

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural
Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party <u>Hilcorp Energy Company</u>	OGRID <u>372171</u>
Contact Name <u>Lindsay Dumas</u>	Contact Telephone <u>832-839-4585</u>
Contact email <u>LDumas@hilcorp.com</u>	Incident # (assigned by OCD) <u>NCS1907738902</u>
Contact mailing address <u>1111 Travis St. Houston, Tx 77002</u>	

Location of Release Source

Latitude 30.62576 Longitude -107.33431
(NAD 83 in decimal degrees to 5 decimal places)

Site Name <u>San Juan 28-5 # 81M</u>	Site Type <u>well site</u>
Date Release Discovered <u>8/27/18</u>	API# (if applicable) <u>30-039-29555</u>

Unit Letter	Section	Township	Range	County
<u>M</u>	<u>26</u>	<u>28N</u>	<u>05W</u>	<u>Rio Arriba</u>

NMOC

Surface Owner: ☐ State ☒ Federal ☐ Tribal ☐ Private (Name: _____) **MAR 22 2019**

Nature and Volume of Release

DISTRICT III

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☒ Produced Water	Volume Released (bbls) <u>38 bbls</u>	Volume Recovered (bbls) <u>38 bbls</u>
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	☐ Yes ☒ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release BGT Corrosion

52

State of New Mexico
Oil Conservation Division

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Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? 19.15.29.7(A)(1) an unauthorized release of a volume, excluding gases, of 25 barrels or more.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Yes, by Lisa Hunter to Jim Eniswold, Cory Smith, Vanessa Fields, and Whitney Thomas (BLM) by email 8/27/18 @ 2:52pm.	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped. ☒ The impacted area has been secured to protect human health and the environment. ☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. ☒ All free liquids and recoverable materials have been removed and managed appropriately.	
If all the actions described above have <u>not</u> been undertaken, explain why: All actions above have been completed.	
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.	
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.	
Printed Name: <u>Lindsay Dumas</u> Signature: <u>Lindsay Dumas</u> email: <u>LDUMAS@hilcorp.com</u>	Title: <u>Environmental Specialist</u> Date: <u>8/4/18</u> Telephone: <u>832-839-4585</u>
OCD Only Received by: _____ Date: _____	

Lindsay Dumas

From: Lisa Hunter
Sent: Monday, August 27, 2018 2:52 PM
To: jim.griswold@state.nm.us; Smith, Cory, EMNRD; 'Fields, Vanessa, EMNRD'; Thomas, Leigh
Cc: Lindsay Dumas
Subject: Release Notification - San Jua 28-5 Unit 81M - Produced Water 38bbbls

All –

This is notification that at approximately 9:15 a.m. today, August 27, 2018, it was discovered that a Below Grade Tank on the San Juan 28-5 Unit 81M, API# 30039295550000, Lat. 36.62583, Long. -107.33365, UL: M, Sec. 26, T28N, R05W released 38bbbls of Produced Water into the cribbing – 38 bbls plus rain water was recovered.

Lindsay Dumas, Environmental (281-794-9159) will follow up with a C-141 and remediation plans.

Thank you.

Lisa Hunter

Field Safety Specialist
Hilcorp Energy – L48 West
382 Road 3100
Aztec, NM 87410
Lhunter@Hilcorp.com
505.486.9494

"If your actions inspire others to dream more, learn more, do more and become more, you are a leader." – John Quincy Adams

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Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	331' (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas not on an exploration, development, production, or storage site?	☐ Yes ☒ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: *Each of the following items must be included in the report.*

- ☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☐ Field data
- ☐ Data table of soil contaminant concentration data
- ☒ Depth to water determination
- ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☐ Boring or excavation logs
- ☐ Photographs including date and GIS information
- ☒ Topographic/Aerial maps
- ☐ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

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

Printed Name: Lindsay DumasTitle: Environmental SpecialistSignature: Lindsay DumasDate: 9-4-18email: LDumas@hilcorp.comTelephone: 832-839-4585**OCD Only**

Received by: _____

Date: _____

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- ☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- ☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- ☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- ☒ Description of remediation activities

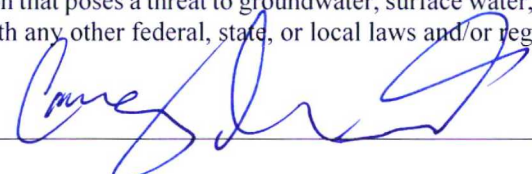
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Lindsay Dumas Title: Environmental Specialist
 Signature:  Date: 3-19-19
 email: LDumas@kilcorp.com Telephone: 832-839-4585

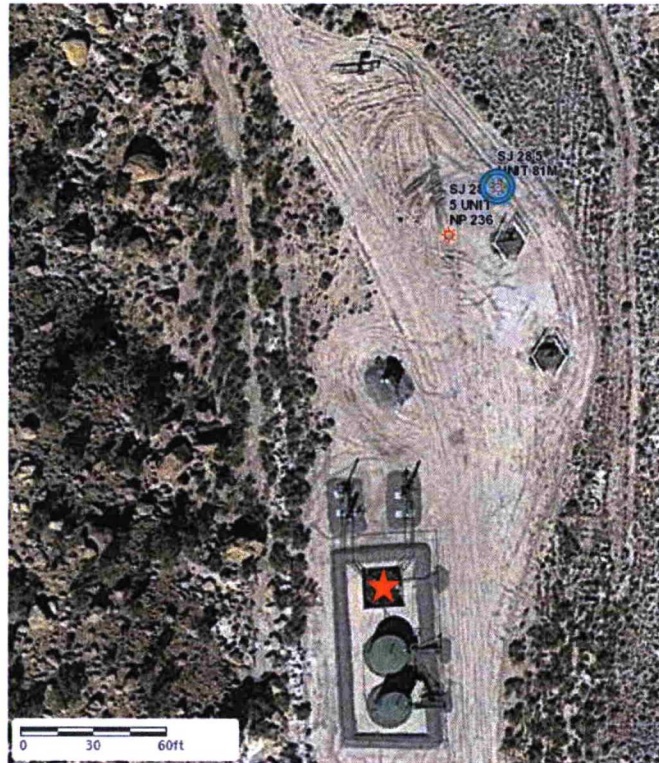
OCD Only

Received by:  Date: 3/22/19

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by:  Date: 4/4/19
 Printed Name: Cory Title: Environmental Spec

Scaled Map



★ Impacted Area

Depth to water determination



New Mexico Office of the State Engineer Point of Diversion Summary

		(quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest)			(NAD83 UTM in meters)	
Well Tag	POD Number	Q64 Q16 Q4	Sec	Tws	Rng	X Y
	SJ 00047		28	28N	05W	288558 4056700* 
Driller License:		Driller Company:				
Driller Name:		CONLEY COX				
Drill Start Date:		Drill Finish Date:		08/04/1953		Plug Date:
Log File Date:		PCW Rcv Date:		Source:		Shallow
Pump Type:		Pipe Discharge Size:		Estimated Yield:		
Casing Size:		7.00		Depth Well:		465 feet
		Depth Water:		265 feet		
Water Bearing Stratifications:		Top	Bottom	Description		
		140	185	Sandstone Gravel Conglomerate		
		200	245	Sandstone Gravel Conglomerate		
Casing Perforations:		Top	Bottom			
		140	185			
		200	245			

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE ISC and is accepted by the recipient with the expressed understanding that the OSE ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

9/4/18 9:47 AM

POINT OF DIVERSION SUMMARY

San Juan 28-5 #81M elevation: 6733'

POD elevation: 6667'

Estimated GW at location: ~331'





New Mexico Office of the State Engineer Point of Diversion Summary

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

Well Tag	POD Number	Q64 Q16 Q4 Sec Tws Rng	X	Y
	SJ 00036	3 28 28N 05W	288156	4056298*

Driller License:	Driller Company:		
Driller Name:	CONLEY COX		
Drill Start Date:	06/27/1953	Drill Finish Date:	06/27/1953
Log File Date:	01/13/1954	PCW Rcv Date:	
Pump Type:		Source:	Shallow
Casing Size:	7.00	Pipe Discharge Size:	
		Estimated Yield:	30 GPM
		Depth Well:	303 feet
		Depth Water:	243 feet

Water Bearing Stratifications:	Top	Bottom	Description
	60	100	Sandstone Gravel Conglomerate
	200	240	Sandstone Gravel Conglomerate
	260	285	Sandstone Gravel Conglomerate

Casing Perforations:	Top	Bottom
	60	100
	200	240
	260	285

*UTM location was derived from FLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

9/4/18 9:52 AM

POINT OF DIVERSION SUMMARY

San Juan 28-5 #81M elevation: 6733'

POD elevation: 6567'

Estimated GW at location: ~409'





New Mexico Office of the State Engineer Water Column/Average Depth to Water

(A CLW***** in the
POD suffix indicates the
POD has been replaced
& no longer serves a
water right file.)

