GW - 028

C-141s
(4)

HOLLYFRONTIER.

January 23, 2019

Mr. Carl Chavez
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: September 2018 Wastewater Effluent Pipeline Release, Site Characterization, Assessment, and Closure Report, HollyFrontier Navajo Refining LLC, Artesia Refinery, Artesia, New Mexico, GW-028

Dear Mr. Chavez:

HollyFrontier Navajo Refining LLC (Navajo) is submitting this letter to document site characterization and assessment results of the wastewater release that was discovered on September 24, 2018, near the Artesia Refinery (refinery) located in Artesia, New Mexico. This also serves as the closure report for this release. The release occurred from the Navajo pipeline that conveys treated wastewater from the refinery to injection wells for disposal in accordance with Groundwater Discharge Permit GW-028 and Underground Injection Control (UIC) permits. The release location and extent of the release area is shown on Figure 1. The initial Form C-141 (Release Notification) for this release was submitted to the New Mexico Oil Conservation Division (OCD) on September 28, 2018. The final Form C-141 is provided as Attachment A.

INITIAL RELEASE RESPONSE ACTIVTIES

Navajo Operations discovered the release based on a change in pipeline flow and pressure monitoring parameters. Navajo completed the following activities after discovery of the release:

- Immediately after noticing a change in pipeline monitoring parameters, the refinery wastewater effluent discharge pumps were turned off and in-line valves on the pipeline were closed.
- Free liquids were recovered via vacuum truck and returned to the refinery wastewater system. Approximately 60 barrels of wastewater were recovered.
- The extent of the released wastewater was outlined with paint and flags. The release area was defined by the presence of wet soil; there was no staining present.
- Soil immediately surrounding the pipeline was excavated to allow repairs of the line and was disposed off-site as non-hazardous waste.

- A sample representative of the released wastewater was collected from near the pipeline pumps within the refinery and submitted for laboratory analysis of New Mexico Water Quality Control Commission (WQCC) constituents (NMAC 20.6.2.3103) and total petroleum hydrocarbons (TPH). Analytical results are summarized and compared to WQCC standards in Table 1. The laboratory analytical report is also provided as Attachment B.
    - Analytical results indicated the following constituents were present in the released wastewater at concentrations that exceeded their respective WQCC standard: benzene, total naphthalene (1-methynaphthalene, 2-methynaphthalene, and naphthalene), phenol, selenium, chloride, fluoride, sulfate, and total dissolved solids (TDS).
    - TPH diesel range organics (DRO), gasoline range organics (GRO), and motor oil range organics (MRO) were detected in the released wastewater, but there are no applicable WQCC standards for TPH.

SITE CHARACTERIZATION

Site characterization information for the release is provided below in accordance with 19.15.29.11 NMAC.

- Depth to Groundwater: Monitoring well MW-124 is located approximately 2,900 feet (0.55 miles) to the northwest of the release area and it is gauged on a semi-annual basis as part of the facility-wide groundwater monitoring program. The depth to groundwater measured at MW-124 in October 2018 was 6.78 feet below ground surface (bgs). Groundwater gauging records will be provided to the OCD in the *2018 Groundwater Monitoring Report* by June 15, 2019.
- Distance to Nearest Watercourse: The Pecos River is located approximately 1,020 feet (0.19 miles) to the west of the release location. According to the Federal Emergency Management Agency (FEMA) Map Service Center, the release location is located within the floodplain of the Pecos River.
- Distance to Nearest Fresh Water Well or Spring: New Mexico Office of the State Engineer (NM OSE) online records indicate there are four potential water wells, or Points of Diversion (PODs), located within 0.5-miles of the release location. A screenshot from the NM OSE ArcGIS Online tool showing all potential wells located within 0.5-miles of the release and a table summarizing available information for these wells are provided in Attachment C. Of the four potential wells identified, only two have an active POD Status, one of which is a Navajo monitoring well (RA 11926) and the other is identified as a domestic water well (RA 04786), but is located within a parcel that is zoned for agricultural use and currently contains no residences or other structures. The other two potential wells (RA 05881 and RA 12619) have a pending POD Status, indicating they have not yet been installed. RA 05881 was permitted

in 1974, but the records indicate it was never installed. RA 12619 was permitted in May 2018 for domestic and livestock watering and the permitted location is on the same parcel as RA 04786. The completed well depth for RA 04786 is 138 feet bgs and the permitted well depth for RA 12619 is 535 feet bgs, both of which are within deeper groundwater sources than the uppermost groundwater zone. RA 04786 is located approximately 2,000 feet (0.38 miles) to the east/southeast of the release location and the permitted location of RA 12619 is approximately 1,800 feet (0.34 miles) to the southeast of the release location. There are no known fresh water springs within 0.5-miles of the release location.

SOIL ASSESSMENT ACTIVITIES

TRC Environmental Corporation (TRC) conducted release area soil assessment activities on behalf of Navajo on December 6, 2018, and background soil assessment activities on January 4, 2019. Discrete grab surface soil samples were collected from the release area to evaluate whether additional remediation actions are necessary. Soil sample locations are shown on the attached Figure 1.

Grab surface soil samples were collected from the release area at an approximate spacing of one per 200 square feet (ft^2). A total of 28 surface soil samples, designated as WWPL-01 through WWPL-28, were collected over the approximate 5,600-ft^2 release area. Five grab surface soil samples, designated as WWPLBG-01 through WWPLBG-05, were collected from areas unaffected from the release to evaluate background chloride concentrations in soil. Soil samples were collected from 0 to 0.5 feet bgs using a decontaminated shovel. One field duplicate soil sample was collected for data quality assurance/quality control (QA/QC) purposes.

Each soil sample collected from the release area were submitted for laboratory analysis of TPH and the WQCC constituents that exceeded WQCC standards in the released wastewater (except TDS), as follows:

- Benzene and naphthalene by Method 8260B;
- 1-methynaphthalene, 2-methynaphthalene, naphthalene, and phenol by Method 8270;
- TPH DRO, GRO, and MRO by Method 8015M;
- Selenium by Method 6010/6020; and
- Chloride, fluoride, and sulfate by Method 300.

SOIL ASSESSMENT RESULTS

Soil analytical results for the release area are summarized and compared to applicable closure criteria in Table 2. Closure criteria were selected in accordance with 19.15.29 NMAC as follows:

- Analytical results for constituents included in Table 1 of 19.15.29 NMAC (benzene, TPH DRO, GRO, and MRO, and chloride) are compared to the closure criteria provided in Table 1 of 19.15.29 NMAC for a minimum depth of <50 feet to groundwater below the horizontal boundary of the release.

- Analytical results of constituents that are not included in Table 1 of 19.15.29.12 NMAC are compared to the criteria listed in either: (1) 40 CFR 261.24, if the constituent is included on Table 1 of 40 CFR 261.24(b), or (2) the New Mexico Environment Department (NMED) risk-based soil screening levels (SSLs) with a dilution attenuation factor (DAF) of 20 per NMED *Risk Assessment Guidance for Site Investigations and Remediation, Volume I, Soil Screening Guidance for Human Health Risk* dated in March 2017 (2017 NMED Risk Assessment Guidance).

    - Selenium is the only constituent that is included on Table 1 of 40 CFR 261.24(b). The criteria included in Table 1 of 40 CFR 261.24(b) consists of the maximum concentration for the toxicity characteristic determined by the toxicity characteristic leaching procedure (TCLP). TCLP simulates landfill conditions to determine the maximum potential concentration of a constituent in leachate from the soil if placed in a landfill, which is not consistent with in-situ conditions (i.e., soil left in place). Toxicity characteristic is not an appropriate closure criteria for in-situ soil, therefore soil samples collected at the site were analyzed for selenium by synthetic precipitation leaching procedure (SPLP, which simulates in-situ conditions) and the analytical results are compared to the WQCC groundwater human health standard for selenium.

    - All other constituents were compared to SSLs (if available) with a DAF of 20 per the 2017 NMED Risk Assessment Guidance. The 2017 NMED Risk Assessment Guidance includes "Risk-based SSLs" for each constituent and "New Mexico Groundwater- (NMGW-) or Maximum Contaminant Level- (MCL-) based SSLs" for select constituents. The "NMGW- or MCL-based SSL" was selected if available for a constituent; otherwise the "Risk-based SSL" was selected for the remaining constituents.

    - Sulfate is not listed in Table 1 of 19.15.29.12 NMAC, 40 CFR 261.24, or the 2017 NMED Risk Assessment Guidance. Sulfate analytical results are compared to the WQCC groundwater standard with a DAF of 20.

As highlighted on Table 2, analytical results indicate chloride is the only constituent present in surface soil within the release area at concentrations that exceed its respective closure criteria. Analytical results exceeded the chloride closure criteria of 600 milligrams per kilogram (mg/kg) in 11 of 28 samples. Chloride concentrations across the release area ranged from 58 mg/kg at WWPL-27 to 8,640 mg/kg at WWPL-02. The soil sample with the maximum detected chloride concentration (WWPL-02) was analyzed for chloride by SPLP and results indicate chloride has

the potential to leach from soil at WWPL-02 to groundwater at a concentration of 419 milligrams per liter (mg/L), which exceeds the WQCC standard of 250 mg/L.

Background Chloride Results

On January 4, 2019, five discrete grab soil samples (WWPLBG-01 through WWPLBG-05) were collected from areas unaffected from the release (i.e., outside of the release area) to evaluate background chloride concentrations in soil. Laboratory results of these five background samples are summarized in Table 3 along with additional chloride background results in soil and groundwater from other investigations conducted in the vicinity of the release area (including semi-annual facility-wide groundwater monitoring events and the August 2016 wastewater release investigation). The location of all background samples included in Table 3 are shown on Figure 1. Results of the chloride background evaluation in soil and groundwater are discussed below:

- Chloride in Soil: Chloride concentrations in soil range by up to two orders of magnitude across the release area and background areas. Background chloride concentrations in soil ranged from 361 mg/kg to 7,600 mg/kg, while chloride concentrations in soil across the release area ranged from 58 mg/kg to 8,640 mg/kg. Only 3 of 28 soil samples collected from the release area (WWPL-01, WWPL-02, and WWPL-04) exceeded the maximum background chloride concentration of 7,600 mg/kg, as highlighted in yellow on Table 3.
- Chloride in Groundwater: Semi-annual groundwater gauging results for wells located at and south of the refinery Evaporation Ponds indicate that shallow groundwater flows to the southeast in the vicinity of the release area (as reported to the OCD in previous annual groundwater monitoring reports and the *2017 Annual Groundwater Monitoring Report* that was submitted on June 15, 2018). The chloride SPLP result at WWPL-02 (i.e., the release area sample with the maximum detected chloride concentration) is an order of magnitude less than the chloride concentrations measured in shallow groundwater upgradient of the release area in monitoring wells MW-10. MW-70, MW-123, and MW-124 (as shown on Table 3). Therefore, the maximum chloride concentrations in soil within the release area will not leach to groundwater at concentrations in excess of upgradient chloride concentrations.

REQUEST FOR CLOSURE

Navajo requests that no further action be required in regards to the September 2018 wastewater effluent release based on the following:

- A majority of the wastewater effluent released was recovered via vacuum truck immediately following the release.

- Soil investigation results indicate that concentrations of TPH and all applicable WQCC constituents in surface soil are less than their respective cleanup criteria with the exception of chloride. Chloride is also present in background (non-release) soils at concentrations that exceed cleanup criteria. In addition, the distribution and magnitude of chloride concentrations vary across the release and background areas indicating that the presence of chloride in soil is not attributable to the September 2018 wastewater effluent release. Only 3 of 28 soil samples collected from the release area exceeded the maximum background chloride concentration.
- The chloride SPLP result for the soil sample with the maximum detected chloride concentration is an order of magnitude less than chloride concentrations detected in upgradient groundwater monitoring wells, indicating that chloride cannot potentially leach from the release area soil to groundwater at concentrations that would adversely affect current groundwater concentrations.

A final Form C-141 (Site Assessment/Characterization and Closure) is included as Attachment A. If you have any questions or comments regarding this request, please feel free to contact me at 575-746-5487 or Robert Combs at 575-746-5382.

