	54.4	1	50.0-150	J6		13.9	20
(S) o-Terphenyl					78.3	88.2		18.0-148				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
RDL (dry)	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

8 Al

9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

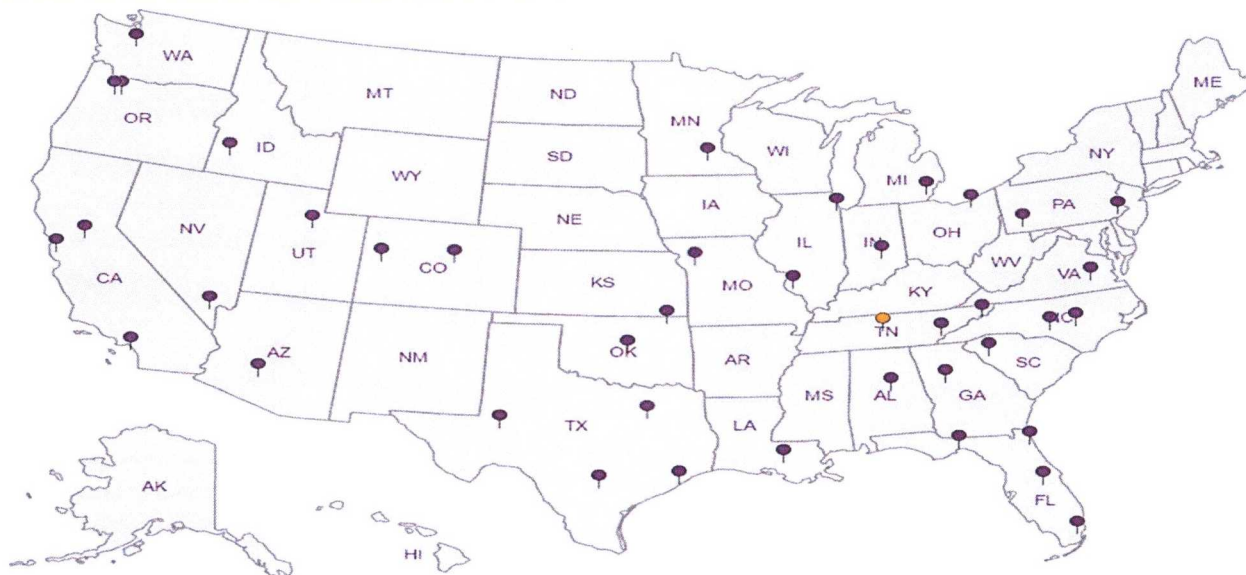
Third Party Federal Accreditations



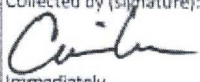
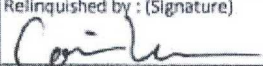
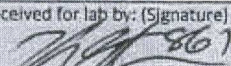
A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



Billing Information: Bill to Hilcorp - CALL LINDSAY DUMAS		Pres Chk		Analysis / Container / Preservative										Chain of Custody Page <u> </u> of <u> </u>						
														 L.A.B S.C.I.E.N.C.E.S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859						
Report to: Lindsay Dumas		Email To: ldumas@hilcorp.com		<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">BTEX - 8021</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">TPH (GRO/DRO/MRO) - 8015</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">Chlorides - 300.0</div> </div>										 L# 998202 A015						
Project Description: Hilcorp San Juan 28-6 #31		City/State Collected: New Mexico																		
Phone: 832-839-4585		Client Project #																		
Fax:		Lab Project #																		
Collected by (print): Corwin Lameman, Sam		Site/Facility ID #												P.O. #						
Collected by (signature): 		Rush? (Lab MUST Be Notified) <input type="checkbox"/> Same Day <input type="checkbox"/> Five Day <input checked="" type="checkbox"/> Next Day <input type="checkbox"/> 5 Day (Rad Only) <input type="checkbox"/> Two Day <input type="checkbox"/> 10 Day (Rad Only) <input type="checkbox"/> Three Day		Quote #																
Immediately Packed on Ice N <input type="checkbox"/> Y <input checked="" type="checkbox"/>		Date Results Needed June 4, 2018		No. of Cntrs																
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time															
SB-1 @ 3 ft	Grab	SS	3	5/31/18	9:36	2	X	X												
SB-1 @ 7 ft	Grab	SS	7	5/31/18	9:55	2	X	X												01
SB-2 @ 7 ft	Grab	SS	7	5/31/18	10:25	2	X	X												02
SB-3 @ 1 ft	Grab	SS	1	5/31/18	10:30	2	X	X												03
SB-3 @ 7.5 ft	Grab	SS	7.5	5/31/18	10:46	2	X	X												04
SB-4 @ 8.5 ft	Grab	SS	8.5	5/31/18	11:15	2	X	X	X											05
SB-5 @ 11.75 ft	Grab	SS	11.75	5/31/18	12:21	2	X	X												06
SB-6 @ 11 ft	Grab	SS	11	5/31/18	13:02	2	X	X												07
																				08
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other _____		Remarks: Email results to Elizabeth McNally - emcnally@animasenvironmental.com		pH _____ Temp _____																
Samples returned via: ___ UPS ___ FedEx ___ Courier _____		Tracking # 7305 8947 4827		Flow _____ Other _____																
Relinquished by: (Signature) 		Date: 5-31-18		Time: 16:49		Received by: (Signature)		Trip Blank Received: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		HCL/MeOH TBR		Sample Receipt Checklist COC Seal Present/Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N COC Signed/Accurate: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N IF Applicable VOA Zero Headspace: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Preservation Correct/Checked: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N								
Relinquished by: (Signature)		Date:		Time:		Received by: (Signature)		Temp: 7.0°C		Bottles Received: 16		If preservation required by Login: Date/Time								
Relinquished by: (Signature)		Date:		Time:		Received for lab by: (Signature) 		Date: 5/31/18		Time: 845		Hold:		Condition: NCF / OK						

ANALYTICAL REPORT

July 10, 2018

HilCorp-Farmington, NM

Sample Delivery Group: L1006375
Samples Received: 06/29/2018
Project Number:
Description: Hilcomp San Juan 28-6 #31

Report To: Kurt Hoekstra and Lindsay Dumas
382 Road 3100
Aztec, NM 87401

Entire Report Reviewed By:



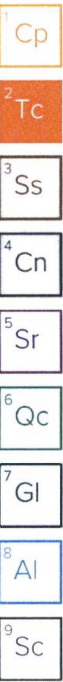
Daphne Richards
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.