(R=POD has
been replaced,
O=orphaned,
C=the file is
closed)

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

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	Code	POD Sub- basin	County	Q Q Q	64	16	4	Sec	Tws	Rng	X	Y	Distance	Depth	Well	Depth	Water	Column
SJ00036		SJ	RA		3	28	28N	05W			288156	4056298*	0	303		243	60	
SJ00047		SJ	RA			28	28N	05W			288558	4056700*	568	465		265	200	
SJ00199		SJ	SJ		1	2	03	27N	05W		290409	4053971*	3238	1840				

Average Depth to Water: 254 feet

Minimum Depth: 243 feet

Maximum Depth: 265 feet

Record Count: 3

UTM/NAD83 Radius Search (in meters):

Easting (X): 288156

Northing (Y): 4056298

Radius: 3500

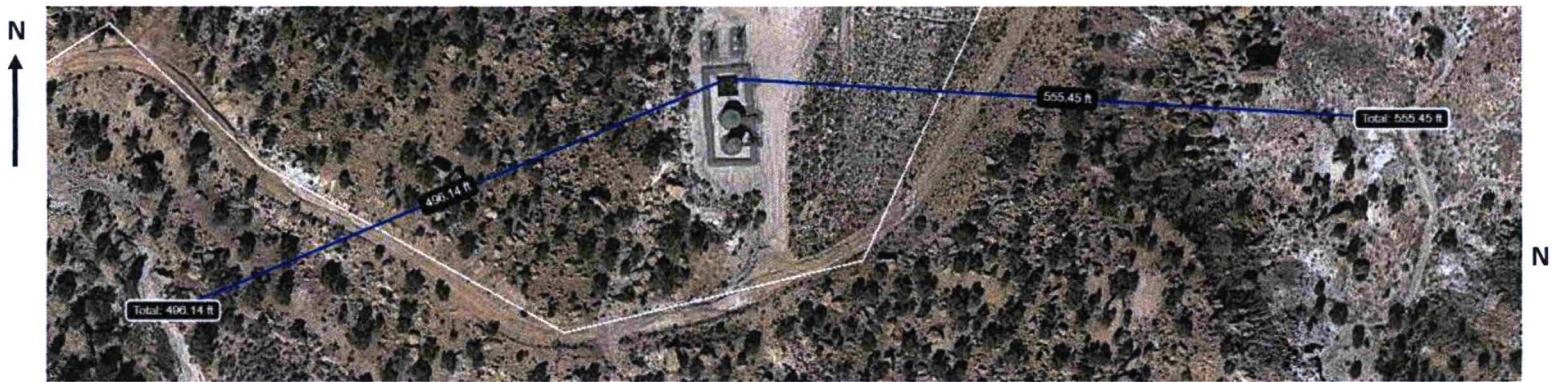
*UTM location was derived from PLSS - see Help

The data is furnished by the NM/OSE ISC and is accepted by the recipient with the expressed understanding that the OSE ISC makes no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

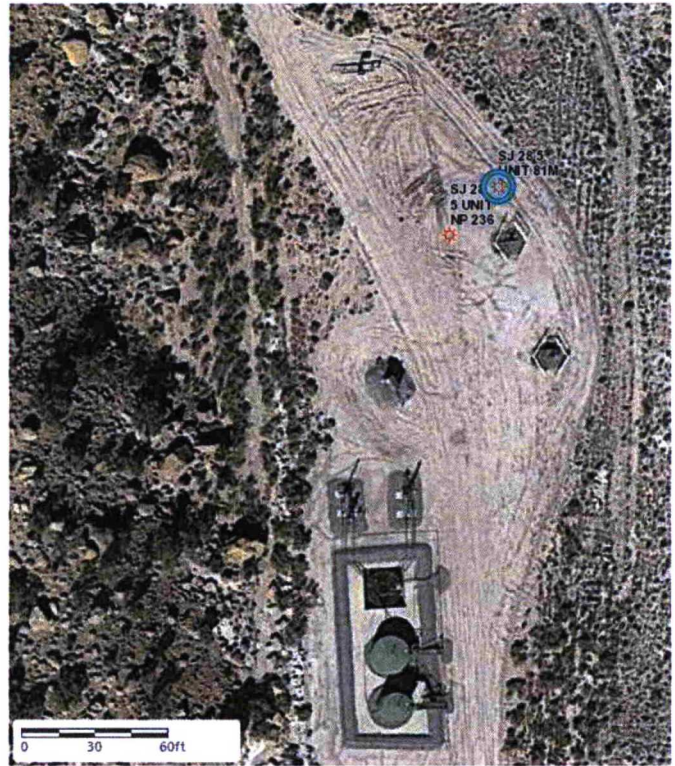
9/4/18 9:50 AM

WATER COLUMN AVERAGE DEPTH TO
WATER

Determination of water sources and significant watercourses within ½ mile of the lateral extent of the release



Topographic/Aerial Maps





1920 W. Villa Maria, Ste. 205
Bryan, Texas 77807
979.324.2139
www.teamtimberwolf.com

October 19, 2018

Ms. Lindsay Dumas
Environmental Specialist
Hilcorp Energy Company
1111 Travis Street
Houston, Texas 77002

Re: Site Assessment Report
San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Dear Ms. Dumas:

At the request of Hilcorp Energy Company (Hilcorp), Timberwolf Environmental, LLC (Timberwolf) presents this report to document site assessment activities at the San Juan 28-5 No. 81M (Site). The Site is located approximately 36.6 miles east southeast of Bloomfield, in Rio Arriba County, New Mexico (Figures 1-3).

Environmental Setting

The Site is situated on BLM land. The area consists of sparse vegetative cover comprised primarily of scrub brush. Average elevation at the Site is approximately 6,745 feet (ft) above mean sea level. The nearest surface water is an intermittent stream located approximately 495 ft west-southwest of the Site. During the field investigation, the stream was dry. Groundwater is expected to be greater than 100 ft below ground surface (bgs).

According to the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), the Site soil consists of the rock outcrop of Vessilla-Menefee complex, 15 to 40 percent slopes. The surface layer consists of sand, underlain by a layer of sandy loam with sandstone inclusions encountered from 6 to approximately 20 inches bgs. Native salinity of the soil is nonsaline to very slightly saline (0.0 to 2.0 millimhos per centimeter (mmhos/cm)).

Overview

The Site is a multi-well upstream oil and gas facility. Surface equipment at the Site includes: two wellheads, two separators, two oil tanks, one below-grade storage tank (“pit-tank”), and gas meters.

On 08/27/18, a corrosion-related release from the pit-tank was discovered at the Site. Released fluids were comprised of produced water. All released fluids were contained by the pit. Recovery activities included vacuuming; approximately 38 bbls of produced water were recovered. The tank was taken out of service and removed from the pit during initial recovery efforts.