Sincerely,

Scott M. Denton
Environmental Manager

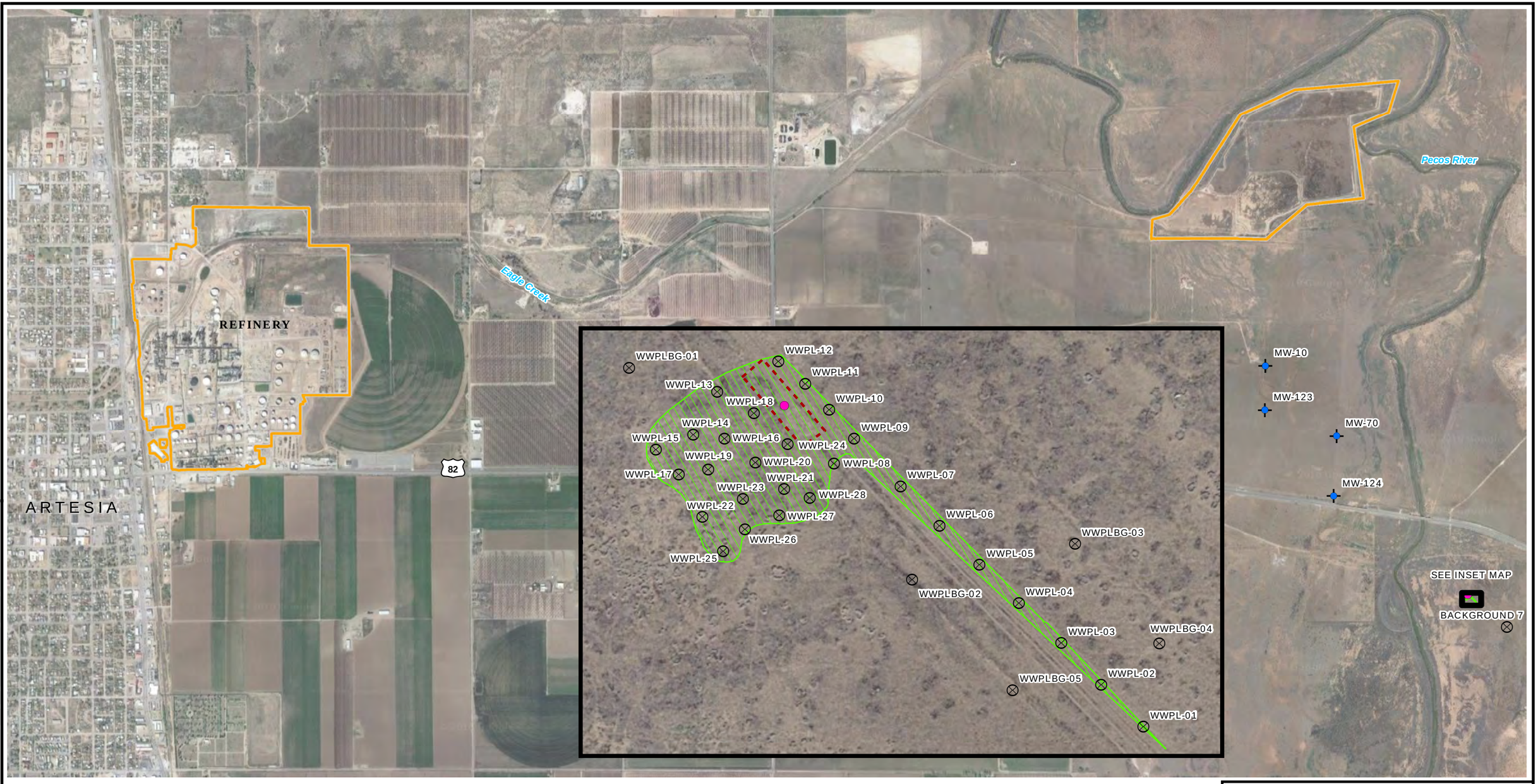
Attachments:

Figure 1 – September 2018 Wastewater Effluent Pipeline Release, Release Location and Sample Location Map
Table 1 – Wastewater Analytical Results
Table 2 – Surface Soil Analytical Results in Release Area
Table 3 – Comparison of Chloride Analytical Results in Release Area and Background Areas

Attachment A – Site Assessment/Characterization and Closure Form C-141
Attachment B – Analytical Laboratory Reports
Attachment C – Summary of Potential Fresh Water Wells Located within 0.5-miles of the Release Location

cc: HF: R. Combs, A. Sahba
TRC: J. Speer, C. Smith, J. Leik

FIGURE



LEGEND

- WASTEWATER EFFLUENT RELEASE LOCATION (9/24/18)
- MONITORING WELL
- SOIL SAMPLE LOCATION
- EXTENT OF RELEASE
- FENCELINE
- AREA EXCAVATED TO REPAIR PIPELINE, BARRICADED
- **WWPL-08** SAMPLE IDENTIFICATION

0 2,000 4,000 Feet

1 " = 2,000 '

1:24,000

PROJECT:

SEPTEMBER 2018 WASTEWATER EFFLUENT PIPELINE RELEASE, RELEASE LOCATION AND SAMPLE LOCATION MAP

TITLE:

HOLLYFRONTIER NAVAJO REFINING LLC ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

WORK IN PROGRESS

DRAWN BY:	S. RAY	PROJ. NO.:	322192
CHECKED BY:			
APPROVED BY:			
DATE:	JANUARY 2019		

FIGURE 1

TRC
505 East Huntland Drive, Suite 250
Austin, TX 78752
Phone: 512.329.6080
www.trcsolutions.com

FILE NO.: 322192_Pipeline_Release.mxd

Plot Date: 1/21/2019, 14:07:40 PM by SRAY -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\HOLLY_ENERGY_PARTNERS\Artesia\322192_2018_GW_Releases\322192_Pipeline_Release.mxd
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere (Meter)

TRC - GIS

TABLES

Table 1. Wastewater Effluent Analytical Results
Wastewater Effluent Pipeline Release - September 24, 2018
HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

Sample ID:	Effluent Pipeline
Date:	9/24/2018

Analyte	Units	WQCC Standard		Result
Volatile Organic Compounds (VOCs)				
1,1,1-Trichloroethane	mg/L	0.06	WQCC GW Human Health	<0.0050
1,1,2,2-Tetrachloroethane	mg/L	0.01	WQCC GW Human Health	<0.010
1,1,2-Trichloroethane	mg/L	0.1	WQCC GW Human Health	<0.0050
1,1-Dichloroethane	mg/L	0.025	WQCC GW Human Health	<0.0050
1,1-Dichloroethene	mg/L	0.005	WQCC GW Human Health	<0.0050
1,2-Dichloroethane	mg/L	0.01	WQCC GW Human Health	<0.0050
Benzene	mg/L	0.01	WQCC GW Human Health	0.220
Carbon Tetrachloride	mg/L	0.01	WQCC GW Human Health	<0.0050
Chloroform	mg/L	0.1	WQCC GW Human Health	<0.0050
Ethylbenzene	mg/L	0.75	WQCC GW Human Health	0.096
Methylene Chloride	mg/L	0.1	WQCC GW Human Health	<0.015
1-Methylnaphthalene	mg/L	0.03	WQCC GW Human Health	0.110
2-Methylnaphthalene	mg/L	0.03	WQCC GW Human Health	0.130
Naphthalene	mg/L	0.03	WQCC GW Human Health	0.160
Tetrachloroethene	mg/L	0.02	WQCC GW Human Health	<0.0050
Toluene	mg/L	0.75	WQCC GW Human Health	0.300
Total Xylenes	mg/L	0.62	WQCC GW Human Health	0.330
Trichloroethene	mg/L	0.1	WQCC GW Human Health	<0.0050
Vinyl Chloride	mg/L	0.001	WQCC GW Human Health	<0.0050
Semi-Volatile Organic Compounds (SVOCs)				
1-Methylnaphthalene	mg/L	0.03	WQCC GW Human Health	0.080
2-Methylnaphthalene	mg/L	0.03	WQCC GW Human Health	0.078
Naphthalene	mg/L	0.03	WQCC GW Human Health	0.110
Benzo(a)pyrene	mg/L	0.0007	WQCC GW Human Health	<0.0007
Ethylene dibromide	mg/L	0.0001	WQCC GW Human Health	<0.0000092
Total Petroleum Hydrocarbons (TPH)				
Gasoline Range Organics (GRO)	mg/L	--	Not Applicable	3.9
Diesel Range Organics (DRO)	mg/L	--	Not Applicable	24
Motor Oil Range Organics (MRO)	mg/L	--	Not Applicable	8.3
Dissolved Metals				
Aluminum	mg/L	5.0	WQCC GW Irrigation	1.9
Arsenic	mg/L	0.1	WQCC GW Human Health	0.040
Barium	mg/L	1.0	WQCC GW Human Health	0.017
Boron	mg/L	0.75	WQCC GW Irrigation	0.20
Cadmium	mg/L	0.01	WQCC GW Human Health	<0.0020
Chromium	mg/L	0.05	WQCC GW Human Health	<0.0060
Cobalt	mg/L	0.05	WQCC GW Irrigation	<0.0060
Copper	mg/L	1.0	WQCC GW Domestic	<0.0060
Iron	mg/L	1.0	WQCC GW Domestic	0.94
Lead	mg/L	0.05	WQCC GW Human Health	<0.0025
Manganese	mg/L	0.2	WQCC GW Domestic	0.067
Molybdenum	mg/L	1.0	WQCC GW Irrigation	<0.008
Nickel	mg/L	0.2	WQCC GW Irrigation	<0.010
Selenium	mg/L	0.05	WQCC GW Human Health	0.27
Silver	mg/L	0.05	WQCC GW Human Health	<0.005
Uranium	mg/L	0.03	WQCC GW Human Health	<0.0025
Zinc	mg/L	10.0	WQCC GW Domestic	0.17
Total Metals				
Mercury	mg/L	0.002	WQCC GW Human Health	<0.00020
Anions				
Chloride	mg/L	250	WQCC GW Domestic	450
Fluoride	mg/L	1.6	WQCC GW Human Health	13
Nitrite, Nitrate (as N)	mg/L	10.0	WQCC GW Human Health	<0.50
Sulfate	mg/L	600	WQCC GW Domestic	2,500
Other Parameters				
Cyanide	mg/L	0.2	WQCC GW Human Health	0.0207
Polychlorinated biphenyls (PCBs)	mg/L	0.001	WQCC GW Human Health	<0.010
Phenols	mg/L	0.005	WQCC GW Domestic	0.170
Radioactivity (Ra 226 + Ra 228)	pCi/L	30	WQCC GW Human Health	6.14
Total Dissolved Solids	mg/L	1,000	WQCC GW Domestic	4,890

Notes:
Yellow highlighted concentration exceeds applicable WQCC Standard
mg/L = milligrams per liter
NMAC = New Mexico Administrative Code
pCi/L = picocuries per liter
WQCC = New Mexico Water Quality Control Commission
WQCC GW Human Health = WQCC groundwater standard for human health exposure, NMAC 20.6.2.3103.A
WQCC GW Irrigation = WQCC groundwater standard for irrigation exposure, NMAC 20.6.2.3103.C
WQCC GW Domestic = WQCC groundwater standard for domestic exposure, NMAC 20.6.2.3103.B

Table 2. Surface Soil Analytical Results in Release Area
Wastewater Effluent Pipeline Release - September 24, 2018
HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