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SB-11 10' L1006375-05	10
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SB-13 10' L1006375-07	12
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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB-7 25' L1006375-01 Solid

 Collected by CL
 Collected date/time 06/27/18 10:19
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1	07/03/18 10:08	07/05/18 13:03	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 20:13	MTJ

1 Cp

2 Tc

SB-8 15' L1006375-02 Solid

 Collected by CL
 Collected date/time 06/27/18 12:13
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	100	07/03/18 10:08	07/05/18 15:33	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 20:53	MTJ

4 Cn

5 Sr

6 Qc

SB-9 10' L1006375-03 Solid

 Collected by CL
 Collected date/time 06/27/18 13:09
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1	07/03/18 10:08	07/05/18 13:24	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 21:07	MTJ

7 Gl

8 Al

SB-10 10' L1006375-04 Solid

 Collected by CL
 Collected date/time 06/27/18 14:11
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1000	07/03/18 10:08	07/05/18 16:16	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 21:20	CLG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	20	07/07/18 00:01	07/09/18 18:27	MG

9 Sc

SB-11 10' L1006375-05 Solid

 Collected by CL
 Collected date/time 06/27/18 14:34
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1	07/03/18 10:08	07/05/18 13:45	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 21:34	MTJ

SB-12 10' L1006375-06 Solid

 Collected by CL
 Collected date/time 06/27/18 15:17
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1134677	2000	07/03/18 10:08	07/09/18 14:48	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 21:47	MTJ
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	5	07/07/18 00:01	07/09/18 16:25	MTJ

SB-13 10' L1006375-07 Solid

 Collected by CL
 Collected date/time 06/27/18 16:02
 Received date/time 06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1000	07/03/18 10:08	07/05/18 16:37	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 22:01	MTJ
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	10	07/07/18 00:01	07/09/18 16:38	MTJ

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB-14 10' L1006375-08 Solid

			Collected by	Collected date/time	Received date/time
			CL	06/27/18 16:41	06/29/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1000	07/03/18 10:08	07/05/18 16:58	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 22:14	MTJ
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	10	07/07/18 00:01	07/09/18 16:52	MTJ

1 Cp

2 Tc

SB-15 10' L1006375-09 Solid

			Collected by	Collected date/time	Received date/time
			CL	06/27/18 17:15	06/29/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1133929	1000	07/03/18 10:08	07/05/18 17:19	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	1	07/07/18 00:01	07/08/18 22:28	MTJ
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1135023	10	07/07/18 00:01	07/09/18 17:06	MTJ

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Technical Service Representative

¹ Cp² Tc³ Ss⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00101	<u>B</u>	0.000500	1	07/05/2018 13:03	WG1133929
Toluene	ND		0.00500	1	07/05/2018 13:03	WG1133929
Ethylbenzene	0.000669	<u>B</u>	0.000500	1	07/05/2018 13:03	WG1133929
Total Xylene	0.00308	<u>B</u>	0.00150	1	07/05/2018 13:03	WG1133929
TPH (GC/FID) Low Fraction	0.247		0.100	1	07/05/2018 13:03	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	99.7		77.0-120		07/05/2018 13:03	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		07/05/2018 13:03	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	14.2		4.00	1	07/08/2018 20:13	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 20:13	WG1135023
(S) o-Terphenyl	77.5		18.0-148		07/08/2018 20:13	WG1135023

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.417		0.0500	100	07/05/2018 15:33	WG1133929
Toluene	ND		0.500	100	07/05/2018 15:33	WG1133929
Ethylbenzene	0.339		0.0500	100	07/05/2018 15:33	WG1133929
Total Xylene	4.19		0.150	100	07/05/2018 15:33	WG1133929
TPH (GC/FID) Low Fraction	362		10.0	100	07/05/2018 15:33	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	94.9		77.0-120		07/05/2018 15:33	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	105		75.0-128		07/05/2018 15:33	WG1133929

1
Cp2
Tc3
Ss4
Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	82.6		4.00	1	07/08/2018 20:53	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 20:53	WG1135023
(S) o-Terphenyl	78.8		18.0-148		07/08/2018 20:53	WG1135023

6
Qc7
Gl8
Al9
Sc



Collected date/time: 06/27/18 13:09

L1006375

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	07/05/2018 13:24	WG1133929
Toluene	ND		0.00500	1	07/05/2018 13:24	WG1133929
Ethylbenzene	0.000649	<u>B</u>	0.000500	1	07/05/2018 13:24	WG1133929
Total Xylene	0.00749		0.00150	1	07/05/2018 13:24	WG1133929
TPH (GC/FID) Low Fraction	0.700		0.100	1	07/05/2018 13:24	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	101		77.0-120		07/05/2018 13:24	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		07/05/2018 13:24	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	07/08/2018 21:07	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 21:07	WG1135023
(S) o-Terphenyl	87.5		18.0-148		07/08/2018 21:07	WG1135023

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	19.6		0.500	1000	07/05/2018 16:16	WG1133929
Toluene	178		5.00	1000	07/05/2018 16:16	WG1133929
Ethylbenzene	33.0		0.500	1000	07/05/2018 16:16	WG1133929
Total Xylene	400		1.50	1000	07/05/2018 16:16	WG1133929
TPH (GC/FID) Low Fraction	10800		100	1000	07/05/2018 16:16	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	90.1		77.0-120		07/05/2018 16:16	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	101		75.0-128		07/05/2018 16:16	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	1330		80.0	20	07/09/2018 18:27	WG1135023
C28-C40 Oil Range	6.67		4.00	1	07/08/2018 21:20	WG1135023
(S) o-Terphenyl	84.4		18.0-148		07/08/2018 21:20	WG1135023
(S) o-Terphenyl	73.2	<u>J7</u>	18.0-148		07/09/2018 18:27	WG1135023

6 Qc

7 Gl

8 Al

9 Sc

SB-11 10'

Collected date/time: 06/27/18 14:34

SAMPLE RESULTS - 05

L1006375

ONE LAB. NATIONWIDE.