Field reports identified the area within the pit as the primary area of concern (AOC). Constituents of concern (COCs) include: benzene, toluene, ethyl-benzene, and xylene (BTEX), total petroleum hydrocarbons (TPH), and chloride.

Regulatory Criteria

The NMOCD established remediation action levels for soils impacted by oilfield products or wastes, which are documented under New Mexico Administrative Code (NMAC) Rule 19.15.29. The Rule was repealed and replaced by *Oil Conservation Commission Order No.: R-14751*, dated June 21, 2018.

Under Rule 19.15.29, soil cleanup criteria is determined primarily based on the distance between the base of impacted soil and the depth to usable groundwater. NMOCD laboratory methodology and soil closure criteria is presented in Table 1.

Table 1. Closure Criteria for Soils Impacted by a Release

Depth to Groundwater ¹	Constituent	Method ²	Regulatory Limit ³ (mg/kg)
≤ 50 feet	Chloride ⁴	EPA 300.0	600
	TPH	EPA SW-846 Method 8015M	100
	Total BTEX	EPA SW-846 Method 8021B or 8260B	50
	Benzene	EPA SW-846 Method 8021B or 8015M	10
51 feet-100 feet	Chloride ⁴	EPA 300.0	10,000
	TPH	EPA SW-846 Method 8015M	2,500
	GRO+DRO	EPA SW-846 Method 8015M	1,000
	Total BTEX	EPA SW-846 Method 8021B or 8260B	50
	Benzene	EPA SW-846 Method 8021B or 8260B	10
> 100 feet	Chloride ⁴	EPA 300.0	20,000
	TPH	EPA SW-846 Method 8015M	2,500
	GRO+DRO	EPA SW-846 Method 8015M	1,000
	Total BTEX	EPA SW-846 Method 8021B or 8260B	50
	Benzene	EPA SW-846 Method 8021B or 8015M	10

¹From base of impact to useable groundwater (i.e., less than 10,000 milligrams per liter (mg/L) total dissolved solids (TDS))

²Or other test methods approved by the division

³Numerical limits or natural background level, whichever is greater

⁴Applies to produced water releases or other fluids which may contain chloride
mg/kg – milligrams per kilograms

GRO – gasoline range organics

DRO – diesel range organics

ORO – oil range organics

TPH – total petroleum hydrocarbons (TPH = GRO + DRO + ORO)

Receptors and Sensitive Area Survey

A survey of receptors and sensitive areas was conducted to establish the regulatory criteria.

The findings are presented in Table 2.

**Table 2. Receptor and Sensitive Area Survey
San Juan 28 – 5 No. 81M**

Receptor or Sensitive Feature	Yes	No
Any continuously flowing watercourse or any other significant watercourse within 300 ft from Site?		√
Any lakebed, sinkhole or playa lake within 200 ft of Site		√
Any occupied permanent residence, school, hospital, institution or church within 300 ft of Site?		√
Any spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes with 500 ft?		√
Any fresh water well or spring within 1000 ft of Site?		√
Within incorporated boundaries or within a defined municipal fresh water well field?		√
Any wetlands within 100 ft of Site?		√
Is the Site situated over any known subsurface mine?		√
Is the Site within an unstable area?		√
Is the Site situated within a 100-year floodplain?		√

Based on the lack of receptors or sensitive features in the area, the following remedial targets are applicable for the Site:

- Chloride < 20,000 mg/kg
- TPH < 2,500 mg/kg
- GRO+DRO < 1,000 mg/kg
- Total BTEX < 50 mg/kg
- Benzene < 10 mg/kg

Site Assessment

On 09/24/18, Timberwolf conducted a soil assessment to determine the magnitude and horizontal and vertical extents of contamination. When Timberwolf personnel arrived on Site, the below-ground storage tank had been removed from the pit and was situated along the northern edge of the well pad.

Timberwolf collected soil samples from six soil borings (i.e. SB1 – SB6) within or adjacent to the pit. The location and purpose of each boring is presented in Table 3. Soil sample locations are shown on the attached Sample Location Map (Figure 4).

**Table 3. Location and Purpose of Soil Borings
San Juan 28 – 5 No. 81M**

Soil Boring	Location – Purpose
SB1	Collected from the center of the pit area to determine the degree of impact to soils and for vertical delineation
SB2—SB5	Collected at the northeast, southeast, southwest, and northwest corners of the pit to achieve horizontal delineation
SB6	Collected west of SB6 for an additional horizontal delineation point, if needed.

Soil borings were advanced with a stainless-steel hand auger. Samples were collected from one-foot depth intervals; the total depths of borings ranged from 5 to 8 feet bgs. Soil encountered consisted primarily of sandy loam. To eliminate cross contamination, the hand auger and sampling equipment were properly decontaminated between samples using distilled water and Alconox®.

Soil samples were placed in laboratory-provided sample containers, stored on ice, and transported under proper chain-of-custody protocol to Pace National Laboratories in Mount Juliet, TN. Samples were analyzed for the following constituents:

- BTEX using EPA Method 8260B
- TPH-GRO and TPH-DRO (extended range) EPA Method 8015C
- Chloride using EPA Method 300

Analytical methods are documented on the attached laboratory reports. The analytical results are summarized Figure 4 and presented in Table 4 below.

**Table 4. Analytical Results of Soil Samples
San Juan 28 – 5 No. 81M**

Sample ID	Date	Volatile Organic Compounds (mg/kg)				Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
		B	T	E	X						
SB1 5-6'	09/24/18	< 0.00046	< 0.0014	< 0.00061	< 0.0055	< 0.0055	0.05	50.7	22.3	73.5	48.1
SB2 5-6'	09/24/18	< 0.00043	< 0.0014	< 0.00058	< 0.0052	< 0.0052	0.028	< 1.8	1.3	3.08	8.3
SB3 5-6'	09/24/18	< 0.00048	< 0.0015	< 0.00063	< 0.0057	< 0.0057	0.033	< 1.9	1.2	3.17	23
SB4 5-6'	09/24/18	< 0.00047	< 0.0015	< 0.00062	< 0.0056	< 0.0056	0.037	< 1.9	1.2	3.14	13.2
SB5 5-6'	09/24/18	< 0.019	0.68	0.59	12.9	14.2	752	186	0.51	938.5	9.5
SB5 7-8'	09/24/18	< 0.00044	< 0.0014	< 0.00058	0.015	0.015	11.3	2.9	< 0.3	14.5	6.5
SB6 5-6'	09/24/18	< 0.00045	< 0.0014	< 0.00059	< 0.0054	< 0.0054	0.05	< 1.8	1.39	3.24	10.4
Remedial Target		10	--	--	--	50	--	--	--	2,500	20,000

mg/kg – milligrams per kilogram
BTEX – benzene, toluene, ethylbenzene, xylenes
GRO – gasoline range organics
DRO – diesel range organics
ORO – oil range organics
TPH – total petroleum hydrocarbons (TPH = GRO + DRO + ORO)

Findings of Site Assessment

Based on the Site assessment and NMOCD remedial targets for the Site, the following is concluded:

- All soil samples were below the remedial targets for all COCs.

Remedial Work and Confirmation Sample

At the request of the NMOCD, Hilcorp personnel excavated one foot of soil from the base of the pit and collected a confirmation sample (i.e., ("BGT Cellar"). This work was conducted on 10/05/18. The analytical results of the confirmation sample are presented in Table 5 below and shown in Figure 5.