Analyte Group:		Volatile Organic Compounds		Semi-Volatile Organic Compounds				Total Petroleum Hydrocarbons				Metals	Anions		
Analyte:		**Benzene**	**Naphthalene**	**Naphthalene**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Phenols**	**GRO**	**DRO**	**MRO**	**Total**	**Selenium, SPLP**	**Chloride**	**Fluoride**	**Sulfate**
Cleanup Criteria[(1)]:		**10**	**0.0823**	**0.0823**	**0.893**	**2.76**	**52.3**	**--**	**--**	**--**	**100**	**0.05**	**600**	**12,000**	**12,000**
Cleanup Criteria Source[(1)]:		Table 1, 19.15.29 NMAC	NMED Risk-based SSL, DAF 20	NMED Risk-based SSL, DAF 20				Not Applicable			Table 1, 19.15.29 NMAC	WQCC GW Human Health	Table 1, 19.15.29 NMAC	NMGW- or MCL-based SSL, DAF 20	WQCC DAF 20
Units:		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**	**mg/L**	**mg/kg**	**mg/kg**	**mg/kg**
Sample ID	**Date**	***Results***													
WWPL-01	12/6/2018	<0.000439	0.00429 J	<0.0121	<0.00946	<0.00976	<0.00763	0.0307 J	4.72	15.3	20.1	<0.00740	**8,210**	3.50	621
WWPL-02	12/6/2018	<0.000467	0.00695 J	<0.0124	<0.00967	<0.00998	<0.00780	0.0308 J	3.56 J	12.7	16.3	<0.00740	**8,640**	4.52	2,030
WWPL-03	12/6/2018	<0.000473	0.00520 J	<0.0125	<0.00978	<0.0101	<0.00790	0.0752 J	5.74	21.0	26.8	<0.00740	**2,380**	5.56	553
WWPL-04	12/6/2018	<0.000458	0.0116 J	<0.0126	<0.00985	<0.0102	<0.00795	0.0530 J	4.44 J	15.3	19.8	<0.00740	**8,520**	4.67	2,030
WWPL-05	12/6/2018	<0.000444	0.00705 J	<0.0122	<0.00955	<0.00986	<0.00771	0.0570 J	4.15 J	13.6	17.8	<0.00740	**1,270**	6.41	395
WWPL-06	12/6/2018	<0.000474	0.00969 J	<0.0129	<0.0101	<0.0104	<0.00816	0.0549 J	2.28 J	9.30	11.6	<0.00740	373	8.17	512
WWPL-07	12/6/2018	<0.000469	0.0124 J	<0.0129	<0.0101	<0.0104	<0.00815	0.0899 J	4.02 J	16.3	20.4	<0.00740	**1,950**	7.88	793
WWPL-08	12/6/2018	<0.000461	0.007040 J	<0.0122	<0.00955	<0.00986	<0.00771	0.0678 J	6.43	28.3	34.8	<0.00740	505	4.63	577
WWPL-09	12/6/2018	<0.000466	0.00724 J	<0.0128	<0.0100	<0.0103	<0.00809	0.0622 J	7.04	24.4	31.5	<0.00740	**4,430**	5.47	1,020
WWPL-09 (Dup)	12/6/2018	<0.000454	<0.00354	**<0.125**	<0.0977	<0.101	<0.0789	<0.615	2.10 J	14.5	16.6	<0.00740	**5,070**	5.67	1,290
WWPL-10	12/6/2018	<0.000447	0.00550 J	<0.0123	<0.00962	<0.00993	<0.00776	0.731 J	4.81	16.3	21.8	<0.00740	136	6.28	151
WWPL-11	12/6/2018	<0.000513	0.00748 J	<0.0282	<0.0220	<0.0228	<0.0178	0.798 J	3.52 J	12.0	16.3	<0.00740	**3,090**	5.82	1,000
WWPL-12	12/6/2018	<0.000504	0.00952 J	<0.0266	<0.0208	<0.0216	<0.0168	<0.683	8.19	29.3	37.5	<0.00740	413	5.50	303
WWPL-13	12/6/2018	<0.000546	0.00595 J	<0.0292	<0.0228	<0.0236	<0.0184	<0.741	<2.13	8.64	8.64	<0.00740	**1,040**	12.5	681
WWPL-14	12/6/2018	<0.000640	0.0134 J	<0.0339	<0.0265	<0.0274	<0.0214	<0.868	<2.48	3.14 J	3.14	<0.00740	**3,040**	4.68	892
WWPL-15	12/6/2018	<0.000456	0.00563 J	<0.0122	<0.00953	<0.00984	<0.00769	<0.619	3.41 J	17.0	20.4	<0.00740	**1,530**	5.62	190
WWPL-16	12/6/2018	<0.000532	0.00510 J	<0.0284	<0.0222	<0.0230	<0.0179	<0.721	9.11 J	44.0	53.1	<0.00740	132	8.07	219
WWPL-17	12/6/2018	<0.000503	0.00649 J	<0.0277	<0.0216	<0.0224	<0.0175	0.685 J	2.16 J	12.5	15.3	<0.00740	296	13.7	638
WWPL-18	12/6/2018	<0.000528	0.00973 J	<0.0288	<0.0225	<0.0233	<0.0182	<0.716	<4.21	24.8	24.8	<0.00740	196	5.19	36.2
WWPL-19	12/6/2018	<0.000583	0.0140 J	<0.0635	<0.0496	<0.0513	<0.0401	<0.790	<2.32	10.6	10.6	<0.00740	**1,350**	5.50	143
WWPL-19 (Dup)	12/6/2018	<0.000451	0.00455 J	**<0.124**	<0.0970	<0.100	<0.0783	<0.611	4.02 J	16.4	20.4	<0.00740	**4,300**	3.19	293
WWPL-20	12/6/2018	<0.000448	0.00600 J	<0.0492	<0.0385	<0.0398	<0.0311	0.612 J	<1.80	13.2	13.8	<0.00740	**1,070**	7.07	1,280
WWPL-21	12/6/2018	<0.000448	<0.00350	<0.0123	<0.00965	<0.00996	<0.00779	0.0922 J	4.53	25.2	29.8	<0.00740	520	13.1	1,910
WWPL-22	12/6/2018	<0.000447	<0.00349	<0.0123	<0.00962	<0.00993	<0.00777	<0.606	<1.80	15.1	15.1	<0.00740	228	5.43	111
WWPL-23	12/6/2018	<0.000432	<0.00337	<0.0119	<0.00929	<0.00959	<0.00750	<0.585	2.07 J	19.6	21.7	<0.00740	369	6.85	624
WWPL-24	12/6/2018	<0.000450	<0.00351	<0.0124	<0.00968	<0.00999	<0.00781	<0.609	2.43 J	16.9	19.3	<0.00740	124	7.90	733
WWPL-24 (Dup)	12/6/2018	<0.000446	<0.00348	**<0.123**	<0.0960	<0.0991	<0.0775	<0.604	5.72	20.4	26.1	<0.00740	102	7.29	720
WWPL-25	12/6/2018	<0.000441	<0.00344	**<0.121**	<0.0950	<0.0981	<0.0767	<0.598	4.92	35.9	40.8	<0.00740	133	4.16	41.4 J
WWPL-26	12/6/2018	<0.000453	0.00383 J	**<0.125**	<0.0976	<0.101	<0.0788	<0.614	3.53 J	26.5	30.0	<0.00740	186	5.35	55.1 J
WWPL-27	12/6/2018	<0.000467	0.00396 J	**<0.128**	<0.100	<0.104	<0.0811	<0.632	3.49 J	22.4	25.9	<0.00740	58.0	5.31	64.1
WWPL-28	12/6/2018	<0.000450	<0.00351	**<0.124**	<0.0969	<0.100	<0.0782	<0.610	3.22 J	21.4	24.6	<0.00740	**2,200**	4.97	5,770

Notes:

1,950	Concentration exceeds applicable Cleanup Criteria.
<0.125	Analyte detected below method detection limit, but method detection limit exceeds Cleanup Criteria

(1) Cleanup Criteria selected in accordance with Subparagraph (e) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC. See accompanying report for selection rationale.
DRO = Diesel Range Organics
GRO = Gasoline Range Organics
J = analyte detected in sample at a concentration above method detection limit, but below reporting detection limit; result is estimated.
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
MRO = Motor Oil Range Organics
NMAC = New Mexico Administrative Code
NMED Risk-based SSL, DAF 20 = New Mexico Environment Department Soil Screening Level with a dilution attenuation factor of 20.
NMGW- or MCL-based SSL, DAF 20 = New Mexico Groundwater- or Maximum Contaminant Level-based Soil Screening Level with a dilution attenuation factor of 20.
SPLP = synthetic precipitation leaching procedure
WQCC GW Human Health = WQCC groundwater standard for human health exposure, 20.6.2.3103.A NMAC
WQCC DAF 20 = New Mexico Water Quality Control Commission groundwater standard (20.6.2.3103 NMAC) with a dilution attenuation factor of 20.

Table 3. Comparision of Chloride Analytical Results in Release Area and Background Areas
Wastewater Effluent Pipeline Release - September 24, 2018
HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

		Chloride in Release Area	
		Chloride	Chloride SPLP
Cleanup Criteria[1]:		600	250
Cleanup Criteria Source[1]:		Table 1, 19.15.29 NMAC	WQCC GW Human Health
Units:		mg/kg	mg/L
Sample ID	Date		
WWPL-01	12/6/2018	**8,210**	NA
WWPL-02	12/6/2018	**8,640**	419
WWPL-03	12/6/2018	2,380	NA
WWPL-04	12/6/2018	**8,520**	NA
WWPL-05	12/6/2018	1,270	NA
WWPL-06	12/6/2018	373	NA
WWPL-07	12/6/2018	1,950	NA
WWPL-08	12/6/2018	505	NA
WWPL-09	12/6/2018	4,430	NA
WWPL-09 (Dup)	12/6/2018	5,070	NA
WWPL-10	12/6/2018	136	NA
WWPL-11	12/6/2018	3,090	NA
WWPL-12	12/6/2018	413	NA
WWPL-13	12/6/2018	1,040	NA
WWPL-14	12/6/2018	3,040	NA
WWPL-15	12/6/2018	1,530	NA
WWPL-16	12/6/2018	132	NA
WWPL-17	12/6/2018	296	NA
WWPL-18	12/6/2018	196	NA
WWPL-19	12/6/2018	1,350	NA
WWPL-19 (Dup)	12/6/2018	4,300	NA
WWPL-20	12/6/2018	1,070	NA
WWPL-21	12/6/2018	520	NA
WWPL-22	12/6/2018	228	NA
WWPL-23	12/6/2018	369	NA
WWPL-24	12/6/2018	124	NA
WWPL-24 (Dup)	12/6/2018	102	NA
WWPL-25	12/6/2018	133	NA
WWPL-26	12/6/2018	186	NA
WWPL-27	12/6/2018	58.0	NA
WWPL-28	12/6/2018	2,200	NA

		Chloride in Background Areas	
Analyte:		Chloride, Soil	Chloride, Groundwater
Units:		mg/kg	mg/L
Sample ID	Date		
Background 7[2]	4/27/2017	7,600*	- -
WWPLBG-01	1/4/2019	3,160	- -
WWPLBG-02	1/4/2019	640	- -
WWPLBG-03	1/4/2019	361	- -
WWPLBG-04	1/4/2019	413	- -
WWPLBG-05	1/4/2019	927	- -
MW-10	10/2/2018	- -	1,300
MW-70	4/4/2018	- -	1,490
MW-123	10/2/2018	- -	1,390
MW-124	10/2/2018	- -	3,700*

Notes:

8,210	Concentration in release area exceeds Cleanup Criteria and maximum background concentration. Concentration in background area exceeds Cleanup Criteria.
1,270	Concentration in release area exceeds Cleanup Criteria, but not maximum background concentration.
3,700*	Maximum background concentration (for each environmental media, soil and groundwater).

[1] Cleanup Criteria selected in accordance with Subparagraph (e) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC. See accompanying report for selection rationale.

[2] Sample 'Background 7' collected approximately 830 feet to the southeast of the September 2018 release location as part of investigation of a wastewater release that occurred in Aufust 2016. Specifications of the collection and location of this sample were reported to OCD in the May 24, 2017, letter report "August 2016 Wastewater Effluent Pipeline Release Investigation Results and Request for Closure" that was approved by the OCD in an email on June 16, 2017.

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

NA = Not Analyzed

NMAC = New Mexico Administrative Code

SPLP = synthetic precipitation leaching procedure

WQCC GW Human Health = WQCC groundwater standard for human health exposure, 20.6.2.3103.A NMAC

ATTACHMENT A

Site Assessment/Characterization and Closure Form C-141

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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?	**6.78** (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

Incident ID	
District RP	
Facility ID	
Application ID	

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: **Robert Combs** Title **Environmental Specialist**

Signature: Date: 1/23/19

email: **Robert.Combs@hollyfrontier.com** Telephone: **575-746-5382**

OCD Only

Received by: Date:

State of New Mexico
Oil Conservation Division

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) – **Not Applicable**

☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities – **Not Applicable**

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: **Robert Combs** Title: **Environmental Specialist**

Signature: _____ Date: 4/23/19

email: **Robert.Combs@hollyfrontier.com** Telephone: **575-746-5382**

OCD Only

Received by: _____ Date: _____

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: _____

Printed Name: _____ Title: _____

ATTACHMENT B

Analytical Laboratory Reports

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 22, 2018

Scott Denton

Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: Effluent Pipeline OrderNo.: 1809E64

Dear Scott Denton:

Hall Environmental Analysis Laboratory received 2 sample(s) on 9/25/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