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000664	B	0.000500	1	07/05/2018 13:45	WG1133929
Toluene	ND		0.00500	1	07/05/2018 13:45	WG1133929
Ethylbenzene	0.000751	B	0.000500	1	07/05/2018 13:45	WG1133929
Total Xylene	0.0127		0.00150	1	07/05/2018 13:45	WG1133929
TPH (GC/FID) Low Fraction	0.119		0.100	1	07/05/2018 13:45	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	100		77.0-120		07/05/2018 13:45	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		07/05/2018 13:45	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	07/08/2018 21:34	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 21:34	WG1135023
(S) o-Terphenyl	92.7		18.0-148		07/08/2018 21:34	WG1135023

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	4.12		1.00	2000	07/09/2018 14:48	WG1134677
Toluene	25.6		10.0	2000	07/09/2018 14:48	WG1134677
Ethylbenzene	14.2		1.00	2000	07/09/2018 14:48	WG1134677
Total Xylene	189		3.00	2000	07/09/2018 14:48	WG1134677
TPH (GC/FID) Low Fraction	4970		200	2000	07/09/2018 14:48	WG1134677
(S) a,a,a-Trifluorotoluene(FID)	96.3		77.0-120		07/09/2018 14:48	WG1134677
(S) a,a,a-Trifluorotoluene(PID)	106		75.0-128		07/09/2018 14:48	WG1134677

1 Cp
2 Tc
3 Ss
4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	372		20.0	5	07/09/2018 16:25	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 21:47	WG1135023
(S) o-Terphenyl	79.3		18.0-148		07/08/2018 21:47	WG1135023
(S) o-Terphenyl	70.0		18.0-148		07/09/2018 16:25	WG1135023

6 Qc
7 Gl
8 Al
9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	1.65	B	0.500	1000	07/05/2018 16:37	WG1133929
Toluene	16.6		5.00	1000	07/05/2018 16:37	WG1133929
Ethylbenzene	7.99		0.500	1000	07/05/2018 16:37	WG1133929
Total Xylene	128		1.50	1000	07/05/2018 16:37	WG1133929
TPH (GC/FID) Low Fraction	3270		100	1000	07/05/2018 16:37	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	102		77.0-120		07/05/2018 16:37	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	105		75.0-128		07/05/2018 16:37	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	813		40.0	10	07/09/2018 16:38	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 22:01	WG1135023
(S) o-Terphenyl	83.9		18.0-148		07/09/2018 16:38	WG1135023
(S) o-Terphenyl	101		18.0-148		07/08/2018 22:01	WG1135023

6 Qc

7 Gl

8 Al

9 Sc



Collected date/time: 06/27/18 16:41

L1006375

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	5.82		0.500	1000	07/05/2018 16:58	WG1133929
Toluene	69.2		5.00	1000	07/05/2018 16:58	WG1133929
Ethylbenzene	18.1		0.500	1000	07/05/2018 16:58	WG1133929
Total Xylene	249		1.50	1000	07/05/2018 16:58	WG1133929
TPH (GC/FID) Low Fraction	5810		100	1000	07/05/2018 16:58	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	88.2		77.0-120		07/05/2018 16:58	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		07/05/2018 16:58	WG1133929

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	932		40.0	10	07/09/2018 16:52	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 22:14	WG1135023
(S) o-Terphenyl	89.1		18.0-148		07/08/2018 22:14	WG1135023
(S) o-Terphenyl	81.4		18.0-148		07/09/2018 16:52	WG1135023

6 Qc

7 Gl

8 Al

9 Sc



Collected date/time: 06/27/18 17:15

L1006375

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	4.05		0.500	1000	07/05/2018 17:19	WG1133929
Toluene	52.2		5.00	1000	07/05/2018 17:19	WG1133929
Ethylbenzene	19.5		0.500	1000	07/05/2018 17:19	WG1133929
Total Xylene	289		1.50	1000	07/05/2018 17:19	WG1133929
TPH (GC/FID) Low Fraction	6130		100	1000	07/05/2018 17:19	WG1133929
(S) a,a,a-Trifluorotoluene(FID)	93.4		77.0-120		07/05/2018 17:19	WG1133929
(S) a,a,a-Trifluorotoluene(PID)	105		75.0-128		07/05/2018 17:19	WG1133929

1 Cp
2 Tc
3 Ss
4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	877		40.0	10	07/09/2018 17:06	WG1135023
C28-C40 Oil Range	ND		4.00	1	07/08/2018 22:28	WG1135023
(S) o-Terphenyl	98.6		18.0-148		07/08/2018 22:28	WG1135023
(S) o-Terphenyl	87.7		18.0-148		07/09/2018 17:06	WG1135023

6 Qc
7 Gl
8 Al
9 Sc

WG1133929

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L1006375-01,02,03,04,05,07,08,09

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3323705-5 07/05/18 12:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	0.000217	J	0.000120	0.000500
Toluene	0.000315	J	0.000150	0.00500
Ethylbenzene	0.000122	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	101			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	105			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3323705-1 07/05/18 10:22 • (LCSD) R3323705-6 07/05/18 10:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.23	5.15	95.0	93.6	70.0-136			1.54	20
(S) a,a,a-Trifluorotoluene(FID)				85.8	88.7	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				113	113	75.0-128				

7 GI

8 AI

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3323705-2 07/05/18 10:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.15	93.6	70.0-136	
(S) a,a,a-Trifluorotoluene(FID)			88.7	77.0-120	
(S) a,a,a-Trifluorotoluene(PID)			113	75.0-128	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3323705-3 07/05/18 11:04 • (LCSD) R3323705-7 07/05/18 11:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0456	0.0472	91.1	94.5	71.0-121			3.59	20
Toluene	0.0500	0.0480	0.0494	96.0	98.9	72.0-120			2.93	20
Ethylbenzene	0.0500	0.0552	0.0569	110	114	76.0-121			3.07	20
Total Xylene	0.150	0.169	0.174	113	116	75.0-124			2.74	20

WG1133929

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

[L1006375-01,02,03,04,05,07,08,09](#)

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3323705-3 07/05/18 11:04 • (LCSD) R3323705-7 07/05/18 11:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
(S) <i>a,a,a</i> -Trifluorotoluene(FID)				99.9	99.5	77.0-120				
(S) <i>a,a,a</i> -Trifluorotoluene(PID)				104	104	75.0-128				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS)

(LCS) R3323705-4 07/05/18 11:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Benzene	0.0500	0.0472	94.5	71.0-121	
Toluene	0.0500	0.0494	98.9	72.0-120	
Ethylbenzene	0.0500	0.0569	114	76.0-121	
Total Xylene	0.150	0.174	116	75.0-124	
(S) <i>a,a,a</i> -Trifluorotoluene(FID)			99.5	77.0-120	
(S) <i>a,a,a</i> -Trifluorotoluene(PID)			104	75.0-128	

7 Gl

8 Al

9 Sc

L1006064-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1006064-01 07/05/18 15:55 • (MS) R3323705-8 07/05/18 17:40 • (MSD) R3323705-9 07/05/18 18:01

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Benzene	0.0500	0.587	8.69	10.7	32.4	40.4	500	10.0-146			20.6	29
Toluene	0.0500	ND	9.30	11.3	35.0	42.9	500	10.0-143			19.2	30
Ethylbenzene	0.0500	2.61	13.0	15.4	41.4	51.3	500	10.0-147			17.4	31
Total Xylene	0.150	1.81	33.4	40.5	42.1	51.6	500	10.0-149	<u>J6</u>	<u>J6</u>	19.2	30
(S) <i>a,a,a</i> -Trifluorotoluene(FID)					101	101		77.0-120				
(S) <i>a,a,a</i> -Trifluorotoluene(PID)					106	106		75.0-128				