**Table 5. Analytical Results of Confirmation Sample
San Juan 28 – 5 No. 81M**

Sample ID	Date	Volatile Organic Compounds (mg/kg)				Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
		B	T	E	X						
BGT Cellar	10/05/18	0.0049	0.017	0.010	0.108	0.14	2.22	17.8	16.5	36.5	32.9
Remedial Target		10	--	--	--	50	--	--	--	2,500	20,000

mg/kg – milligrams per kilogram

BTEX – benzene, toluene, ethylbenzene, xylenes

GRO – gasoline range organics

DRO – diesel range organics

ORO – oil range organics

TPH – total petroleum hydrocarbons (TPH = GRO + DRO + ORO)

Conclusions

Based on laboratory analysis of samples collected during the Site assessment and the confirmation sample following excavation activities, the following is concluded:

- Concentration of chlorides in all soil samples were below regulatory limits
- Concentration of TPH in all soil samples were below regulatory limits
- Concentration of benzene and total BTEX in all soil samples were below regulatory limits

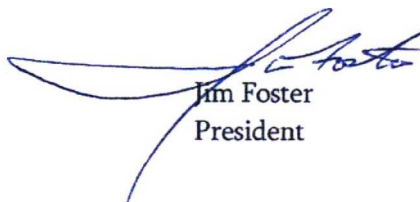
Soil samples collected during the Site assessment and confirmation sampling event indicate the Site is in compliance with regulatory criteria. No further action is required.

Timberwolf appreciates the opportunity to provide Hilcorp with our professional consulting services. If you have any questions regarding this proposal, please contact us at (979) 324-2139.