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

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Effluent Pipeline
Project: Effluent Pipeline
Collection Date: 9/24/2018 7:00:00 AM
Lab ID: 1809E64-001 **Matrix:** AQUEOUS **Received Date:** 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **ELS**	
Arsenic	0.040	0.0050	*	mg/L	5	9/27/2018 4:20:20 PM	A54472
Lead	ND	0.0025		mg/L	5	9/27/2018 4:20:20 PM	A54472
Selenium	0.27	0.010	*	mg/L	10	10/1/2018 12:49:47 PM	B54541
Uranium	ND	0.0025		mg/L	5	9/27/2018 4:20:20 PM	A54472
EPA 903.1: RA 226 AND EPA 904.0: RA 228-SUBBED						Analyst: **SUB**	
Radium-226	2.08	0.956		pCi/L	1	10/11/2018	R54879
Radium-226 ±	1.11	0.956		pCi/L	1	10/11/2018	R54879
Radium-228	1.89	1.97		pCi/L	1	10/11/2018	R54879
Radium-228 ±	1.06	1.97		pCi/L	1	10/11/2018	R54879
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Fluoride	13	2.0	*	mg/L	20	10/9/2018 3:04:22 PM	R54766
Chloride	450	50		mg/L	100	10/8/2018 12:39:16 PM	R54731
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	9/26/2018 3:40:20 AM	R54427
Bromide	1.5	0.50		mg/L	5	9/26/2018 3:40:20 AM	R54427
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	9/26/2018 3:40:20 AM	R54427
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	10/9/2018 3:04:22 PM	R54766
Sulfate	2500	50		mg/L	100	10/8/2018 12:39:16 PM	R54731
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JRR**	
Conductivity	7000	5.0		µmhos/c	1	9/25/2018 10:16:08 PM	R54446
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	222.4	20.00		mg/L Ca	1	10/1/2018 12:24:32 PM	R54574
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	10/1/2018 12:24:32 PM	R54574
Total Alkalinity (as CaCO3)	222.4	20.00		mg/L Ca	1	10/1/2018 12:24:32 PM	R54574
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	4890	200	*D	mg/L	1	10/1/2018 11:24:00 AM	40638
EPA 335.4: TOTAL CYANIDE SUBBED						Analyst: **SUB**	
Cyanide	0.0207	0.0100		mg/L	1	10/3/2018	R55068
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	8.09		H	pH units	1	9/25/2018 10:16:08 PM	R54446
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **pmf**	
Aluminum	1.9	0.10	*	mg/L	5	10/18/2018 5:08:13 PM	A55001
Barium	0.017	0.0020		mg/L	1	10/16/2018 10:24:51 PM	A54920
Boron	0.20	0.040		mg/L	1	10/16/2018 10:24:51 PM	A54920
Cadmium	ND	0.0020		mg/L	1	10/16/2018 10:24:51 PM	A54920
Chromium	ND	0.0060		mg/L	1	10/16/2018 10:24:51 PM	A54920

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Effluent Pipeline
Project: Effluent Pipeline
Collection Date: 9/24/2018 7:00:00 AM
Lab ID: 1809E64-001 **Matrix:** AQUEOUS **Received Date:** 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **pmf**	
Cobalt	ND	0.0060		mg/L	1	10/16/2018 10:24:51 PM	A54920
Copper	ND	0.0060		mg/L	1	10/16/2018 10:24:51 PM	A54920
Iron	0.94	0.020	*	mg/L	1	10/16/2018 10:24:51 PM	A54920
Manganese	0.067	0.0020	*	mg/L	1	10/16/2018 10:24:51 PM	A54920
Molybdenum	ND	0.0080		mg/L	1	10/16/2018 10:24:51 PM	A54920
Nickel	ND	0.010		mg/L	1	10/16/2018 10:24:51 PM	A54920
Silver	ND	0.0050		mg/L	1	10/18/2018 5:06:14 PM	A55001
Vanadium	ND	0.050		mg/L	1	10/16/2018 10:24:51 PM	A54920
Zinc	0.17	0.010		mg/L	1	10/16/2018 10:24:51 PM	A54920
EPA METHOD 245.1: MERCURY						Analyst: **rde**	
Mercury	ND	0.00020		mg/L	1	10/12/2018 1:37:12 PM	40967
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0092		µg/L	1	10/1/2018 2:57:31 PM	40697
EPA METHOD 8082A: PCB'S						Analyst: **TOM**	
Aroclor 1016	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1221	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1232	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1242	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1248	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1254	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Aroclor 1260	ND	10		µg/L	1	10/1/2018 7:25:11 PM	40587
Surr: Decachlorobiphenyl	70.8	34.1-101		%Rec	1	10/1/2018 7:25:11 PM	40587
Surr: Tetrachloro-m-xylene	69.2	22.9-104		%Rec	1	10/1/2018 7:25:11 PM	40587
EPA METHOD 8015M/D: DIESEL RANGE						Analyst: **lrm**	
Diesel Range Organics (DRO)	24	1.0		mg/L	1	9/27/2018 9:42:20 PM	40629
Motor Oil Range Organics (MRO)	8.3	5.0		mg/L	1	9/27/2018 9:42:20 PM	40629
Surr: DNOP	128	76.7-135		%Rec	1	9/27/2018 9:42:20 PM	40629
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	3.9	0.25		mg/L	5	9/27/2018 11:34:23 PM	G54473
Surr: BFB	155	69.3-150	S	%Rec	5	9/27/2018 11:34:23 PM	G54473
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Naphthalene	110	30		µg/L	1	10/1/2018 5:05:50 PM	40605
1-Methylnaphthalene	80	30		µg/L	1	10/1/2018 5:05:50 PM	40605
2-Methylnaphthalene	78	30		µg/L	1	10/1/2018 5:05:50 PM	40605
Acenaphthylene	ND	30		µg/L	1	10/1/2018 5:05:50 PM	40605
Acenaphthene	ND	30		µg/L	1	10/1/2018 5:05:50 PM	40605

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Effluent Pipeline
Project: Effluent Pipeline
Collection Date: 9/24/2018 7:00:00 AM
Lab ID: 1809E64-001 **Matrix:** AQUEOUS **Received Date:** 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8310: PAHS						Analyst: **TOM**	
Fluorene	ND	8.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Phenanthrene	10	6.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Anthracene	ND	6.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Fluoranthene	ND	3.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Pyrene	ND	4.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Benz(a)anthracene	ND	0.70		µg/L	1	10/1/2018 5:05:50 PM	40605
Chrysene	4.5	2.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Benzo(b)fluoranthene	ND	1.0		µg/L	1	10/1/2018 5:05:50 PM	40605
Benzo(k)fluoranthene	ND	0.70		µg/L	1	10/1/2018 5:05:50 PM	40605
Benzo(a)pyrene	ND	0.70		µg/L	1	10/1/2018 5:05:50 PM	40605
Dibenz(a,h)anthracene	ND	1.2		µg/L	1	10/1/2018 5:05:50 PM	40605
Benzo(g,h,i)perylene	ND	1.2		µg/L	1	10/1/2018 5:05:50 PM	40605
Indeno(1,2,3-cd)pyrene	ND	2.5		µg/L	1	10/1/2018 5:05:50 PM	40605
Surr: Benzo(e)pyrene	78.4	44.4-111		%Rec	1	10/1/2018 5:05:50 PM	40605
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	220	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Toluene	300	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Ethylbenzene	96	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2,4-Trimethylbenzene	200	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,3,5-Trimethylbenzene	44	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Naphthalene	160	10		µg/L	5	9/27/2018 8:03:00 AM	B54445
1-Methylnaphthalene	110	20		µg/L	5	9/27/2018 8:03:00 AM	B54445
2-Methylnaphthalene	130	20		µg/L	5	9/27/2018 8:03:00 AM	B54445
Acetone	790	50		µg/L	5	9/27/2018 8:03:00 AM	B54445
Bromobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Bromodichloromethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Bromoform	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Bromomethane	ND	15		µg/L	5	9/27/2018 8:03:00 AM	B54445
2-Butanone	ND	50		µg/L	5	9/27/2018 8:03:00 AM	B54445
Carbon disulfide	ND	50		µg/L	5	9/27/2018 8:03:00 AM	B54445
Carbon Tetrachloride	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Chlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Chloroethane	ND	10		µg/L	5	9/27/2018 8:03:00 AM	B54445
Chloroform	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Chloromethane	ND	15		µg/L	5	9/27/2018 8:03:00 AM	B54445
2-Chlorotoluene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Effluent Pipeline
Project: Effluent Pipeline
Collection Date: 9/24/2018 7:00:00 AM
Lab ID: 1809E64-001 **Matrix:** AQUEOUS **Received Date:** 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
4-Chlorotoluene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
cis-1,2-DCE	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	9/27/2018 8:03:00 AM	B54445
Dibromochloromethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Dibromomethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2-Dichlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,3-Dichlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,4-Dichlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Dichlorodifluoromethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1-Dichloroethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1-Dichloroethene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2-Dichloropropane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,3-Dichloropropane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
2,2-Dichloropropane	ND	10		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1-Dichloropropene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Hexachlorobutadiene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
2-Hexanone	ND	50		µg/L	5	9/27/2018 8:03:00 AM	B54445
Isopropylbenzene	10	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
4-Isopropyltoluene	5.9	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
4-Methyl-2-pentanone	ND	50		µg/L	5	9/27/2018 8:03:00 AM	B54445
Methylene Chloride	ND	15		µg/L	5	9/27/2018 8:03:00 AM	B54445
n-Butylbenzene	17	15		µg/L	5	9/27/2018 8:03:00 AM	B54445
n-Propylbenzene	24	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
sec-Butylbenzene	9.2	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Styrene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
tert-Butylbenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	9/27/2018 8:03:00 AM	B54445
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
trans-1,2-DCE	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1,1-Trichloroethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,1,2-Trichloroethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Trichloroethene (TCE)	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Trichlorofluoromethane	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
1,2,3-Trichloropropane	ND	10		µg/L	5	9/27/2018 8:03:00 AM	B54445

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Effluent Pipeline
Project: Effluent Pipeline
Collection Date: 9/24/2018 7:00:00 AM
Lab ID: 1809E64-001
Matrix: AQUEOUS
Received Date: 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Vinyl chloride	ND	5.0		µg/L	5	9/27/2018 8:03:00 AM	B54445
Xylenes, Total	330	7.5		µg/L	5	9/27/2018 8:03:00 AM	B54445
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	5	9/27/2018 8:03:00 AM	B54445
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	5	9/27/2018 8:03:00 AM	B54445
Surr: Dibromofluoromethane	104	70-130		%Rec	5	9/27/2018 8:03:00 AM	B54445
Surr: Toluene-d8	99.6	70-130		%Rec	5	9/27/2018 8:03:00 AM	B54445
TOTAL PHENOLICS BY SW-846 9067						Analyst: **CLP**	
Phenolics	170	50		µg/L	5	10/4/2018	40818

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project: Effluent Pipeline
Collection Date:
Lab ID: 1809E64-002
Matrix: TRIP BLANK
Received Date: 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0095		µg/L	1	10/1/2018 3:12:44 PM	40697
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Toluene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Ethylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Naphthalene	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1-Methylnaphthalene	ND	4.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
2-Methylnaphthalene	ND	4.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Acetone	36	10		µg/L	1	9/27/2018 8:27:00 AM	B54445
Bromobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Bromodichloromethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Bromoform	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Bromomethane	ND	3.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
2-Butanone	ND	10		µg/L	1	9/27/2018 8:27:00 AM	B54445
Carbon disulfide	ND	10		µg/L	1	9/27/2018 8:27:00 AM	B54445
Carbon Tetrachloride	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Chlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Chloroethane	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Chloroform	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Chloromethane	ND	3.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
2-Chlorotoluene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
4-Chlorotoluene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
cis-1,2-DCE	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Dibromochloromethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Dibromomethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1-Dichloroethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1-Dichloroethene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2-Dichloropropane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project: Effluent Pipeline
Collection Date:
Lab ID: 1809E64-002
Matrix: TRIP BLANK
Received Date: 9/25/2018 12:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,3-Dichloropropane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
2,2-Dichloropropane	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1-Dichloropropene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Hexachlorobutadiene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
2-Hexanone	ND	10		µg/L	1	9/27/2018 8:27:00 AM	B54445
Isopropylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
4-Isopropyltoluene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
4-Methyl-2-pentanone	ND	10		µg/L	1	9/27/2018 8:27:00 AM	B54445
Methylene Chloride	ND	3.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
n-Butylbenzene	ND	3.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
n-Propylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
sec-Butylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Styrene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
tert-Butylbenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
trans-1,2-DCE	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Trichlorofluoromethane	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Vinyl chloride	ND	1.0		µg/L	1	9/27/2018 8:27:00 AM	B54445
Xylenes, Total	ND	1.5		µg/L	1	9/27/2018 8:27:00 AM	B54445
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	1	9/27/2018 8:27:00 AM	B54445
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	1	9/27/2018 8:27:00 AM	B54445
Surr: Dibromofluoromethane	105	70-130		%Rec	1	9/27/2018 8:27:00 AM	B54445
Surr: Toluene-d8	105	70-130		%Rec	1	9/27/2018 8:27:00 AM	B54445

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A54920**	RunNo: **54920**
Prep Date:	Analysis Date: **10/16/2018**	SeqNo: **1825613** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								
Boron	ND	0.040								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.020								
Manganese	ND	0.0020								
Molybdenum	ND	0.0080								
Nickel	ND	0.010								
Vanadium	ND	0.050								
Zinc	ND	0.010								