L1006064-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1006064-01 07/05/18 15:55 • (MS) R3323705-10 07/05/18 18:22 • (MSD) R3323705-11 07/05/18 18:43

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	152	678	753	19.1	21.8	500	10.0-147			10.5	30
(S) <i>a,a,a</i> -Trifluorotoluene(FID)					103	101		77.0-120				



L1006064-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1006064-01 07/05/18 15:55 • (MS) R3323705-10 07/05/18 18:22 • (MSD) R3323705-11 07/05/18 18:43

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
(S) a,a,a-Trifluorotoluene(PID)					108	107		75.0-128				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

7 Gl

8 Al

9 Sc

WG1134677

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L1006375-06

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3324099-5 07/09/18 13:13

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	0.000134	J	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	104			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	107			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3324099-1 07/09/18 11:02 • (LCSD) R3324099-2 07/09/18 11:23

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0489	0.0510	97.7	102	71.0-121			4.25	20
Toluene	0.0500	0.0482	0.0498	96.4	99.5	72.0-120			3.21	20
Ethylbenzene	0.0500	0.0523	0.0539	105	108	76.0-121			2.94	20
Total Xylene	0.150	0.158	0.163	106	108	75.0-124			2.74	20
(S) a,a,a-Trifluorotoluene(FID)				98.0	97.8	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				102	102	75.0-128				

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3324099-3 07/09/18 12:10 • (LCSD) R3324099-4 07/09/18 12:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.41	5.22	98.3	94.9	70.0-136			3.55	20
(S) a,a,a-Trifluorotoluene(FID)				88.8	88.1	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				111	113	75.0-128				

WG1135023

Semi-Volatile Organic Compounds (GC) by Method 8015

QUALITY CONTROL SUMMARY

[L1006375-01,02,03,04,05,06,07,08,09](#)

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3324028-1 07/08/18 19:32

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	97.0			18.0-148

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3324028-2 07/08/18 19:45 • (LCSD) R3324028-3 07/08/18 19:59

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	50.0	39.6	44.1	79.2	88.1	50.0-150			10.6	20
(S) o-Terphenyl				88.7	98.3	18.0-148				

7 GI

8 Al

9 Sc

L1006375-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1006375-01 07/08/18 20:13 • (MS) R3324028-4 07/08/18 20:26 • (MSD) R3324028-5 07/08/18 20:40

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	50.0	14.2	59.1	56.9	89.8	85.3	1	50.0-150			3.84	20
(S) o-Terphenyl					70.7	77.1		18.0-148				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana ¹	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

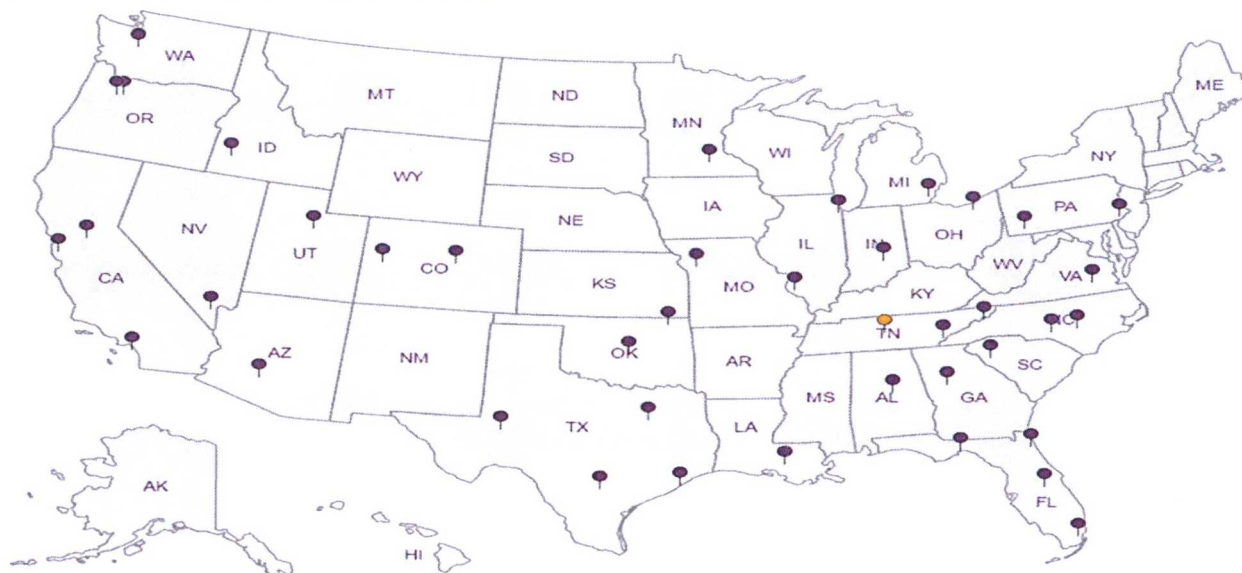
Third Party Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



ACCOUNT:
HilCorp-Farmington, NM

PROJECT:

SDG:
L1006375

DATE/TIME:
07/10/18 13:50

PAGE:
21 of 23

Billing Information: <div style="text-align: center; font-size: 1.2em;">Bill</div>				Pres Chk	Analysis / Container / Preservative										Chain of Custody Page 1 of 2				
															 <small>12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859</small>				
Report to:				Email To:				<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> L# 1006315 F207 </div> <div> Acctnum: Template: Prelogin: TSR: PB: Shipped Via: </div>											
Lindsay Dumas				ldumas@hilcorp.com															
Project Description: Hilcorp San Juan 28-b #31				City/State Collected: New Mexico															
Phone: 832-839-4585		Client Project #		Lab Project #		P.O. #													
Fax:		Site/Facility ID #		Quote #		Date Results Needed													
Collected by (print): Conwin Lammeman				Rush? (Lab MUST Be Notified) <input type="checkbox"/> Same Day <input checked="" type="checkbox"/> Five Day <input type="checkbox"/> Next Day <input type="checkbox"/> 5 Day (Rad Only) <input type="checkbox"/> Two Day <input type="checkbox"/> 10 Day (Rad Only) <input type="checkbox"/> Three Day STANDARD				No. of Cntrs											
Collected by (signature):				Immediately Packed on Ice N <input type="checkbox"/> Y <input checked="" type="checkbox"/>															
Sample ID		Comp/Grab	Matrix *	Depth	Date	Time													
SB-7 @ 25 ft		Grab	SS	25	6-27-18	10:19	1	X	X										
SB-7 @ 35 ft		Grab	SS	35	6-27-18	10:41	2	X	X										
SB-8 @ 15 ft		Grab	SS	15	6-27-18	12:13	1	X	X										
SB-8 @ 25 ft		Grab	SS	25	6-27-18	12:24	1	X	X										
SB-9 @ 10 ft		Grab	SS	10	6-27-18	13:09	2	X	X										
SB-9 @ 25 ft		Grab	SS	25	6-27-18	13:15	1	X	X										
SB-10 @ 10 ft		Grab	SS	10	6-27-18	13:55	2	X	X										
SB-10 @ 25 ft		Grab	SS	25	6-27-18	14:11	1	X	X										
SB-11 @ 10 ft		Grab	SS	10	6-27-18	14:34	2	X	X										
SB-11 @ 25 ft		Grab	SS	25	6-27-18	14:51	2	X	X										
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - Waste Water DW - Drinking Water OT - Other				Remarks: Some samples not completely full due to limited recovery from drilling auger.				pH _____ Temp _____ Flow _____ Other _____				Sample Receipt Check/Est COC Seal Present/Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N COC Signed/Accurate: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If Applicable VOA Zero Headspace: <input type="checkbox"/> Y <input type="checkbox"/> N Preservation Correct/Checked: <input type="checkbox"/> Y <input type="checkbox"/> N							
Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier				Tracking # 7305 8947 4816															
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Trip Blank Received: Yes/No													
						HCL/MeOH TBR													
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Temp: 27.5°C Bottles Received: 28-40		If preservation required by Login: Date/Time											
Relinquished by: (Signature)		Date:	Time:	Received for lab by: (Signature)		Date: 6/29/18 Time: 845		6-183				Condition: NCF / OK							