Sincerely,
Timberwolf Environmental, LLC



Preston Kocian
Project Manager



Jim Foster
President

Attachments: Figures
Laboratory Report and Chain-of-Custody Documents

Figures

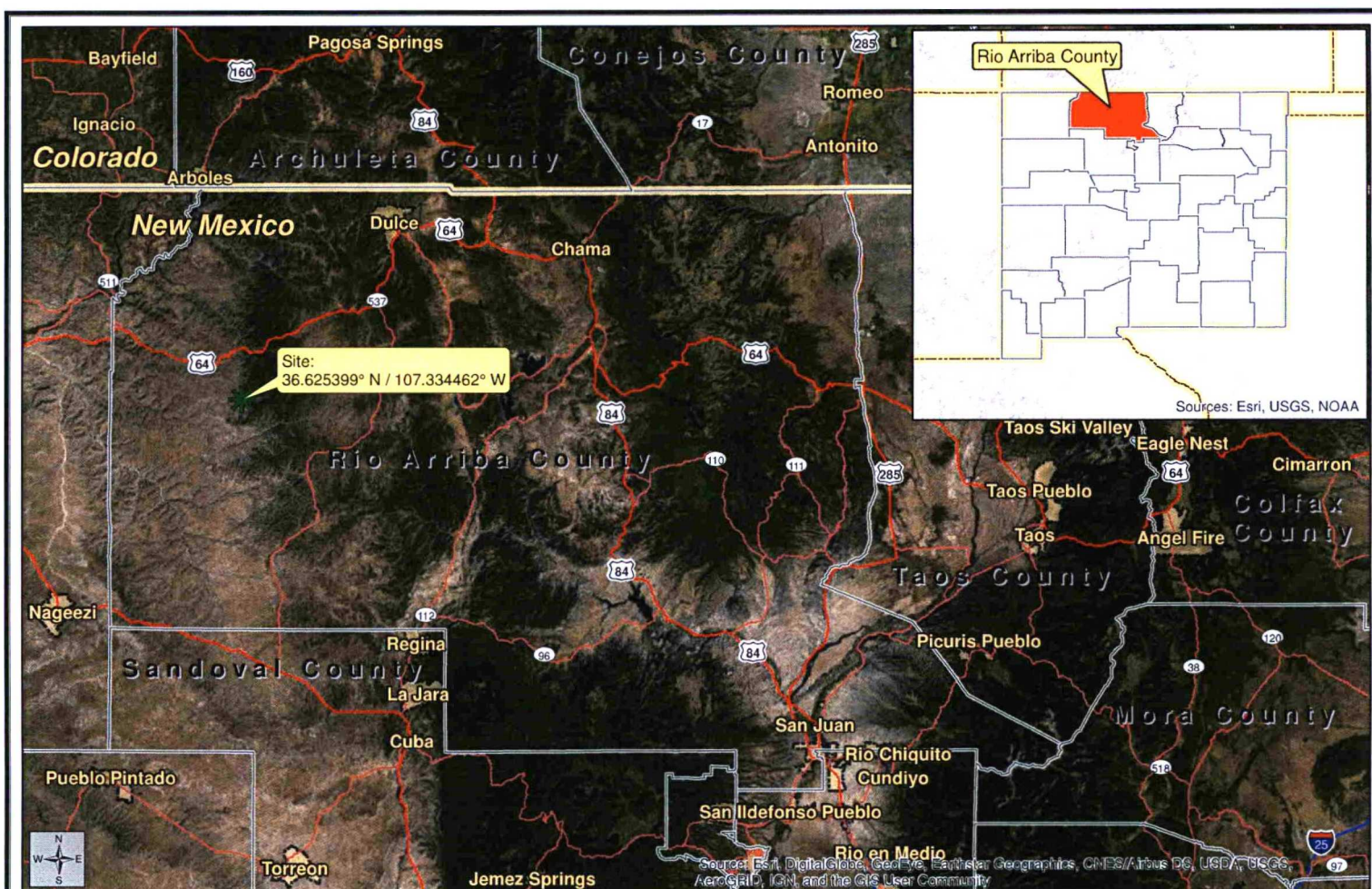


Figure 1
Site Location Map

Site Assessment Report

September 28, 2018



Created By:
Kevin Cole
TE Project No.: HEC-180048

San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: ESRI and TE

* Site

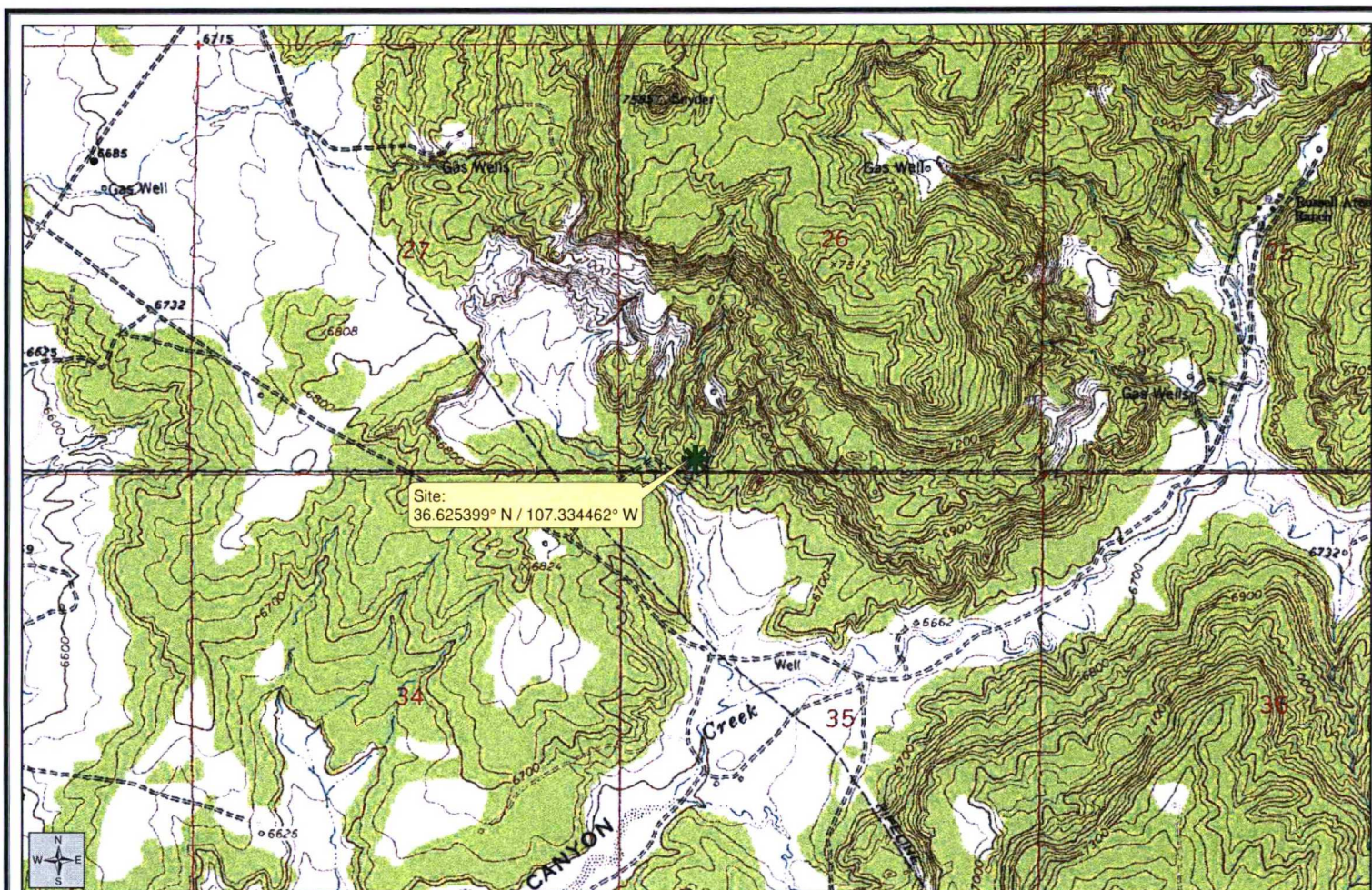


Figure 2
Topographic Map

Site Assessment Report

September 28, 2018



Created By:
Kevin Cole
TE Project No.: HEC-180048

San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: USGS
Quads: Gobernador and Vigas Canyon
Vector Source: TE

 Site





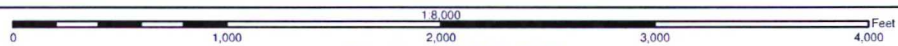
Figure 3
Aerial Map

Site Assessment Report

September 28, 2018



Created By:
Kevin Cole
TE Project No.: HEC-180048

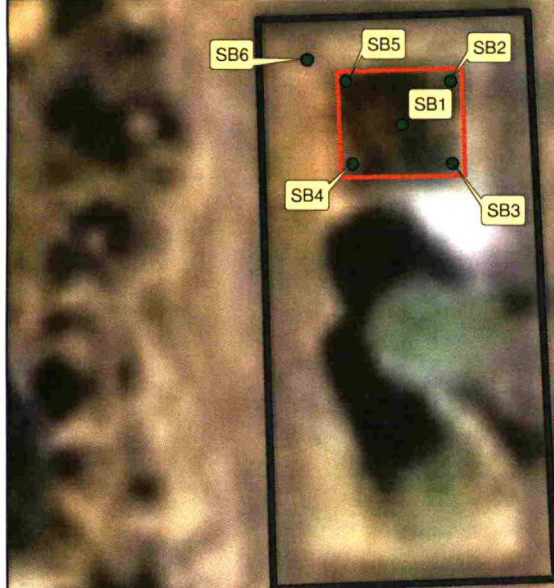


San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

 Site

Sample ID	Date	Volatile Organic Compounds (mg/kg)				Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
		B	T	E	X						
SB1 5-6'	09/24/18	< 0.00046	< 0.0014	< 0.00061	< 0.0055	< 0.0055	0.05	50.7	22.3	73.5	48.1
SB2 5-6'	09/24/18	< 0.00043	< 0.0014	< 0.00058	< 0.0052	< 0.0052	0.028	< 1.8	1.3	3.08	8.3
SB3 5-6'	09/24/18	< 0.00048	< 0.0015	< 0.00063	< 0.0057	< 0.0057	0.033	< 1.9	1.2	3.17	23
SB4 5-6'	09/24/18	< 0.00047	< 0.0015	< 0.00062	< 0.0056	< 0.0056	0.037	< 1.9	1.2	3.14	13.2
SB5 5-6'	09/24/18	< 0.019	0.68	0.59	12.9	14.2	752	186	0.51	938.5	9.5
SB5 7-8'	09/24/18	< 0.00044	< 0.0014	< 0.00058	0.015	0.015	11.3	2.9	< 0.3	14.5	6.5
SB6 5-6'	09/24/18	< 0.00045	< 0.0014	< 0.00059	< 0.0054	< 0.0054	0.05	< 1.8	1.39	3.24	10.4
Remedial Target		10	--	--	--	50	--	--	--	2,500	20,000



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 4
Sample Location Map

Site Assessment Report

Sample Date:
September 24, 2018



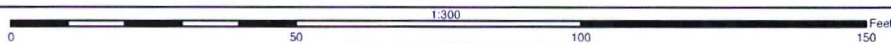
**TIMBERWOLF
ENVIRONMENTAL**

Created By:
Kevin Cole
September 26, 2018
TE Project No.: HEC-180048

San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

- Sample Location (clean)
- Tank Battery Berm
- Below Grade Tank - 5ft bgs



Sample ID	Date	Volatile Organic Compounds (mg/kg)				Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	ORO (mg/kg)	TPH (mg/kg)	Chloride (mg/kg)
		B	T	E	X						
BGT Cellar	10/05/18	0.0049	0.017	0.01	0.108	0.14	2.22	17.8	16.5	36.5	32.9
Remedial Target		10	—	—	—	50	—	—	—	2,500	20,000



Figure 5
Confirmation Sample
Location Map

Site Assessment Report

Sample Date:
October 5, 2018



**TIMBERWOLF
ENVIRONMENTAL**

Created By:
Kevin Cole
October 18, 2018
TE Project No.: HEC-180048

San Juan 28-5 No. 81M
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

- Sample Location (clean)
- Tank Battery Berm
- Below Grade Tank - 5ft bgs

Laboratory Reports and Chain-Of-Custody Documents



ANALYTICAL REPORT

September 26, 2018

Timberwolf Environmental, LLC

Sample Delivery Group: L1028432
Samples Received: 09/25/2018
Project Number: 180048
Description: SJ 28-5 No. 81M

Report To: Preston Kocian
1920 W Villa Maria, Ste 205
Bryan, TX 77807

Entire Report Reviewed By:

Mark W. Beasley
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.





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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB1 5-6 L1028432-01 Solid

Collected by
Preston K

Collected date/time
09/24/18 09:40

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 19:09	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	1	09/25/18 11:53	09/26/18 00:35	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 17:09	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/25/18 23:09	AAT

SB2 5-6 L1028432-02 Solid

Collected by
Preston K

Collected date/time
09/24/18 09:47

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 19:18	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	1	09/25/18 11:53	09/26/18 00:56	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 17:29	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/25/18 23:21	AAT

SB3 5-6 L1028432-03 Solid

Collected by
Preston K

Collected date/time
09/24/18 09:50

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 19:27	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	1	09/25/18 11:53	09/26/18 01:17	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 17:50	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/25/18 23:33	AAT

SB4 5-6 L1028432-04 Solid

Collected by
Preston K

Collected date/time
09/24/18 09:55

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 19:53	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	1	09/25/18 11:53	09/26/18 01:38	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 18:11	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/25/18 23:45	AAT

SB5 5-6 L1028432-05 Solid

Collected by
Preston K

Collected date/time
09/24/18 10:00

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 20:02	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	500	09/25/18 11:53	09/26/18 01:59	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	40	09/25/18 11:53	09/25/18 23:17	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/25/18 23:57	AAT

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SB5 7-8 L1028432-06 Solid

Collected by
Preston K

Collected date/time
09/24/18 10:05

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171059	1	09/25/18 13:06	09/25/18 13:21	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 20:11	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	25	09/25/18 11:53	09/26/18 02:20	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 18:31	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/26/18 00:09	AAT

SB6 5-6 L1028432-07 Solid

Collected by
Preston K

Collected date/time
09/24/18 10:10

Received date/time
09/25/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1171061	1	09/25/18 12:53	09/25/18 13:01	KDW
Wet Chemistry by Method 9056A	WG1171045	1	09/25/18 14:52	09/25/18 20:20	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1171299	1	09/25/18 11:53	09/26/18 02:41	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1170977	1	09/25/18 11:53	09/25/18 18:52	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1171079	1	09/25/18 18:32	09/26/18 00:21	AAT

¹ Cp

² Tc

³ Ss

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 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.