Sample ID **LLLCS-A**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A54920**	RunNo: **54920**
Prep Date:	Analysis Date: **10/16/2018**	SeqNo: **1825614** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.0020	0.0020	0.002000	0	102	50	150			
Boron	ND	0.040	0.04000	0	96.9	50	150			
Cadmium	ND	0.0020	0.002000	0	89.0	50	150			
Chromium	ND	0.0060	0.006000	0	96.5	50	150			
Cobalt	0.0061	0.0060	0.006000	0	102	50	150			
Copper	ND	0.0060	0.006000	0	98.2	50	150			
Iron	0.023	0.020	0.02000	0	113	50	150			
Manganese	0.0020	0.0020	0.002000	0	101	50	150			
Molybdenum	0.0092	0.0080	0.008000	0	116	50	150			
Nickel	ND	0.010	0.005000	0	62.2	50	150			
Vanadium	ND	0.050	0.01000	0	106	50	150			
Zinc	ND	0.010	0.005000	0	118	50	150			

Sample ID **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A54920**	RunNo: **54920**
Prep Date:	Analysis Date: **10/16/2018**	SeqNo: **1825615** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.0020	0.5000	0	98.8	85	115			
Boron	0.49	0.040	0.5000	0	98.3	85	115			
Cadmium	0.50	0.0020	0.5000	0	100	85	115			
Chromium	0.50	0.0060	0.5000	0	100	85	115			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**LCS-A**	SampType: **LCS**			TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID: **A54920**			RunNo: **54920**					
Prep Date:		Analysis Date: **10/16/2018**			SeqNo: **1825615**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.49	0.0060	0.5000	0	97.8	85	115			
Copper	0.53	0.0060	0.5000	0	107	85	115			
Iron	0.50	0.020	0.5000	0	99.7	85	115			
Manganese	0.50	0.0020	0.5000	0	100	85	115			
Molybdenum	0.50	0.0080	0.5000	0	101	85	115			
Nickel	0.50	0.010	0.5000	0	99.7	85	115			
Vanadium	0.53	0.050	0.5000	0	106	85	115			
Zinc	0.49	0.010	0.5000	0	98.4	85	115			

Sample ID	**MB-A**	SampType: **MBLK**			TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**PBW**	Batch ID: **A55001**			RunNo: **55001**					
Prep Date:		Analysis Date: **10/18/2018**			SeqNo: **1828216**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Silver	ND	0.0050								

Sample ID	**LLLCS-A**	SampType: **LCSLL**			TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID: **A55001**			RunNo: **55001**					
Prep Date:		Analysis Date: **10/18/2018**			SeqNo: **1828217**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020	0.01000	0	75.2	50	150			
Silver	0.0054	0.0050	0.005000	0	109	50	150			

Sample ID	**LCS-A**	SampType: **LCS**			TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID: **A55001**			RunNo: **55001**					
Prep Date:		Analysis Date: **10/18/2018**			SeqNo: **1828218**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.52	0.020	0.5000	0	104	85	115			
Silver	0.10	0.0050	0.1000	0	103	85	115			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA 200.8: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A54472**	RunNo:	**54472**					
Prep Date:		Analysis Date:	**9/27/2018**	SeqNo:	**1805618**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010								
Lead	ND	0.00050								
Uranium	ND	0.00050								

Sample ID	**MSLLLCS-A**	SampType:	**LCSLL**	TestCode:	**EPA 200.8: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID:	**A54472**	RunNo:	**54472**					
Prep Date:		Analysis Date:	**9/27/2018**	SeqNo:	**1805619**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010	0.001000	0	96.5	50	150			
Lead	ND	0.00050	0.0005000	0	95.8	50	150			
Uranium	ND	0.00050	0.0005000	0	89.2	50	150			

Sample ID	**MSLCS-A**	SampType:	**LCS**	TestCode:	**EPA 200.8: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A54472**	RunNo:	**54472**					
Prep Date:		Analysis Date:	**9/27/2018**	SeqNo:	**1805620**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.024	0.0010	0.02500	0	94.4	85	115			
Lead	0.012	0.00050	0.01250	0	93.4	85	115			
Uranium	0.011	0.00050	0.01250	0	86.1	85	115			

Sample ID	**MB-B**	SampType:	**MBLK**	TestCode:	**EPA 200.8: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**B54541**	RunNo:	**54541**					
Prep Date:		Analysis Date:	**10/1/2018**	SeqNo:	**1808022**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.0010								

Sample ID	**MSLLLCS-B**	SampType:	**LCSLL**	TestCode:	**EPA 200.8: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID:	**B54541**	RunNo:	**54541**					
Prep Date:		Analysis Date:	**10/1/2018**	SeqNo:	**1808023**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.0010	0.001000	0	94.7	50	150			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**MSLCS-B**	SampType: **LCS**			TestCode: **EPA 200.8: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID: **B54541**			RunNo: **54541**					
Prep Date:		Analysis Date: **10/1/2018**			SeqNo: **1808024**		Units: **mg/L**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium		0.024	0.0010	0.02500	0	96.5	85	115			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**MB-40967**	SampType: **MBLK**		TestCode: **EPA Method 245.1: Mercury**					
Client ID:	**PBW**	Batch ID: **40967**		RunNo: **54845**					
Prep Date:	**10/11/2018**	Analysis Date: **10/12/2018**		SeqNo: **1822160**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-40967**	SampType: **LCS**		TestCode: **EPA Method 245.1: Mercury**					
Client ID:	**LCSW**	Batch ID: **40967**		RunNo: **54845**					
Prep Date:	**10/11/2018**	Analysis Date: **10/12/2018**		SeqNo: **1822161**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R54427**	RunNo: **54427**
Prep Date:	Analysis Date: **9/25/2018**	SeqNo: **1803584** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R54427**	RunNo: **54427**
Prep Date:	Analysis Date: **9/25/2018**	SeqNo: **1803585** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrite (As N)	0.93	0.10	1.000	0	92.5	90	110			
Bromide	2.4	0.10	2.500	0	96.9	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110			

Sample ID **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R54731**	RunNo: **54731**
Prep Date:	Analysis Date: **10/8/2018**	SeqNo: **1816788** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R54731**	RunNo: **54731**
Prep Date:	Analysis Date: **10/8/2018**	SeqNo: **1816789** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.0	90	110			
Sulfate	9.4	0.50	10.00	0	93.8	90	110			

Sample ID **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R54766**	RunNo: **54766**
Prep Date:	Analysis Date: **10/9/2018**	SeqNo: **1818043** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R54766**	RunNo: **54766**
Prep Date:	Analysis Date: **10/9/2018**	SeqNo: **1818044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.53	0.10	0.5000	0	107	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.7	90	110			

Sample ID **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R54766**	RunNo: **54766**
Prep Date:	Analysis Date: **10/9/2018**	SeqNo: **1818106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								

Sample ID **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R54766**	RunNo: **54766**
Prep Date:	Analysis Date: **10/9/2018**	SeqNo: **1818107** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.59	0.10	0.5000	0	118	90	110			S
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	101	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**LCS-40697**	SampType: **LCS**			TestCode: **EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID: **40697**			RunNo: **54559**					
Prep Date:	**10/1/2018**	Analysis Date: **10/1/2018**			SeqNo: **1809463**		Units: **µg/L**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane		0.11	0.010	0.1000	0	110	70	130			

Sample ID	**MB-40697**	SampType: **MBLK**			TestCode: **EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID: **40697**			RunNo: **54559**					
Prep Date:	**10/1/2018**	Analysis Date: **10/1/2018**			SeqNo: **1809464**		Units: **µg/L**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane		ND	0.010								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **LCS-40629**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **LCSW**	Batch ID: **40629**	RunNo: **54465**
Prep Date: **9/27/2018**	Analysis Date: **9/27/2018**	SeqNo: **1807089** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.9	1.0	5.000	0	117	70	130			
Surr: DNOP	0.60		0.5000		120	76.7	135			

Sample ID **MB-40629**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **PBW**	Batch ID: **40629**	RunNo: **54465**
Prep Date: **9/27/2018**	Analysis Date: **9/27/2018**	SeqNo: **1807090** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	1.2		1.000		125	76.7	135			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**B30**	SampType:	**MBLK**	TestCode:	**EPA Method 8015D: Gasoline Range**					
Client ID:	**PBW**	Batch ID:	**G54473**	RunNo:	**54473**					
Prep Date:		Analysis Date:	**9/27/2018**	SeqNo:	**1805665**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	19		20.00		95.2	69.3	150			

Sample ID	**2.5UG GRO LCS**	SampType:	**LCS**	TestCode:	**EPA Method 8015D: Gasoline Range**					
Client ID:	**LCSW**	Batch ID:	**G54473**	RunNo:	**54473**					
Prep Date:		Analysis Date:	**9/27/2018**	SeqNo:	**1805666**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.44	0.050	0.5000	0	87.7	79.5	127			
Surr: BFB	22		20.00		110	69.3	150			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**MB-40587**	SampType:	**MBLK**	TestCode:	**EPA Method 8082A: PCB's**					
Client ID:	**PBW**	Batch ID:	**40587**	RunNo:	**54543**					
Prep Date:	**9/26/2018**	Analysis Date:	**10/1/2018**	SeqNo:	**1808717**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	1.0								
Aroclor 1221	ND	1.0								
Aroclor 1232	ND	1.0								
Aroclor 1242	ND	1.0								
Aroclor 1248	ND	1.0								
Aroclor 1254	ND	1.0								
Aroclor 1260	ND	1.0								
Surr: Decachlorobiphenyl	2.0		2.500		79.2	34.1	101			
Surr: Tetrachloro-m-xylene	1.8		2.500		70.8	22.9	104			

Sample ID	**LCS-40587**	SampType:	**LCS**	TestCode:	**EPA Method 8082A: PCB's**					
Client ID:	**LCSW**	Batch ID:	**40587**	RunNo:	**54543**					
Prep Date:	**9/26/2018**	Analysis Date:	**10/1/2018**	SeqNo:	**1808718**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	3.4	1.0	5.000	0	67.4	25.9	120			
Aroclor 1260	3.8	1.0	5.000	0	76.0	38.4	134			
Surr: Decachlorobiphenyl	1.8		2.500		71.6	34.1	101			
Surr: Tetrachloro-m-xylene	1.8		2.500		73.2	22.9	104			

Sample ID	**LCSD-40587**	SampType:	**LCSD**	TestCode:	**EPA Method 8082A: PCB's**					
Client ID:	**LCSS02**	Batch ID:	**40587**	RunNo:	**54543**					
Prep Date:	**9/26/2018**	Analysis Date:	**10/1/2018**	SeqNo:	**1808719**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	3.2	1.0	5.000	0	64.5	25.9	120	4.43	17.9	
Aroclor 1260	3.8	1.0	5.000	0	75.5	38.4	134	0.739	16.2	
Surr: Decachlorobiphenyl	1.9		2.500		75.6	34.1	101	0	0	
Surr: Tetrachloro-m-xylene	1.7		2.500		67.6	22.9	104	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **B54445**	RunNo: **54445**
Prep Date:	Analysis Date: **9/27/2018**	SeqNo: **1804252** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	109	70	130			
Toluene	20	1.0	20.00	0	100	70	130			
Chlorobenzene	21	1.0	20.00	0	103	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	109	70	130			
Trichloroethene (TCE)	20	1.0	20.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		110	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	11		10.00		113	70	130			
Surr: Toluene-d8	10		10.00		102	70	130			

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **B54445**	RunNo: **54445**
Prep Date:	Analysis Date: **9/27/2018**	SeqNo: **1804253** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **B54445**	RunNo: **54445**
Prep Date:	Analysis Date: **9/27/2018**	SeqNo: **1804253** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **B54445**	RunNo: **54445**
Prep Date:	Analysis Date: **9/27/2018**	SeqNo: **1804253** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	11		10.00		109	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	11		10.00		112	70	130			
Surr: Toluene-d8	10		10.00		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID **MB-40605**	SampType: **MBLK**	TestCode: **EPA Method 8310: PAHs**
Client ID: **PBW**	Batch ID: **40605**	RunNo: **54544**
Prep Date: **9/26/2018**	Analysis Date: **10/1/2018**	SeqNo: **1809034** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	3.0								
1-Methylnaphthalene	ND	3.0								
2-Methylnaphthalene	ND	3.0								
Acenaphthylene	ND	3.0								
Acenaphthene	ND	3.0								
Fluorene	ND	0.80								
Phenanthrene	ND	0.60								
Anthracene	ND	0.60								
Fluoranthene	ND	0.30								
Pyrene	ND	0.40								
Benz(a)anthracene	ND	0.070								
Chrysene	ND	0.20								
Benzo(b)fluoranthene	ND	0.10								
Benzo(k)fluoranthene	ND	0.070								
Benzo(a)pyrene	ND	0.070								
Dibenz(a,h)anthracene	ND	0.12								
Benzo(g,h,i)perylene	ND	0.12								
Indeno(1,2,3-cd)pyrene	ND	0.25								
Surr: Benzo(e)pyrene	15		20.00		74.0	44.4	111			