ANALYTICAL REPORT

July 16, 2018

HilCorp-Farmington, NM

Sample Delivery Group: L1008712

Samples Received: 06/29/2018

Project Number:

Description: Hilcomp San Juan 28-6 #31

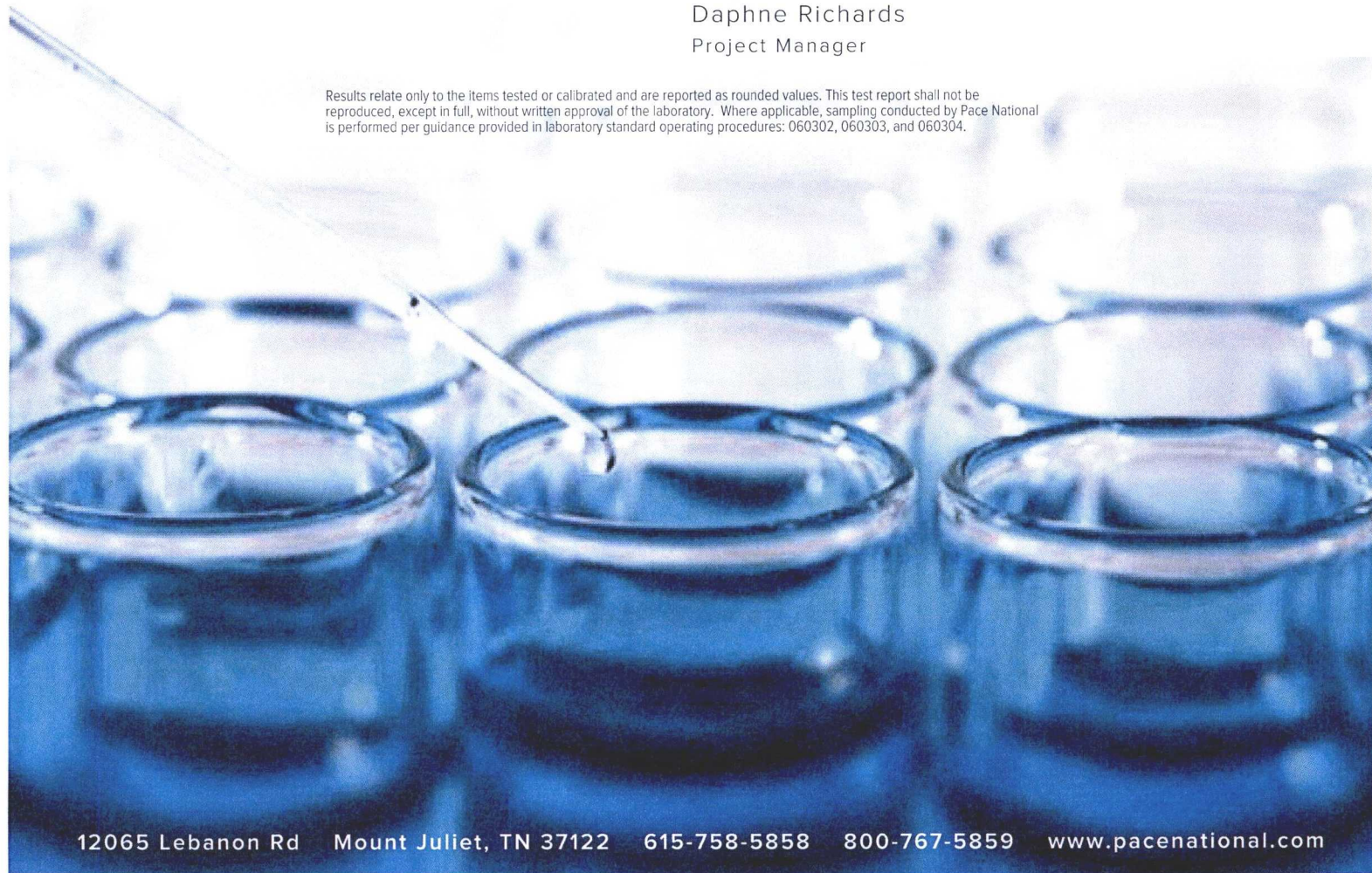
Report To: Kurt Hoekstra and Lindsay Dumas
382 Road 3100
Aztec, NM 87401

Entire Report Reviewed By:



Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
SB-10 25FT L1008712-01	5	
SB-12 25FT L1008712-02	6	⁴ Cn
SB-13 25FT L1008712-03	7	
SB-14 25FT L1008712-04	8	⁵ Sr
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Qc: Quality Control Summary	10	⁶ Qc
Volatile Organic Compounds (GC) by Method 8015/8021	10	⁷ Gl
Semi-Volatile Organic Compounds (GC) by Method 8015	11	
Gl: Glossary of Terms	12	⁸ Al
Al: Accreditations & Locations	13	
Sc: Sample Chain of Custody	14	⁹ Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB-10 25FT L1008712-01 Solid

Collected by
CL

Collected date/time
06/27/18 14:11

Received date/time
06/29/18 08:45

¹ Cp

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1137283	1000	07/12/18 15:40	07/13/18 01:36	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1137313	1	07/12/18 21:38	07/13/18 15:30	KLM