Mark W. Beasley
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	86.6		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	48.1		0.918	10.0	11.5	1	09/25/2018 19:09	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0473	J	0.0250	0.100	0.115	1	09/26/2018 00:35	WG1171299
(S) <i>o,o,a</i> -Trifluorotoluene(FID)	94.0				77.0-120		09/26/2018 00:35	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000462	0.00100	0.00115	1	09/25/2018 17:09	WG1170977
Toluene	U		0.00144	0.00500	0.00577	1	09/25/2018 17:09	WG1170977
Ethylbenzene	U		0.000612	0.00250	0.00289	1	09/25/2018 17:09	WG1170977
Total Xylenes	U		0.00552	0.00650	0.00750	1	09/25/2018 17:09	WG1170977
(S) Toluene-d8	109				75.0-131		09/25/2018 17:09	WG1170977
(S) Dibromofluoromethane	110				65.0-129		09/25/2018 17:09	WG1170977
(S) 4-Bromofluorobenzene	117				67.0-138		09/25/2018 17:09	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	50.7		1.86	4.00	4.62	1	09/25/2018 23:09	WG1171079
C28-C40 Oil Range	22.3		0.316	4.00	4.62	1	09/25/2018 23:09	WG1171079
(S) <i>o</i> -Terphenyl	78.9				18.0-148		09/25/2018 23:09	WG1171079

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 GI

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	92.2		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	8.28	<u>B</u>	0.862	10.0	10.8	1	09/25/2018 19:18	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0284	<u>J</u>	0.0235	0.100	0.108	1	09/26/2018 00:56	WG1171299
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	95.3				77.0-120		09/26/2018 00:56	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000434	0.00100	0.00108	1	09/25/2018 17:29	WG1170977
Toluene	U		0.00136	0.00500	0.00542	1	09/25/2018 17:29	WG1170977
Ethylbenzene	U		0.000575	0.00250	0.00271	1	09/25/2018 17:29	WG1170977
Total Xylenes	U		0.00518	0.00650	0.00705	1	09/25/2018 17:29	WG1170977
(S) Toluene-d8	108				75.0-131		09/25/2018 17:29	WG1170977
(S) Dibromofluoromethane	107				65.0-129		09/25/2018 17:29	WG1170977
(S) 4-Bromofluorobenzene	112				67.0-138		09/25/2018 17:29	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	U		1.75	4.00	4.34	1	09/25/2018 23:21	WG1171079
C28-C40 Oil Range	1.30	<u>J</u>	0.297	4.00	4.34	1	09/25/2018 23:21	WG1171079
(S) <i>o</i> -Terphenyl	80.7				18.0-148		09/25/2018 23:21	WG1171079

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	83.8		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis date / time	Batch
Chloride	23.0	<u>B</u>	0.949	10.0	11.9	1	09/25/2018 19:27	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0327	<u>J</u>	0.0259	0.100	0.119	1	09/26/2018 01:17	WG1171299
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	94.0				77.0-120		09/26/2018 01:17	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis date / time	Batch
Benzene	U		0.000478	0.00100	0.00119	1	09/25/2018 17:50	WG1170977
Toluene	U		0.00149	0.00500	0.00597	1	09/25/2018 17:50	WG1170977
Ethylbenzene	U		0.000633	0.00250	0.00298	1	09/25/2018 17:50	WG1170977
Total Xylenes	U		0.00571	0.00650	0.00776	1	09/25/2018 17:50	WG1170977
(S) Toluene-d8	106				75.0-131		09/25/2018 17:50	WG1170977
(S) Dibromofluoromethane	114				65.0-129		09/25/2018 17:50	WG1170977
(S) 4-Bromofluorobenzene	120				67.0-138		09/25/2018 17:50	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	U		1.92	4.00	4.78	1	09/25/2018 23:33	WG1171079
C28-C40 Oil Range	1.22	<u>J</u>	0.327	4.00	4.78	1	09/25/2018 23:33	WG1171079
(S) <i>o</i> -Terphenyl	59.2				18.0-148		09/25/2018 23:33	WG1171079

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc



Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	85.4		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	13.2	<u>B</u>	0.931	10.0	11.7	1	09/25/2018 19:53	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0371	<u>J</u>	0.0254	0.100	0.117	1	09/26/2018 01:38	WG1171299
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	94.1				77.0-120		09/26/2018 01:38	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000469	0.00100	0.00117	1	09/25/2018 18:11	WG1170977
Toluene	U		0.00146	0.00500	0.00586	1	09/25/2018 18:11	WG1170977
Ethylbenzene	U		0.000621	0.00250	0.00293	1	09/25/2018 18:11	WG1170977
Total Xylenes	U		0.00560	0.00650	0.00761	1	09/25/2018 18:11	WG1170977
(S) <i>Toluene-d8</i>	108				75.0-131		09/25/2018 18:11	WG1170977
(S) <i>Dibromofluoromethane</i>	111				65.0-129		09/25/2018 18:11	WG1170977
(S) <i>4-Bromofluorobenzene</i>	111				67.0-138		09/25/2018 18:11	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	U		1.89	4.00	4.69	1	09/25/2018 23:45	WG1171079
C28-C40 Oil Range	1.21	<u>J</u>	0.321	4.00	4.69	1	09/25/2018 23:45	WG1171079
(S) <i>o</i> -Terphenyl	65.0				18.0-148		09/25/2018 23:45	WG1171079

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	85.9		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	9.47	BJ	0.926	10.0	11.6	1	09/25/2018 20:02	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	752		12.6	0.100	58.2	500	09/26/2018 01:59	WG1171299
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	92.4				77.0-120		09/26/2018 01:59	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

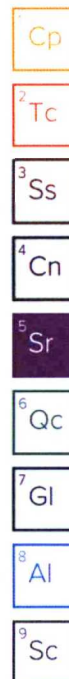
Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U	J3	0.0186	0.00100	0.0466	40	09/25/2018 23:17	WG1170977
Toluene	0.683	J3	0.0582	0.00500	0.233	40	09/25/2018 23:17	WG1170977
Ethylbenzene	0.586	J3	0.0247	0.00250	0.116	40	09/25/2018 23:17	WG1170977
Total Xylenes	12.9	J3 J6	0.223	0.00650	0.303	40	09/25/2018 23:17	WG1170977
(S) Toluene-d8	105				75.0-131		09/25/2018 23:17	WG1170977
(S) Dibromofluoromethane	115				65.0-129		09/25/2018 23:17	WG1170977
(S) 4-Bromofluorobenzene	112				67.0-138		09/25/2018 23:17	WG1170977

Sample Narrative:

L1028432-05 WG1170977: Non-target compounds too high to run at a lower dilution.