Sample ID **LCS-40605**	SampType: **LCS**	TestCode: **EPA Method 8310: PAHs**
Client ID: **LCSW**	Batch ID: **40605**	RunNo: **54544**
Prep Date: **9/26/2018**	Analysis Date: **10/1/2018**	SeqNo: **1809035** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	42	3.0	80.00	0	52.0	35.5	118			
1-Methylnaphthalene	41	3.0	80.20	0	51.7	35.5	119			
2-Methylnaphthalene	41	3.0	80.00	0	51.2	32.4	122			
Acenaphthylene	49	3.0	80.20	0	60.9	47.6	128			
Acenaphthene	45	3.0	80.00	0	56.5	43.7	112			
Fluorene	4.7	0.80	8.020	0	58.1	45.9	113			
Phenanthrene	2.5	0.60	4.020	0	62.7	52.7	114			
Anthracene	2.6	0.60	4.020	0	63.4	54.1	127			
Fluoranthene	5.2	0.30	8.020	0	65.3	59.1	116			
Pyrene	5.4	0.40	8.020	0	67.3	55.2	105			
Benz(a)anthracene	0.56	0.070	0.8020	0	69.8	52.9	126			
Chrysene	2.7	0.20	4.020	0	67.9	50.6	120			
Benzo(b)fluoranthene	0.66	0.10	1.002	0	65.9	49.7	118			
Benzo(k)fluoranthene	0.34	0.070	0.5000	0	68.0	54.5	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID **LCS-40605**	SampType: **LCS**	TestCode: **EPA Method 8310: PAHs**							
Client ID: **LCSW**	Batch ID: **40605**	RunNo: **54544**							
Prep Date: **9/26/2018**	Analysis Date: **10/1/2018**	SeqNo: **1809035**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzo(a)pyrene	0.34	0.070	0.5020	0	67.7	49.8	120			
Dibenz(a,h)anthracene	0.69	0.12	1.002	0	68.9	52.5	126			
Benzo(g,h,i)perylene	0.69	0.12	1.000	0	69.0	52.3	120			
Indeno(1,2,3-cd)pyrene	1.4	0.25	2.004	0	67.4	46.8	114			
Surr: Benzo(e)pyrene	15		20.00		76.1	44.4	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**MB-40818**	SampType: **MBLK**		TestCode: **Total Phenolics by SW-846 9067**					
Client ID:	**PBW**	Batch ID: **40818**		RunNo: **54647**					
Prep Date:	**10/4/2018**	Analysis Date: **10/4/2018**		SeqNo: **1812643**		Units: **µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics	ND	2.5								

Sample ID	**LCS-40818**	SampType: **LCS**		TestCode: **Total Phenolics by SW-846 9067**					
Client ID:	**LCSW**	Batch ID: **40818**		RunNo: **54647**					
Prep Date:	**10/4/2018**	Analysis Date: **10/4/2018**		SeqNo: **1812644**		Units: **µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics	12	2.5	10.00	0	124	53.3	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**MB-R55068**	SampType: **MBLK**		TestCode: **EPA 335.4: Total Cyanide Subbed**					
Client ID:	**PBW**	Batch ID: **R55068**		RunNo: **55068**					
Prep Date:		Analysis Date: **10/3/2018**		SeqNo: **1830674**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	ND	0.0100								

Sample ID	**LCS-R55068**	SampType: **LCS**		TestCode: **EPA 335.4: Total Cyanide Subbed**					
Client ID:	**LCSW**	Batch ID: **R55068**		RunNo: **55068**					
Prep Date:		Analysis Date: **10/3/2018**		SeqNo: **1830675**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	0.534		0.5000	0	107	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**lcs-1 98.3uS eC**	SampType:	**LCS**		TestCode:	**SM2510B: Specific Conductance**					
Client ID:	**LCSW**	Batch ID:	**R54446**		RunNo:	**54446**					
Prep Date:		Analysis Date:	**9/25/2018**		SeqNo:	**1804319**	Units:	**µmhos/cm**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity		100	5.0	98.30	0	103	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**1809e64-001f dup**	SampType:	**DUP**	TestCode:	**SM4500-H+B / 9040C: pH**					
Client ID:	**Effluent Pipeline**	Batch ID:	**R54446**	RunNo:	**54446**					
Prep Date:		Analysis Date:	**9/25/2018**	SeqNo:	**1804316**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	8.06									H

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**MB-R54879**	SampType:	**MBLK**	TestCode:	**EPA 903.1: Ra 226 and EPA 904.0: Ra 228-Subbed**
Client ID:	**PBW**	Batch ID:	**R54879**	RunNo:	**54879**
Prep Date:		Analysis Date:	**10/11/2018**	SeqNo:	**1824033** Units: **pCi/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Radium-226	0.343	1.06								
Radium-226 ±	0.595	1.06								
Radium-228	0.941	0.773								
Radium-228 ±	0.452	0.773								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**
22-Oct-18

Client: Navajo Refining Company
Project: Effluent Pipeline

Sample ID	**mb-1 alk**	SampType:	**MBLK**	TestCode:	**SM2320B: Alkalinity**					
Client ID:	**PBW**	Batch ID:	**R54574**	RunNo:	**54574**					
Prep Date:		Analysis Date:	**10/1/2018**	SeqNo:	**1809490**	Units:	**mg/L CaCO3**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID	**lcs-1 alk**	SampType:	**LCS**	TestCode:	**SM2320B: Alkalinity**					
Client ID:	**LCSW**	Batch ID:	**R54574**	RunNo:	**54574**					
Prep Date:		Analysis Date:	**10/1/2018**	SeqNo:	**1809491**	Units:	**mg/L CaCO3**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	77.88	20.00	80.00	0	97.4	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809E64**

22-Oct-18

Client: Navajo Refining Company

Project: Effluent Pipeline

Sample ID	**MB-40638**	SampType:	**MBLK**	TestCode:	**SM2540C MOD: Total Dissolved Solids**					
Client ID:	**PBW**	Batch ID:	**40638**	RunNo:	**54531**					
Prep Date:	**9/27/2018**	Analysis Date:	**10/1/2018**	SeqNo:	**1807588**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID	**LCS-40638**	SampType:	**LCS**	TestCode:	**SM2540C MOD: Total Dissolved Solids**					
Client ID:	**LCSW**	Batch ID:	**40638**	RunNo:	**54531**					
Prep Date:	**9/27/2018**	Analysis Date:	**10/1/2018**	SeqNo:	**1807589**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING COM Work Order Number: 1809E64 RcptNo: 1

Received By: Erin Melendrez 9/25/2018 12:20:00 PM

Completed By: Ashley Gallegos 9/25/2018 1:14:23 PM

Reviewed By: ENM 9/26/18 Labeled by: JAB 09/26/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 6 (2)
(<2 or >12 unless noted)
Adjusted? No
Checked by: JAB 09/26/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.8	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refinery

Mailing Address: P.O. Box 159 Artesia,

NM 88211-0159

Phone #: 575-748-3311

email or Fax#: 575-746-5451

QA/QC Package:

X Standard ☐ Level 4 (Full Validation)

☐ Other

☐ EDD (Type)

Turn-Around Time:

X Standard ☐ Rush

Project Name:

Effluent Pipeline

Project #:

Project Manager:

Scott Denton

Robert Combs

Sampler:

On Ice: X Yes ☐ No

Sample Temperature: 5.8

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1809E604	8260B:WQCC List VOCs	8270C: WQCC list SVOCs	6010B: WQCC Metals +Va	335.4: Total Cyanide	7470: Mercury	8015: GRO, DRO	8082: PCBs	Radioactivity (EPA 903.1+904.0)	Cation/Anion Balance	Phenols SW-846 9067	pH	504.1:EDB	Air Bubbles (Y or N)		
9/24/2018	7:00	liquid	Effluent Pipeline	2 - 500ml P	1-unpres 1-H2SO4	-001									X		X		Y		
9/24/2018	7:00	liquid	Effluent Pipeline	3-40ml VOA	HCL		X														
9/24/2018	7:00	liquid	Effluent Pipeline	1-500ml P	HNO3						X										
9/24/2018	7:00	liquid	Effluent Pipeline	1-125ml P	HNO3				X												
9/24/2018	7:00	liquid	Effluent Pipeline	1-500ml P	NaOH					X											
9/24/2018	7:00	liquid	Effluent Pipeline	2- 1L P	HNO3									X							
9/24/2018	7:00	liquid	Effluent Pipeline	3-40ml VOA	Na2S2O3													X			
9/24/2018	7:00	liquid	Effluent Pipeline	2 - 1L Glass	unpres								X								
9/24/2018	7:00	liquid	Effluent Pipeline	1 - 1L Glass	unpres			X													
9/24/2018	7:00	liquid	Effluent Pipeline	3-40ml VOA	HCl							X									
9/24/2018	7:00	liquid	Effluent Pipeline	1-250mlGlass	unpres							X									
9/24/2018	7:00	liquid	Effluent Pipeline	1 - 1L Glass	H2SO4	-002										X					

Date	Time	Relinquished by	Received by	Date	Time
9/24/18	8:15	Brady Hubbard			
9/24/18	1900		Courier ENM	9/25/18	9/25/18 1220

Remarks: email to Scott Denton, Robert Combs and Randy Dade

Metals: As, Al, Ba, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, U, Zn

VOCs: 1,1,1-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,1,2,2-Tetrachloroethylene; 1,1,2-Trichloroethane; 1,1,2-Trichloroethylene; 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dibromoethane; 1,2-Dichloroethane; Benzene; Carbon Tetrachloride; Chloroform; Dichloromethane; Ethylbenzene; Toluene; Total Xylenes; Vinyl Chloride

SVOCs: benzo(a)pyrene, phenol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 18, 2018

TRC Solutions - Austin, TX

Sample Delivery Group:	L1051220
Samples Received:	12/08/2018
Project Number:	
Description:	Navajo WW Effluent Pipeline Release
Site:	NAVAJO REFINERY
Report To:	Julie Speer 505 E. Huntland Dr, Ste 250 Austin, TX 78752

Entire Report Reviewed By:

Chris McCord
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.

TABLE OF CONTENTS

WWPL-01 L1051220-01 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:40 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209432	1	12/12/18 14:41	12/12/18 14:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 19:27	MAJ
Wet Chemistry by Method 300.0	WG1207924	20	12/10/18 16:00	12/15/18 19:59	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 10:40	12/14/18 03:04	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 10:40	12/14/18 05:48	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 00:53	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 01:10	JNJ

WWPL-01 L1051220-02 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:40 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/13/18 23:45	TRB

WWPL-02 L1051220-03 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:48 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209432	1	12/12/18 14:41	12/12/18 14:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 20:32	MAJ
Wet Chemistry by Method 300.0	WG1207924	20	12/10/18 16:00	12/15/18 20:48	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 10:48	12/14/18 03:25	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1.04	12/06/18 10:48	12/14/18 06:09	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 01:06	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 01:33	JNJ

WWPL-02 L1051220-04 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:48 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/13/18 23:56	TRB

WWPL-03 L1051220-05 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:57 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209577	1	12/12/18 12:39	12/12/18 12:51	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 21:05	MAJ
Wet Chemistry by Method 300.0	WG1207924	5	12/10/18 16:00	12/15/18 21:54	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 10:57	12/14/18 03:46	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1.04	12/06/18 10:57	12/14/18 06:29	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 01:20	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 01:55	JNJ

WWPL-03 L1051220-06 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 10:57 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/13/18 23:59	TRB

WWPL-04 L1051220-07 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:07 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209577	1	12/12/18 12:39	12/12/18 12:51	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 22:11	MAJ
Wet Chemistry by Method 300.0	WG1207924	20	12/10/18 16:00	12/15/18 22:27	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:07	12/14/18 04:07	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 11:07	12/14/18 06:49	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 01:34	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 02:18	JNJ

WWPL-04 L1051220-08 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:07 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:01	TRB

WWPL-05 L1051220-09 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:14 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 22:44	MAJ
Wet Chemistry by Method 300.0	WG1207924	5	12/10/18 16:00	12/15/18 23:00	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:14	12/14/18 04:28	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 11:14	12/14/18 07:09	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 01:47	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 03:27	JNJ

WWPL-05 L1051220-10 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:14 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:10	TRB

WWPL-06 L1051220-11 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:21 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 23:16	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:21	12/14/18 04:50	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1.01	12/06/18 11:21	12/14/18 07:30	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 02:01	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 02:41	JNJ

WWPL-06 L1051220-12 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:21 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:12	TRB

WWPL-07 L1051220-13 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:30 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/15/18 23:33	MAJ
Wet Chemistry by Method 300.0	WG1207924	5	12/10/18 16:00	12/15/18 23:49	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:30	12/14/18 05:11	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 11:30	12/14/18 07:50	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 02:14	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 03:04	JNJ

WWPL-07 L1051220-14 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:30 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:15	TRB

WWPL-08 L1051220-15 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:38 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 00:06	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:38	12/14/18 05:32	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1.04	12/06/18 11:38	12/14/18 08:10	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 02:28	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 03:50	JNJ

WWPL-08 L1051220-16 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:38 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:18	TRB

WWPL-09 L1051220-17 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:47 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 00:22	MAJ
Wet Chemistry by Method 300.0	WG1207924	10	12/10/18 16:00	12/16/18 01:12	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	1	12/06/18 11:47	12/14/18 05:53	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 11:47	12/14/18 08:30	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 02:42	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 04:13	JNJ

WWPL-09 L1051220-18 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:47 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:21	TRB

WWPL-10 L1051220-19 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:58 | Received date/time: 12/08/18 08:45

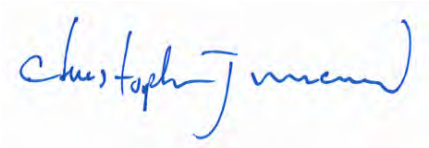
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209579	1	12/13/18 09:43	12/13/18 09:52	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 01:28	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211786	25	12/06/18 11:58	12/17/18 00:24	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 11:58	12/14/18 08:51	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209819	1	12/12/18 18:57	12/13/18 00:39	KME
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209804	1	12/13/18 11:41	12/14/18 04:36	JNJ

WWPL-10 L1051220-20 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 11:58 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209400	1	12/12/18 08:22	12/12/18 08:22	TM
Metals (ICP) by Method 6010B	WG1210240	1	12/13/18 11:49	12/14/18 00:24	TRB

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.