² Tc

SB-12 25FT L1008712-02 Solid

Collected by
CL

Collected date/time
06/27/18 15:30

Received date/time
06/29/18 08:45

⁴ Cn

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1137283	1000	07/12/18 15:40	07/13/18 01:58	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1137313	1	07/12/18 21:38	07/13/18 15:44	KLM

⁵ Sr⁶ Qc

SB-13 25FT L1008712-03 Solid

Collected by
CL

Collected date/time
06/27/18 16:17

Received date/time
06/29/18 08:45

⁷ Gl

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1137283	1000	07/12/18 15:40	07/13/18 02:20	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1137313	1	07/12/18 21:38	07/13/18 15:57	KLM

⁸ Al⁹ Sc

SB-14 25FT L1008712-04 Solid

Collected by
CL

Collected date/time
06/27/18 17:15

Received date/time
06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1137283	1000	07/12/18 15:40	07/13/18 02:43	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1137313	1	07/12/18 21:38	07/13/18 16:11	KLM

SB-15 25FT L1008712-05 Solid

Collected by
CL

Collected date/time
06/27/18 17:42

Received date/time
06/29/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1137283	1000	07/12/18 15:40	07/13/18 03:05	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1137313	1	07/12/18 21:38	07/13/18 16:24	KLM



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp² Tc³ Ss⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND	<u>T8</u>	0.500	1000	07/13/2018 01:36	WG1137283
Toluene	21.1	<u>T8</u>	5.00	1000	07/13/2018 01:36	WG1137283
Ethylbenzene	13.4	<u>T8</u>	0.500	1000	07/13/2018 01:36	WG1137283
Total Xylene	109	<u>T8</u>	1.50	1000	07/13/2018 01:36	WG1137283
TPH (GC/FID) Low Fraction	1860	<u>T8</u>	100	1000	07/13/2018 01:36	WG1137283
(S) a,a,a-Trifluorotoluene(FID)	89.4		77.0-120		07/13/2018 01:36	WG1137283
(S) a,a,a-Trifluorotoluene(PID)	98.9		75.0-128		07/13/2018 01:36	WG1137283

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	15.7	<u>T8</u>	4.00	1	07/13/2018 15:30	WG1137313
C28-C40 Oil Range	ND	<u>T8</u>	4.00	1	07/13/2018 15:30	WG1137313
(S) o-Terphenyl	111		18.0-148		07/13/2018 15:30	WG1137313

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.519	<u>T8</u>	0.500	1000	07/13/2018 01:58	WG1137283
Toluene	ND	<u>T8</u>	5.00	1000	07/13/2018 01:58	WG1137283
Ethylbenzene	3.73	<u>T8</u>	0.500	1000	07/13/2018 01:58	WG1137283
Total Xylene	19.7	<u>T8</u>	1.50	1000	07/13/2018 01:58	WG1137283
TPH (GC/FID) Low Fraction	625	<u>T8</u>	100	1000	07/13/2018 01:58	WG1137283
(S) a,a,a-Trifluorotoluene(FID)	97.5		77.0-120		07/13/2018 01:58	WG1137283
(S) a,a,a-Trifluorotoluene(PID)	100		75.0-128		07/13/2018 01:58	WG1137283

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	11.4	<u>T8</u>	4.00	1	07/13/2018 15:44	WG1137313
C28-C40 Oil Range	ND	<u>T8</u>	4.00	1	07/13/2018 15:44	WG1137313
(S) o-Terphenyl	110		18.0-148		07/13/2018 15:44	WG1137313

6 Qc

7 Gl

8 Al

9 Sc

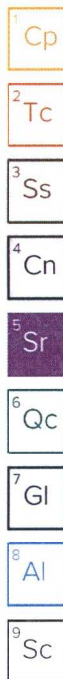


Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND	<u>T8</u>	0.500	1000	07/13/2018 02:20	WG1137283
Toluene	ND	<u>T8</u>	5.00	1000	07/13/2018 02:20	WG1137283
Ethylbenzene	5.76	<u>T8</u>	0.500	1000	07/13/2018 02:20	WG1137283
Total Xylene	40.4	<u>T8</u>	1.50	1000	07/13/2018 02:20	WG1137283
TPH (GC/FID) Low Fraction	1020	<u>T8</u>	100	1000	07/13/2018 02:20	WG1137283
(S) a,a,a-Trifluorotoluene(FID)	95.1		77.0-120		07/13/2018 02:20	WG1137283
(S) a,a,a-Trifluorotoluene(PID)	99.0		75.0-128		07/13/2018 02:20	WG1137283

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	6.49	<u>T8</u>	4.00	1	07/13/2018 15:57	WG1137313
C28-C40 Oil Range	ND	<u>T8</u>	4.00	1	07/13/2018 15:57	WG1137313
(S) o-Terphenyl	109		18.0-148		07/13/2018 15:57	WG1137313





Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND	<u>T8</u>	0.500	1000	07/13/2018 02:43	WG1137283
Toluene	5.02	<u>T8</u>	5.00	1000	07/13/2018 02:43	WG1137283
Ethylbenzene	8.26	<u>T8</u>	0.500	1000	07/13/2018 02:43	WG1137283
Total Xylene	64.1	<u>T8</u>	1.50	1000	07/13/2018 02:43	WG1137283
TPH (GC/FID) Low Fraction	1240	<u>T8</u>	100	1000	07/13/2018 02:43	WG1137283
(S) a,a,a-Trifluorotoluene(FID)	94.6		77.0-120		07/13/2018 02:43	WG1137283
(S) a,a,a-Trifluorotoluene(PID)	99.4		75.0-128		07/13/2018 02:43	WG1137283

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	10.4	<u>T8</u>	4.00	1	07/13/2018 16:11	WG1137313
C28-C40 Oil Range	ND	<u>T8</u>	4.00	1	07/13/2018 16:11	WG1137313
(S) o-Terphenyl	108		18.0-148		07/13/2018 16:11	WG1137313

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND	<u>T8</u>	0.500	1000	07/13/2018 03:05	WG1137283
Toluene	6.76	<u>T8</u>	5.00	1000	07/13/2018 03:05	WG1137283
Ethylbenzene	11.6	<u>T8</u>	0.500	1000	07/13/2018 03:05	WG1137283
Total Xylene	90.9	<u>T8</u>	1.50	1000	07/13/2018 03:05	WG1137283
TPH (GC/FID) Low Fraction	1800	<u>T8</u>	100	1000	07/13/2018 03:05	WG1137283
(S) a,a,a-Trifluorotoluene(FID)	96.0		77.0-120		07/13/2018 03:05	WG1137283
(S) a,a,a-Trifluorotoluene(PID)	100		75.0-128		07/13/2018 03:05	WG1137283