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	186		1.87	4.00	4.66	1	09/25/2018 23:57	WG1171079
C28-C40 Oil Range	0.538	J	0.319	4.00	4.66	1	09/25/2018 23:57	WG1171079
(S) <i>o</i> -Terphenyl	78.7				18.0-148		09/25/2018 23:57	WG1171079





Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	91.1		1	09/25/2018 13:21	WG1171059

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	6.53	<u>B J</u>	0.873	10.0	11.0	1	09/25/2018 20:11	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	11.3		0.596	0.100	2.75	25	09/26/2018 02:20	WG1171299
(S) <i>o,a,a</i> -Trifluorotoluene(FID)	95.9				77.0-120		09/26/2018 02:20	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000439	0.00100	0.00110	1	09/25/2018 18:31	WG1170977
Toluene	U		0.00137	0.00500	0.00549	1	09/25/2018 18:31	WG1170977
Ethylbenzene	U		0.000582	0.00250	0.00275	1	09/25/2018 18:31	WG1170977
Total Xylenes	0.0148		0.00525	0.00650	0.00714	1	09/25/2018 18:31	WG1170977
(S) Toluene-d8	110				75.0-131		09/25/2018 18:31	WG1170977
(S) Dibromofluoromethane	112				65.0-129		09/25/2018 18:31	WG1170977
(S) 4-Bromofluorobenzene	111				67.0-138		09/25/2018 18:31	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2.89	<u>J</u>	1.77	4.00	4.39	1	09/26/2018 00:09	WG1171079
C28-C40 Oil Range	U		0.301	4.00	4.39	1	09/26/2018 00:09	WG1171079
(S) <i>o</i> -Terphenyl	83.3				18.0-148		09/26/2018 00:09	WG1171079

Cp

Tc

Ss

Cn

Sr

Qc

GI

AI

Sc



Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	89.2		1	09/25/2018 13:01	WG1171061

Wet Chemistry by Method 9056A

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Chloride	10.4	<u>B J</u>	0.892	10.0	11.2	1	09/25/2018 20:20	WG1171045

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0503	<u>J</u>	0.0243	0.100	0.112	1	09/26/2018 02:41	WG1171299
(S) <i>o,o,a</i> -Trifluorotoluene(FID)	94.3				77.0-120		09/26/2018 02:41	WG1171299

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000449	0.00100	0.00112	1	09/25/2018 18:52	WG1170977
Toluene	U		0.00140	0.00500	0.00561	1	09/25/2018 18:52	WG1170977
Ethylbenzene	U		0.000594	0.00250	0.00280	1	09/25/2018 18:52	WG1170977
Total Xylenes	U		0.00536	0.00650	0.00729	1	09/25/2018 18:52	WG1170977
(S) Toluene-d8	109				75.0-131		09/25/2018 18:52	WG1170977
(S) Dibromofluoromethane	112				65.0-129		09/25/2018 18:52	WG1170977
(S) 4-Bromofluorobenzene	110				67.0-138		09/25/2018 18:52	WG1170977

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry) mg/kg	Qualifier	SDL (dry) mg/kg	Unadj. MQL mg/kg	MQL (dry) mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	U		1.81	4.00	4.49	1	09/26/2018 00:21	WG1171079
C28-C40 Oil Range	1.39	<u>J</u>	0.307	4.00	4.49	1	09/26/2018 00:21	WG1171079
(S) <i>o</i> -Terphenyl	74.1				18.0-148		09/26/2018 00:21	WG1171079

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 GI

8 AI

9 Sc

WG1171059

Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

L1028432-01,02,03,04,05,06

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3345090-1 09/25/18 13:21

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	%		%	%
Total Solids	0.00300			

L1028430-02 Original Sample (OS) • Duplicate (DUP)

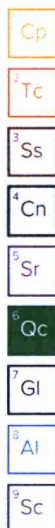
(OS) L1028430-02 09/25/18 13:21 • (DUP) R3345090-3 09/25/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	%	%		%		%
Total Solids	70.3	65.1	1	7.76		10

Laboratory Control Sample (LCS)

(LCS) R3345090-2 09/25/18 13:21

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	%	%	%	%	
Total Solids	50.0	50.0	99.9	85.0-115	

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Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

[L1028432-07](#)

Method Blank (MB)

(MB) R3345089-1 09/25/18 13:01

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00200			

Cp

Tc

Ss

L1027821-20 Original Sample (OS) • Duplicate (DUP)

(OS) L1027821-20 09/25/18 13:01 • (DUP) R3345089-3 09/25/18 13:01

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Total Solids	90.7	87.1	1	4.01		10

Cn

Sr

Qc

Laboratory Control Sample (LCS)

(LCS) R3345089-2 09/25/18 13:01

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	49.8	99.6	85.0-115	

GI

Al

Sc

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Wet Chemistry by Method 9056A

QUALITY CONTROL SUMMARY

L1028432-01,02,03,04,05,06,07

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3345039-1 09/25/18 17:59

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	3.88	J	0.795	10.0

L1028434-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1028434-01 09/25/18 20:28 • (DUP) R3345039-6 09/25/18 20:37

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	ND	5.01	1	24.3	J P1	15

L1028434-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1028434-02 09/25/18 20:46 • (DUP) R3345039-7 09/25/18 20:55

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	307	205	1	39.8	J3	15

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

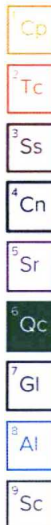
(LCS) R3345039-2 09/25/18 18:08 • (LCSD) R3345039-3 09/25/18 18:17

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	207	210	104	105	80.0-120			1.65	15

L1027953-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1027953-01 09/25/18 18:43 • (MS) R3345039-4 09/25/18 18:52 • (MSD) R3345039-5 09/25/18 19:01

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	500	54.7	548	535	98.6	96.0	1	80.0-120			2.40	15

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Method Blank (MB)

(MB) R3345097-3 09/25/18 22:39

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	98.4			77.0-120

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

(LCS) R3345097-1 09/25/18 21:36 • (LCSD) R3345097-2 09/25/18 21:57

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	5.94	5.83	108	106	72.0-127			1.84	20
(S) a,a,a-Trifluorotoluene(FID)				112	111	77.0-120				

Cp

Tc

Ss

Cn

Sr

Qc

GI

Al

Sc

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Volatile Organic Compounds (GC/MS) by Method 8260B

QUALITY CONTROL SUMMARY

L1028432-01,02,03,04,05,06,07

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3345072-2 09/25/18 16:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	110			75.0-131
(S) Dibromofluoromethane	109			65.0-129
(S) 4-Bromofluorobenzene	110			67.0-138

Laboratory Control Sample (LCS)

(LCS) R3345072-1 09/25/18 15:09

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.136	109	70.0-123	
Ethylbenzene	0.125	0.135	108	74.0-126	
Toluene	0.125	0.129	103	75.0-121	
Xylenes, Total	0.375	0.359	95.7	72.0-127	
(S) Toluene-d8			101	75.0-131	
(S) Dibromofluoromethane			116	65.0-129	
(S) 4-Bromofluorobenzene			106	67.0-138	

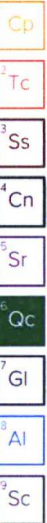
L1028432-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1028432-05 09/25/18 23:17 • (MS) R3345072-3 09/25/18 23:38 • (MSD) R3345072-4 09/25/18 23:58

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	0.146	U	4.53	2.36	77.9	40.6	40	10.0-149		J3	62.9	37
Ethylbenzene	0.146	0.586	5.04	2.62	76.5	34.9	40	10.0-160		J3	63.3	38
Toluene	0.146	0.683	4.94	2.68	73.1	34.2	40	10.0-156		J3	59.4	38
Xylenes, Total	0.437	12.9	24.8	14.8	68.1	11.1	40	10.0-160		J3 J6	50.3	38
(S) Toluene-d8					103	98.6		75.0-131				
(S) Dibromofluoromethane					119	117		65.0-129				
(S) 4-Bromofluorobenzene					109	111		67.0-138				

Sample Narrative:

OS: Non-target compounds too high to run at a lower dilution.