Chris McCord
Project Manager

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	91.1		1	12/12/2018 14:52	WG1209432

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	8210		17.5	220	20	12/15/2018 19:59	WG1207924
Fluoride	3.50		0.287	1.10	1	12/15/2018 19:27	WG1207924
Sulfate	621	J3	0.626	54.9	1	12/15/2018 19:27	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0307	J	0.0238	0.110	1	12/14/2018 03:04	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*92.5*			*77.0-120*		*12/14/2018 03:04*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000439	0.00110	1	12/14/2018 05:48	WG1210179
Naphthalene	0.00429	J J3	0.00343	0.0137	1	12/14/2018 05:48	WG1210179
(S) Toluene-d8	*117*			*75.0-131*		*12/14/2018 05:48*	WG1210179
(S) Dibromofluoromethane	*90.3*			*65.0-129*		*12/14/2018 05:48*	WG1210179
(S) a,a,a-Trifluorotoluene	*108*			*80.0-120*		*12/14/2018 05:48*	WG1210179
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/14/2018 05:48*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.72		1.77	4.39	1	12/13/2018 00:53	WG1209819
C28-C40 Oil Range	15.3		0.301	4.39	1	12/13/2018 00:53	WG1209819
(S) o-Terphenyl	*79.1*			*18.0-148*		*12/13/2018 00:53*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00976	0.0366	1	12/14/2018 01:10	WG1209804
1-Methylnaphthalene	U		0.0121	0.0366	1	12/14/2018 01:10	WG1209804
2-Methylnaphthalene	U		0.00946	0.0366	1	12/14/2018 01:10	WG1209804
Phenol	U		0.00763	0.366	1	12/14/2018 01:10	WG1209804
(S) 2-Fluorophenol	*59.5*			*12.0-120*		*12/14/2018 01:10*	WG1209804
(S) Phenol-d5	*53.9*			*10.0-120*		*12/14/2018 01:10*	WG1209804
(S) Nitrobenzene-d5	*55.6*			*10.0-122*		*12/14/2018 01:10*	WG1209804
(S) 2-Fluorobiphenyl	*55.9*			*15.0-120*		*12/14/2018 01:10*	WG1209804
(S) 2,4,6-Tribromophenol	*49.2*			*10.0-127*		*12/14/2018 01:10*	WG1209804
(S) p-Terphenyl-d14	*54.4*			*10.0-120*		*12/14/2018 01:10*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	6.83		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/13/2018 23:45	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.1		1	12/12/2018 14:52	WG1209432

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	8640		17.9	225	20	12/15/2018 20:48	WG1207924
Fluoride	4.52		0.293	1.12	1	12/15/2018 20:32	WG1207924
Sulfate	2030		12.8	1120	20	12/15/2018 20:48	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0308	J	0.0244	0.112	1	12/14/2018 03:25	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*96.7*			*77.0-120*		*12/14/2018 03:25*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000467	0.00117	1.04	12/14/2018 06:09	WG1210179
Naphthalene	0.00695	J J3	0.00364	0.0146	1.04	12/14/2018 06:09	WG1210179
(S) Toluene-d8	*113*			*75.0-131*		*12/14/2018 06:09*	WG1210179
(S) Dibromofluoromethane	*88.0*			*65.0-129*		*12/14/2018 06:09*	WG1210179
(S) a,a,a-Trifluorotoluene	*112*			*80.0-120*		*12/14/2018 06:09*	WG1210179
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 06:09*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.56	J	1.81	4.49	1	12/13/2018 01:06	WG1209819
C28-C40 Oil Range	12.7		0.308	4.49	1	12/13/2018 01:06	WG1209819
(S) o-Terphenyl	*76.2*			*18.0-148*		*12/13/2018 01:06*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00998	0.0374	1	12/14/2018 01:33	WG1209804
1-Methylnaphthalene	U		0.0124	0.0374	1	12/14/2018 01:33	WG1209804
2-Methylnaphthalene	U		0.00967	0.0374	1	12/14/2018 01:33	WG1209804
Phenol	U		0.00780	0.374	1	12/14/2018 01:33	WG1209804
(S) 2-Fluorophenol	*62.8*			*12.0-120*		*12/14/2018 01:33*	WG1209804
(S) Phenol-d5	*56.7*			*10.0-120*		*12/14/2018 01:33*	WG1209804
(S) Nitrobenzene-d5	*59.0*			*10.0-122*		*12/14/2018 01:33*	WG1209804
(S) 2-Fluorobiphenyl	*59.9*			*15.0-120*		*12/14/2018 01:33*	WG1209804
(S) 2,4,6-Tribromophenol	*54.0*			*10.0-127*		*12/14/2018 01:33*	WG1209804
(S) p-Terphenyl-d14	*56.9*			*10.0-120*		*12/14/2018 01:33*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	7.05		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/13/2018 23:56	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.0		1	12/12/2018 12:51	WG1209577

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	2380		4.52	56.8	5	12/15/2018 21:54	WG1207924
Fluoride	5.56		0.297	1.14	1	12/15/2018 21:05	WG1207924
Sulfate	553		0.648	56.8	1	12/15/2018 21:05	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0752	J	0.0247	0.114	1	12/14/2018 03:46	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*93.3*			*77.0-120*		*12/14/2018 03:46*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000473	0.00118	1.04	12/14/2018 06:29	WG1210179
Naphthalene	0.00520	J J3	0.00368	0.0148	1.04	12/14/2018 06:29	WG1210179
(S) Toluene-d8	*114*			*75.0-131*		*12/14/2018 06:29*	WG1210179
(S) Dibromofluoromethane	*93.2*			*65.0-129*		*12/14/2018 06:29*	WG1210179
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/14/2018 06:29*	WG1210179
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/14/2018 06:29*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	5.74		1.83	4.54	1	12/13/2018 01:20	WG1209819
C28-C40 Oil Range	21.0		0.311	4.54	1	12/13/2018 01:20	WG1209819
(S) o-Terphenyl	*80.4*			*18.0-148*		*12/13/2018 01:20*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0101	0.0378	1	12/14/2018 01:55	WG1209804
1-Methylnaphthalene	U		0.0125	0.0378	1	12/14/2018 01:55	WG1209804
2-Methylnaphthalene	U		0.00978	0.0378	1	12/14/2018 01:55	WG1209804
Phenol	U		0.00790	0.378	1	12/14/2018 01:55	WG1209804
(S) 2-Fluorophenol	*60.4*			*12.0-120*		*12/14/2018 01:55*	WG1209804
(S) Phenol-d5	*54.8*			*10.0-120*		*12/14/2018 01:55*	WG1209804
(S) Nitrobenzene-d5	*56.7*			*10.0-122*		*12/14/2018 01:55*	WG1209804
(S) 2-Fluorobiphenyl	*57.4*			*15.0-120*		*12/14/2018 01:55*	WG1209804
(S) 2,4,6-Tribromophenol	*52.0*			*10.0-127*		*12/14/2018 01:55*	WG1209804
(S) p-Terphenyl-d14	*55.8*			*10.0-120*		*12/14/2018 01:55*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	7.45		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/13/2018 23:59	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	87.4		1	12/12/2018 12:51	WG1209577