1 Cp

2 Tc

3 Ss

4 Cn

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	4.19	<u>T8</u>	4.00	1	07/13/2018 16:24	WG1137313
C28-C40 Oil Range	ND	<u>T8</u>	4.00	1	07/13/2018 16:24	WG1137313
(S) o-Terphenyl	110		18.0-148		07/13/2018 16:24	WG1137313

6 Qc

7 Gl

8 Al

9 Sc

WG1137283

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L1008712-01,02,03,04,05

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3325329-4 07/12/18 22:09

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S)				
<i>a,a,a</i> -Trifluorotoluene(FID)	99.4			77.0-120
(S)				
<i>a,a,a</i> -Trifluorotoluene(PID)	99.9			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3325329-1 07/12/18 20:18 • (LCSD) R3325329-5 07/13/18 10:30

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0494	0.0499	98.7	99.8	71.0-121			1.07	20
Toluene	0.0500	0.0511	0.0507	102	101	72.0-120			0.924	20
Ethylbenzene	0.0500	0.0512	0.0499	102	99.7	76.0-121			2.60	20
Total Xylene	0.150	0.155	0.151	103	101	75.0-124			2.81	20
(S)										
<i>a,a,a</i> -Trifluorotoluene(FID)				99.6	99.4	77.0-120				
(S)										
<i>a,a,a</i> -Trifluorotoluene(PID)				98.1	98.3	75.0-128				

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3325329-2 07/12/18 21:03 • (LCSD) R3325329-3 07/12/18 21:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.00	5.24	90.9	95.3	70.0-136			4.75	20
(S)										
<i>a,a,a</i> -Trifluorotoluene(FID)				103	103	77.0-120				
(S)										
<i>a,a,a</i> -Trifluorotoluene(PID)				106	108	75.0-128				

WG1137313

Semi-Volatile Organic Compounds (GC) by Method 8015

QUALITY CONTROL SUMMARY

L1008712-01,02,03,04,05

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3325389-1 07/13/18 10:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	119			18.0-148

1 Cp

2 Tc

3 Ss

4 Cn

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3325389-2 07/13/18 10:46 • (LCSD) R3325389-3 07/13/18 11:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	50.0	50.8	47.8	102	95.7	50.0-150			6.07	20
(S) o-Terphenyl				123	116	18.0-148				

5 Sr

7 GI

8 AI

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁸ Al

⁹ Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



ACCOUNT:

HilCorp-Farmington, NM

PROJECT:

SDG:

L1008712



DATE/TIME:

07/16/18 09:57

PAGE:

13 of 16

17/12/23

Billing Information:						Analysis / Container / Preservative										Chain of Custody		
Report to: Lindsay Dumas Project Description: Hilcorp San Juan 28-6 #31 Phone: 832-839-4585 Fax: _____ Collected by (print): Corwin Lameman Collected by (signature): <i>Corwin Lameman</i> Immediately Packed on Ice: <input checked="" type="checkbox"/> N <input checked="" type="checkbox"/> Y						Email To: ldumas@hilcorp.com City/State Collected: New Mexico Lab Project #: _____ P.O. #: _____ Quote #: _____ Rush? (Lab MUST be Notified) Same Day <input checked="" type="checkbox"/> Five Day _____ Next Day <input type="checkbox"/> 3 Day (Rush Only) _____ Two Day <input type="checkbox"/> 30 Day (Rush Only) _____ Three Day <input checked="" type="checkbox"/> Standard _____ Date Results Needed: _____ No. of Containers: 8021 8015						 12005 California Rd Mount Juliet, TN 37122 Phone: 615-754-5854 Fax: 615-754-5854 QR Code: 						
						L# 7006975 Table # L1008712 Accrual: _____ Template: _____ Prelogin: _____ TSR: _____ PB: _____ Shipped Via: _____												
Sample ID	Comp/Grat	Matrix *	Depth	Date	Time											Remarks	Sample # (Del only)	
SB-12 e 16 ft	Grab	SS	10	6-27-18	15:17	2	X	X										
SB-12 e 25 ft	Grab	SS	25	6-27-18	15:30	1	X	X										
SB-13 e 16 ft	Grab	SS	10	6-27-18	16:02	2	X	X										
SB-13 e 25 ft	Grab	SS	25	6-27-18	16:17	1	X	X										
SB-14 e 16 ft	Grab	SS	10	6-27-18	16:41	2	X	X										
SB-14 e 25 ft	Grab	SS	25	6-27-18	17:15	1	X	X										
SB-15 e 10 ft	Grab	SS	10	6-27-18	17:28	2	X	X										
SB-15 e 25 ft	Grab	SS	25	6-27-18	17:42	2	X	X										
* Matrix: SS - Soil, AIR - Air, F - Filter, GW - Groundwater, B - Bypass, WW - Wastewater, DW - Drinking Water, OT - Other _____ Remarks: Some samples not completely filled due to limited recovery from drinking auger. pH _____ Temp _____ Flow _____ Other _____ Samples returned via: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> Courier _____ Tracking # _____ Relinquished by: (Signature) _____ Date: _____ Time: _____ Relinquished by: (Signature) _____ Date: _____ Time: _____ Relinquished by: (Signature) _____ Date: _____ Time: _____ Trip Blank Received: Yes/No <input checked="" type="checkbox"/> HCL/Mesh TBR Temp: 27.1 °C Bottles Received: 29 Date: 6/29/18 Time: 845 If preservation required by Login: Date/Time _____ Hold: _____ Condition: NCF / OK																		

Soil Vapor Extraction Systems

Geotech SVE

The Geotech Soil Vapor Extraction system is designed to remove hazardous vapors from the subsurface by drawing air through contaminated soil, and volatilizing adsorbed phase pollutants. Geotech SVE systems are ideal for well point or trench type vapor barriers.