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Method Blank (MB)

(MB) R3345251-1 09/25/18 22:33

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	93.4			18.0-148

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

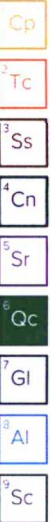
(LCS) R3345251-2 09/25/18 22:45 • (LCSD) R3345251-3 09/25/18 22:57

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	34.6	32.9	69.2	65.8	50.0-150			5.04	20
(S) o-Terphenyl				110	112	18.0-148				

L1028434-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1028434-01 09/26/18 01:08 • (MS) R3345251-4 09/26/18 01:20 • (MSD) R3345251-5 09/26/18 01:32

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	47.3	ND	34.4	34.7	72.7	70.2	1	50.0-150			0.868	20
(S) o-Terphenyl					89.4	83.4		18.0-148				

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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.
MQL (dry)	Method Quantitation Limit.
MQL	Method Quantitation Limit.
ND	Not detected at the Method Quantitation Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
SDL	Sample Detection Limit.
SDL (dry)	Sample Detection Limit.
(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 Sample Detection Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.
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.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

Cp

²Tc³Ss⁴Cn⁵Sr⁶Qc⁷Gl⁸Al⁹Sc

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	AZLA

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:
Timberwolf Environmental, LLC

PROJECT:
180048

SDG:
L1028432

DATE/TIME:
09/26/18 16:21

PAGE:
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Relinquished by: (Signature) _____ Date: _____ Time: _____		Relinquished by: (Signature) _____ Date: 9/24/18 Time: 1330		Relinquished by: (Signature) _____ Date: 9/25/18 Time: 0845	
Received by: (Signature) _____ Date: _____ Time: _____		Received by: (Signature) _____ Date: 9/24/18 Time: 1330		Received by: (Signature) _____ Date: 9/25/18 Time: 0845	
Received for lab by: (Signature) _____ Date: _____ Time: _____		Received for lab by: (Signature) _____ Date: 9/24/18 Time: 1330		Received for lab by: (Signature) _____ Date: 9/25/18 Time: 0845	
Condition: NCF / OK		Condition: NCF / OK		Condition: NCF / OK	

Matrix: _____ SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay DW - Drinking Water OT - Other		Samples returned via: _____ UPS FedEx Courier		Tracking # 7829 1594 8278	
Remarks:		RAO CORRENT <0.5 mR/hr		pH _____ Temp _____ Flow _____ Other _____	
Sample ID		Comp/Grab		Date	
581 5-6'		5-6'		9/24/18	
581 6-7'		6-7'		9/24/18	
581 7-8'		7-8'		9/24/18	
582 5-6'		5-6'		9/24/18	
583 5-6'		5-6'		9/24/18	
584 5-6'		5-6'		9/24/18	
585 5-6'		5-6'		9/24/18	
585 7-8'		7-8'		9/24/18	
586 5-6'		5-6'		9/24/18	

Project: 55 28-5 N. 81M Description: 361-722-8706 Phone: 361-722-8706 Fax: _____		Report to: _____ Email to: _____	
Client Project # 180048 Site/Facility ID # _____ P.O. # _____		Rush? (Lab MUST be notified) _____ Date Results Needed 24 Hr 1st	
Collected by (print): _____ Collected by (signature): _____ Packed on ice N _____		Quote # _____ Date Results Needed 24 Hr 1st	
Shipped Via: _____ PB: _____ TSE: _____ Prelogon: _____ Template: _____ Accrual: _____		Sample # (Lab only) _____	

Chain of Custody		Analysis / Container / Preservative	
Page 1 of 1		Page 1 of 1	



ANALYTICAL REPORT

October 09, 2018

HilCorp-Farmington, NM

Sample Delivery Group: L1032397
Samples Received: 10/06/2018
Project Number:
Description:
Site: J.J. 28-5 #81M
Report To: Lindsay Dumas
382 Road 3100
Aztec, NM 87401

Entire Report Reviewed By:

Olivia Studebaker
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.



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ONE LAB. NATIONWIDE.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



BGT CELLAR L1032397-01 Solid

Collected by
Kurt H

Collected date/time
10/05/18 10:15

Received date/time
10/06/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1177210	1	10/07/18 16:10	10/09/18 03:13	ELN
Volatile Organic Compounds (GC) by Method 8015/8021	WG1176974	1	10/06/18 11:54	10/06/18 15:05	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1177134	2	10/06/18 21:04	10/07/18 15:06	AAT

¹ Cp

² Tc

³ Ss

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 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.

Olivia Studebaker
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	32.9	P1	10.0	1	10/09/2018 03:13	WG1177210

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00492		0.000500	1	10/06/2018 15:05	WG1176974
Toluene	0.0166		0.00500	1	10/06/2018 15:05	WG1176974
Ethylbenzene	0.0104		0.000500	1	10/06/2018 15:05	WG1176974
Total Xylene	0.108		0.00150	1	10/06/2018 15:05	WG1176974
TPH (GC/FID) Low Fraction	2.22		0.100	1	10/06/2018 15:05	WG1176974
(S) a,a,a-Trifluorotoluene(FID)	77.6		77.0-120		10/06/2018 15:05	WG1176974
(S) a,a,a-Trifluorotoluene(PID)	96.5		72.0-128		10/06/2018 15:05	WG1176974

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	17.8		8.00	2	10/07/2018 15:06	WG1177134
C28-C40 Oil Range	16.5		8.00	2	10/07/2018 15:06	WG1177134
(S) o-Terphenyl	40.7		18.0-148		10/07/2018 15:06	WG1177134

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 GI

8 AI

9 Sc

WG1177210

Wet Chemistry by Method 9056A

QUALITY CONTROL SUMMARY

L1032397-01

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3348776-1 10/08/18 20:06

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

L1031396-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1031396-01 10/08/18 23:25 • (DUP) R3348776-4 10/08/18 23:33

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	645	640	1	0.771		15

L1032397-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1032397-01 10/09/18 03:13 • (DUP) R3348776-7 10/09/18 03:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	32.9	39.5	1	18.3	P1	15

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

(LCS) R3348776-2 10/08/18 20:15 • (LCSD) R3348776-3 10/08/18 20:24

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	201	202	101	101	80.0-120			0.655	15

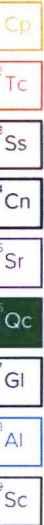
L1032174-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1032174-16 10/09/18 01:10 • (MS) R3348776-5 10/09/18 01:19 • (MSD) R3348776-6 10/09/18 01:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	500	61.7	599	586	107	105	1	80.0-120			2.17	15

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HillCorp-Farmington, NM

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WG1176974

Volatile Organic Compounds (GC) by Method 8015/8021

QUALITY CONTROL SUMMARY

L1032397-01

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3348357-5 10/06/18 13:47

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000367	J	0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	0.0268	J	0.0217	0.100
(S)				
a,a,a-Trifluorotoluene(FID)	100			77.0-120
(S)				
a,a,a-Trifluorotoluene(PID)	101			72.0-128

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

(LCS) R3348357-1 10/06/18 11:56 • (LCSD) R3348357-2 10/06/18 12:18

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	0.0468	0.0468	93.5	93.6	76.0-121			0.0264	20
Toluene	0.0500	0.0485	0.0484	96.9	96.8	80.0-120			0.162	20
Ethylbenzene	0.0500	0.0477	0.0480	95.3	95.9	80.0-124			0.633	20
Total Xylene	0.150	0.146	0.148	97.3	98.6	37.0-160			1.36	20
(S)										
a,a,a-Trifluorotoluene(FID)				100	100	77.0-120				
(S)										
a,a,a-Trifluorotoluene(PID)				99.8	99.8	72.0-128				

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

(LCS) R3348357-3 10/06/18 12:40 • (LCSD) R3348357-4 10/06/18 13:03

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	5.52	5.45	100	99.1	72.0-127			1.22	20
(S)										
a,a,a-Trifluorotoluene(FID)				104	104	77.0-120				
(S)										
a,a,a-Trifluorotoluene(PID)				111	111	72.0-128				

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Method Blank (MB)

(MB) R3348412-1 10/07/18 14:26

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	79.4			18.0-148

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

(LCS) R3348412-2 10/07/18 14:39 • (LCSD) R3348412-3 10/07/18 14:53

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	41.6	41.4	83.2	82.8	50.0-150			0.482	20
(S) o-Terphenyl				101	98.0	18.0-148				

Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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HilCorp-Farmington, NM

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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.
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.
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Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

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* 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:

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