FEATURES

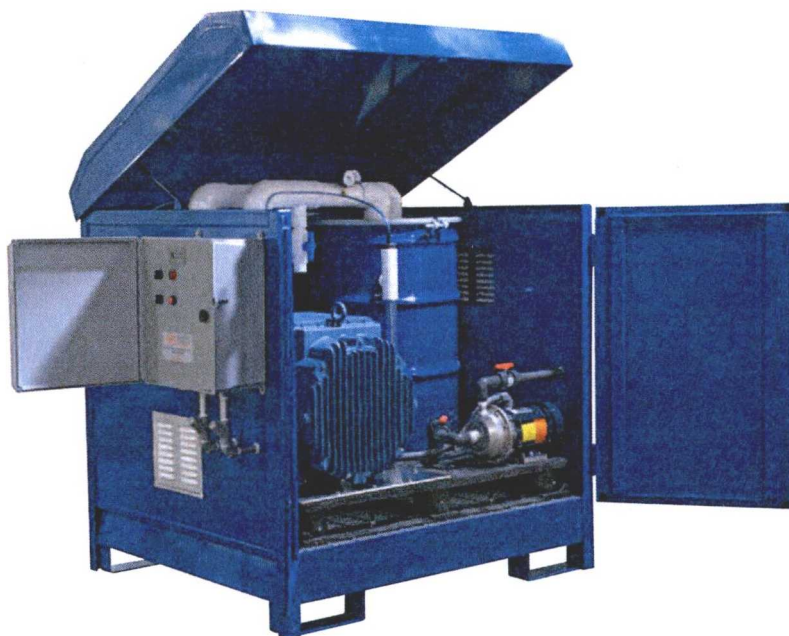
- **Compact, durable design**
- **Skid Mounted with moisture separator drum/mist eliminator**
 - 37 gallon (140 liters) liquid holding capacity
 - Hi Water level switch
 - Hi Vacuum switch
- **Continuous reliable operation**
- **Many blower types are available to meet your requirements:**
 - Regenerative
 - Rotary Claw
 - Positive Displacement (Rotary Lobe)
 - Rotary Vane
 - Centrifugal Fan
- **Thermal overload protection**
- **Influent dilution air valve**
- **Two vacuum gauges**
- **Optional NEC code available**
(Class 1, Div. 1, or Div. 2)
- **Non-explosive units are available**

OPERATION

The Geotech SVE system works by pulling air through soil that has been saturated with hydrocarbons or other volatile organic compounds, causing these compounds to volatilize. The vapors are then discharged to the atmosphere, through carbon polishing or vapor oxidation.

These systems are deployed with a moisture separator and mist eliminator filter to protect blower and end treatment from corrosion particulates and debris.

Every Geotech SVE system is factory assembled and fully tested for function, performance, and safety to meet the design conditions of each site application.



Regenerative Blower SVE inside optional hazmat enclosure



Regenerative Blower SVE

CALL GEOTECH TODAY (800) 833-7958

Geotech Environmental Equipment, Inc.

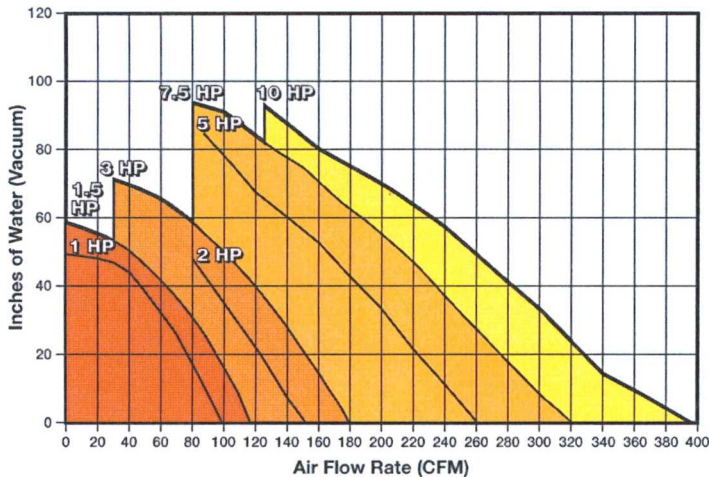
2650 East 40th Avenue • Denver, Colorado 80205

(303) 320-4764 • (800) 833-7958 • FAX (303) 322-7242

email: sales@geotechenv.com website: www.geotechenv.com

Soil Vapor Extraction Systems

Geotech SVE



Regenerative Type Blower
Soil Vapor Extraction System
Selection Curve 1 through 10 HP

Note: Higher flow and vacuum versions are available.



Regenerative Blower SVE
with optional Geotech Environmental Control Module

SPECIFICATIONS

Applications: Well point or trench type vapor barriers

Product Recovery: Volatile Organic Compounds (VOCs)

Dimensions: 40" L x 48" W x 65" H
(101.6 cm L x 121.9 cm W x 165.1 cm)

Options: Geotech Environmental Control Module
Telemetry package
Influent or effluent silencer
Effluent sample port
Effluent temperature gauge
Local CFM display
Auto-Drain (this option features automatic water level control inside the moisture separator with an effluent transfer pump)

Power Requirements:

HP	Voltage	Phase	CFM/CMM	Inches H ₂ O Vacuum
1	115/230	1	0-95/0-2.7	50"
1.5	230	1	0-115/0-3.3	58"
2	230	1	80-145/2.3-4.1	55"
2	230	3	80-145/2.3-4.1	55"
3	230	1 or 3	30-185/85-5.2	72"
5	230	3	85-280/2.4-7.9	82"
7.5	230	3	80-325/2.3-9.2	93"
10	230	3	125-380/3.5-10.8	93"

CALL GEOTECH TODAY (800) 833-7958

Geotech Environmental Equipment, Inc.

2650 East 40th Avenue • Denver, Colorado 80205

(303) 320-4764 • (800) 833-7958 • FAX (303) 322-7242

email: sales@geotechenv.com website: www.geotechenv.com

geotech

Environmental Equipment, Inc.

RE: A 3 HP Soil Vapor Extraction System™

As the premier supplier of environmental sampling, monitoring, remediation equipment and associated field supplies since 1978, Geotech Environmental Equipment is pleased to provide you with this quotation for equipment and supplies:

Geotech will supply a 3 HP ORS, XP Soil Vapor Extraction System with the following features:

- Ametek Rotron model EN656M5XL rated for Hazardous Location Class I, Group D, Class II Group F&G, Aluminum fan regenerative blower capable of Approx 100 ICFM (+/- 10%) - 50 inches W.C. Blower motor will be XP, 230 volt, 3HP, single phase with thermal overload protection.
- Explosion proof power disconnect on/off switch (NEMA 7 Enclosure)
- Manual dilution air valve
- Two vacuum gauges.
- Duotec Model H3A-1SL, Vacuum switch to protect the blower from overheating by detecting a blockage in the line. Rated for Hazardous locations, Class I Group B,C & D and Class II Group E,F& G
- Moisture Separator capable of removing vapor from an air flow of up to 350

SCFM with the following features:

- * Integral Mist Eliminator/Particulate Filter
- * 37 gallon capacity, steel canister with epoxy coated interior.
- * High efficiency cyclonic separation.
- * Inherent safe collection design.

* Outfitted with drain for convenient removal of fluids.

* W.E. Anderson, Flotect Model L-6, high liquid level switch system that will shut down the blower to protect the blower from flooding when the moisture separator is full. Rated for Hazardous location, Class I Group A, B, C & D, Class II Group E, F & G.

- Mounted and wired in a metal Haz Mat Station, with lockable, hinged lid & doors. Welded steel construction, 66 gallon sump meets EPA & n UFC requirements. Side vents and added Roof Vent for passive ventilation. Coated with a durable, corrosion and weather resistant finished. Four way “forklift able”