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	8520		18.2	229	20	12/15/2018 22:27	WG1207924
Fluoride	4.67		0.299	1.14	1	12/15/2018 22:11	WG1207924
Sulfate	2030		13.0	1140	20	12/15/2018 22:27	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0530	J	0.0248	0.114	1	12/14/2018 04:07	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.9*			*77.0-120*		*12/14/2018 04:07*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000458	0.00114	1	12/14/2018 06:49	WG1210179
Naphthalene	0.0116	J J3	0.00357	0.0143	1	12/14/2018 06:49	WG1210179
(S) Toluene-d8	*111*			*75.0-131*		*12/14/2018 06:49*	WG1210179
(S) Dibromofluoromethane	*89.6*			*65.0-129*		*12/14/2018 06:49*	WG1210179
(S) a,a,a-Trifluorotoluene	*106*			*80.0-120*		*12/14/2018 06:49*	WG1210179
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/14/2018 06:49*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.44	J	1.84	4.58	1	12/13/2018 01:34	WG1209819
C28-C40 Oil Range	15.3		0.313	4.58	1	12/13/2018 01:34	WG1209819
(S) o-Terphenyl	*77.4*			*18.0-148*		*12/13/2018 01:34*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0102	0.0381	1	12/14/2018 02:18	WG1209804
1-Methylnaphthalene	U		0.0126	0.0381	1	12/14/2018 02:18	WG1209804
2-Methylnaphthalene	U		0.00985	0.0381	1	12/14/2018 02:18	WG1209804
Phenol	U		0.00795	0.381	1	12/14/2018 02:18	WG1209804
(S) 2-Fluorophenol	*61.8*			*12.0-120*		*12/14/2018 02:18*	WG1209804
(S) Phenol-d5	*55.9*			*10.0-120*		*12/14/2018 02:18*	WG1209804
(S) Nitrobenzene-d5	*58.2*			*10.0-122*		*12/14/2018 02:18*	WG1209804
(S) 2-Fluorobiphenyl	*57.3*			*15.0-120*		*12/14/2018 02:18*	WG1209804
(S) 2,4,6-Tribromophenol	*54.6*			*10.0-127*		*12/14/2018 02:18*	WG1209804
(S) p-Terphenyl-d14	*56.7*			*10.0-120*		*12/14/2018 02:18*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	7.41		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:01	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.2		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1270		4.41	55.5	5	12/15/2018 23:00	WG1207924
Fluoride	6.41		0.289	1.11	1	12/15/2018 22:44	WG1207924
Sulfate	395		0.632	55.5	1	12/15/2018 22:44	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0570	J	0.0241	0.111	1	12/14/2018 04:28	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*94.8*			*77.0-120*		*12/14/2018 04:28*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000444	0.00111	1	12/14/2018 07:09	WG1210179
Naphthalene	0.00705	J J3	0.00346	0.0139	1	12/14/2018 07:09	WG1210179
(S) Toluene-d8	*112*			*75.0-131*		*12/14/2018 07:09*	WG1210179
(S) Dibromofluoromethane	*91.0*			*65.0-129*		*12/14/2018 07:09*	WG1210179
(S) a,a,a-Trifluorotoluene	*113*			*80.0-120*		*12/14/2018 07:09*	WG1210179
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 07:09*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.15	J	1.79	4.44	1	12/13/2018 01:47	WG1209819
C28-C40 Oil Range	13.6		0.304	4.44	1	12/13/2018 01:47	WG1209819
(S) o-Terphenyl	*81.4*			*18.0-148*		*12/13/2018 01:47*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00986	0.0369	1	12/14/2018 03:27	WG1209804
1-Methylnaphthalene	U		0.0122	0.0369	1	12/14/2018 03:27	WG1209804
2-Methylnaphthalene	U		0.00955	0.0369	1	12/14/2018 03:27	WG1209804
Phenol	U		0.00771	0.369	1	12/14/2018 03:27	WG1209804
(S) 2-Fluorophenol	*58.5*			*12.0-120*		*12/14/2018 03:27*	WG1209804
(S) Phenol-d5	*52.2*			*10.0-120*		*12/14/2018 03:27*	WG1209804
(S) Nitrobenzene-d5	*53.1*			*10.0-122*		*12/14/2018 03:27*	WG1209804
(S) 2-Fluorobiphenyl	*51.5*			*15.0-120*		*12/14/2018 03:27*	WG1209804
(S) 2,4,6-Tribromophenol	*49.1*			*10.0-127*		*12/14/2018 03:27*	WG1209804
(S) p-Terphenyl-d14	*48.5*			*10.0-120*		*12/14/2018 03:27*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	7.74		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:10	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.2		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	373		0.934	11.7	1	12/15/2018 23:16	WG1207924
Fluoride	8.17		0.307	1.17	1	12/15/2018 23:16	WG1207924
Sulfate	512		0.669	58.7	1	12/15/2018 23:16	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0549	J	0.0255	0.117	1	12/14/2018 04:50	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*92.9*			*77.0-120*		*12/14/2018 04:50*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000474	0.00119	1.01	12/14/2018 07:30	WG1210179
Naphthalene	0.00969	J J3	0.00370	0.0148	1.01	12/14/2018 07:30	WG1210179
(S) Toluene-d8	*110*			*75.0-131*		*12/14/2018 07:30*	WG1210179
(S) Dibromofluoromethane	*93.6*			*65.0-129*		*12/14/2018 07:30*	WG1210179
(S) a,a,a-Trifluorotoluene	*108*			*80.0-120*		*12/14/2018 07:30*	WG1210179
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 07:30*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	2.28	J	1.89	4.70	1	12/13/2018 02:01	WG1209819
C28-C40 Oil Range	9.30		0.322	4.70	1	12/13/2018 02:01	WG1209819
(S) o-Terphenyl	*46.2*			*18.0-148*		*12/13/2018 02:01*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0104	0.0391	1	12/14/2018 02:41	WG1209804
1-Methylnaphthalene	U		0.0129	0.0391	1	12/14/2018 02:41	WG1209804
2-Methylnaphthalene	U		0.0101	0.0391	1	12/14/2018 02:41	WG1209804
Phenol	U		0.00816	0.391	1	12/14/2018 02:41	WG1209804
(S) 2-Fluorophenol	*62.5*			*12.0-120*		*12/14/2018 02:41*	WG1209804
(S) Phenol-d5	*56.6*			*10.0-120*		*12/14/2018 02:41*	WG1209804
(S) Nitrobenzene-d5	*59.5*			*10.0-122*		*12/14/2018 02:41*	WG1209804
(S) 2-Fluorobiphenyl	*59.8*			*15.0-120*		*12/14/2018 02:41*	WG1209804
(S) 2,4,6-Tribromophenol	*53.9*			*10.0-127*		*12/14/2018 02:41*	WG1209804
(S) p-Terphenyl-d14	*58.0*			*10.0-120*		*12/14/2018 02:41*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	7.89		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:12	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.3		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1950		4.67	58.6	5	12/15/2018 23:49	WG1207924
Fluoride	7.88		0.306	1.17	1	12/15/2018 23:33	WG1207924
Sulfate	793		0.668	58.6	1	12/15/2018 23:33	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0899	J	0.0254	0.117	1	12/14/2018 05:11	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*92.2*			*77.0-120*		*12/14/2018 05:11*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000469	0.00117	1	12/14/2018 07:50	WG1210179
Naphthalene	0.0124	J J3	0.00366	0.0147	1	12/14/2018 07:50	WG1210179
(S) Toluene-d8	*115*			*75.0-131*		*12/14/2018 07:50*	WG1210179
(S) Dibromofluoromethane	*93.3*			*65.0-129*		*12/14/2018 07:50*	WG1210179
(S) a,a,a-Trifluorotoluene	*112*			*80.0-120*		*12/14/2018 07:50*	WG1210179
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/14/2018 07:50*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.02	J	1.89	4.69	1	12/13/2018 02:14	WG1209819
C28-C40 Oil Range	16.3		0.321	4.69	1	12/13/2018 02:14	WG1209819
(S) o-Terphenyl	*54.8*			*18.0-148*		*12/13/2018 02:14*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0104	0.0390	1	12/14/2018 03:04	WG1209804
1-Methylnaphthalene	U		0.0129	0.0390	1	12/14/2018 03:04	WG1209804
2-Methylnaphthalene	U		0.0101	0.0390	1	12/14/2018 03:04	WG1209804
Phenol	U		0.00815	0.390	1	12/14/2018 03:04	WG1209804
(S) 2-Fluorophenol	*59.4*			*12.0-120*		*12/14/2018 03:04*	WG1209804
(S) Phenol-d5	*54.1*			*10.0-120*		*12/14/2018 03:04*	WG1209804
(S) Nitrobenzene-d5	*57.3*			*10.0-122*		*12/14/2018 03:04*	WG1209804
(S) 2-Fluorobiphenyl	*57.0*			*15.0-120*		*12/14/2018 03:04*	WG1209804
(S) 2,4,6-Tribromophenol	*53.2*			*10.0-127*		*12/14/2018 03:04*	WG1209804
(S) p-Terphenyl-d14	*53.6*			*10.0-120*		*12/14/2018 03:04*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	8.04		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:15	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.2		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	505		0.882	11.1	1	12/16/2018 00:06	WG1207924
Fluoride	4.63		0.289	1.11	1	12/16/2018 00:06	WG1207924
Sulfate	577		0.632	55.4	1	12/16/2018 00:06	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0678	J	0.0241	0.111	1	12/14/2018 05:32	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*106*			*77.0-120*		*12/14/2018 05:32*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000461	0.00115	1.04	12/14/2018 08:10	WG1210179
Naphthalene	0.00704	J J3	0.00359	0.0144	1.04	12/14/2018 08:10	WG1210179
(S) Toluene-d8	*114*			*75.0-131*		*12/14/2018 08:10*	WG1210179
(S) Dibromofluoromethane	*89.1*			*65.0-129*		*12/14/2018 08:10*	WG1210179
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 08:10*	WG1210179
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/14/2018 08:10*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	6.43		1.79	4.44	1	12/13/2018 02:28	WG1209819
C28-C40 Oil Range	28.3		0.304	4.44	1	12/13/2018 02:28	WG1209819
(S) o-Terphenyl	*73.9*			*18.0-148*		*12/13/2018 02:28*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00986	0.0369	1	12/14/2018 03:50	WG1209804
1-Methylnaphthalene	U		0.0122	0.0369	1	12/14/2018 03:50	WG1209804
2-Methylnaphthalene	U		0.00955	0.0369	1	12/14/2018 03:50	WG1209804
Phenol	U		0.00771	0.369	1	12/14/2018 03:50	WG1209804
(S) 2-Fluorophenol	*61.2*			*12.0-120*		*12/14/2018 03:50*	WG1209804
(S) Phenol-d5	*54.2*			*10.0-120*		*12/14/2018 03:50*	WG1209804
(S) Nitrobenzene-d5	*57.1*			*10.0-122*		*12/14/2018 03:50*	WG1209804
(S) 2-Fluorobiphenyl	*57.1*			*15.0-120*		*12/14/2018 03:50*	WG1209804
(S) 2,4,6-Tribromophenol	*51.9*			*10.0-127*		*12/14/2018 03:50*	WG1209804
(S) p-Terphenyl-d14	*53.4*			*10.0-120*		*12/14/2018 03:50*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	8.30		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:18	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.9		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	4430		9.25	116	10	12/16/2018 01:12	WG1207924
Fluoride	5.47		0.304	1.16	1	12/16/2018 00:22	WG1207924
Sulfate	1020		0.663	58.2	1	12/16/2018 00:22	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0622	J	0.0253	0.116	1	12/14/2018 05:53	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.7*			*77.0-120*		*12/14/2018 05:53*	WG1210700

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000466	0.00116	1	12/14/2018 08:30	WG1210179
Naphthalene	0.00724	J J3	0.00363	0.0145	1	12/14/2018 08:30	WG1210179
(S) Toluene-d8	*114*			*75.0-131*		*12/14/2018 08:30*	WG1210179
(S) Dibromofluoromethane	*90.2*			*65.0-129*		*12/14/2018 08:30*	WG1210179
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/14/2018 08:30*	WG1210179
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/14/2018 08:30*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	7.04		1.87	4.66	1	12/13/2018 02:42	WG1209819
C28-C40 Oil Range	24.4		0.319	4.66	1	12/13/2018 02:42	WG1209819
(S) o-Terphenyl	*75.0*			*18.0-148*		*12/13/2018 02:42*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0103	0.0388	1	12/14/2018 04:13	WG1209804
1-Methylnaphthalene	U		0.0128	0.0388	1	12/14/2018 04:13	WG1209804
2-Methylnaphthalene	U		0.0100	0.0388	1	12/14/2018 04:13	WG1209804
Phenol	U		0.00809	0.388	1	12/14/2018 04:13	WG1209804
(S) 2-Fluorophenol	*65.1*			*12.0-120*		*12/14/2018 04:13*	WG1209804
(S) Phenol-d5	*58.4*			*10.0-120*		*12/14/2018 04:13*	WG1209804
(S) Nitrobenzene-d5	*62.3*			*10.0-122*		*12/14/2018 04:13*	WG1209804
(S) 2-Fluorobiphenyl	*62.3*			*15.0-120*		*12/14/2018 04:13*	WG1209804
(S) 2,4,6-Tribromophenol	*56.9*			*10.0-127*		*12/14/2018 04:13*	WG1209804
(S) p-Terphenyl-d14	*58.4*			*10.0-120*		*12/14/2018 04:13*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	8.03		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:21	WG1210240

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.5		1	12/13/2018 09:52	WG1209579

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	136		0.888	11.2	1	12/16/2018 01:28	WG1207924
Fluoride	6.28	J6	0.292	1.12	1	12/16/2018 01:28	WG1207924
Sulfate	151		0.637	55.9	1	12/16/2018 01:28	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.731	J	0.605	2.79	25	12/17/2018 00:24	WG1211786
(S) a,a,a-Trifluorotoluene(FID)	*94.5*			*77.0-120*		*12/17/2018 00:24*	WG1211786

Sample Narrative:

L1051220-19 WG1211786: Lowest possible dilution. Stir bar prep received with no solvent.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000447	0.00112	1	12/14/2018 08:51	WG1210179
Naphthalene	0.00550	J J3	0.00349	0.0140	1	12/14/2018 08:51	WG1210179
(S) Toluene-d8	*112*			*75.0-131*		*12/14/2018 08:51*	WG1210179
(S) Dibromofluoromethane	*93.1*			*65.0-129*		*12/14/2018 08:51*	WG1210179
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/14/2018 08:51*	WG1210179
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/14/2018 08:51*	WG1210179

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.81		1.80	4.47	1	12/13/2018 00:39	WG1209819
C28-C40 Oil Range	16.3		0.306	4.47	1	12/13/2018 00:39	WG1209819
(S) o-Terphenyl	*70.4*			*18.0-148*		*12/13/2018 00:39*	WG1209819

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00993	0.0372	1	12/14/2018 04:36	WG1209804
1-Methylnaphthalene	U		0.0123	0.0372	1	12/14/2018 04:36	WG1209804
2-Methylnaphthalene	U		0.00962	0.0372	1	12/14/2018 04:36	WG1209804
Phenol	U		0.00776	0.372	1	12/14/2018 04:36	WG1209804
(S) 2-Fluorophenol	*63.0*			*12.0-120*		*12/14/2018 04:36*	WG1209804
(S) Phenol-d5	*57.2*			*10.0-120*		*12/14/2018 04:36*	WG1209804
(S) Nitrobenzene-d5	*59.3*			*10.0-122*		*12/14/2018 04:36*	WG1209804
(S) 2-Fluorobiphenyl	*60.2*			*15.0-120*		*12/14/2018 04:36*	WG1209804
(S) 2,4,6-Tribromophenol	*54.9*			*10.0-127*		*12/14/2018 04:36*	WG1209804
(S) p-Terphenyl-d14	*57.8*			*10.0-120*		*12/14/2018 04:36*	WG1209804

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:22:41 AM	WG1209400
Fluid	2		12/12/2018 8:22:41 AM	WG1209400
Final pH	8.29		12/12/2018 8:22:41 AM	WG1209400

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 00:24	WG1210240

Method Blank (MB)

(MB) R3367772-1 12/12/18 14:52

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

L1051220-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051220-01 12/12/18 14:52 • (DUP) R3367772-3 12/12/18 14:52

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	91.1	90.9	1	0.156		10

Laboratory Control Sample (LCS)

(LCS) R3367772-2 12/12/18 14:52

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

Method Blank (MB)

(MB) R3367822-1 12/12/18 12:51

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1050973-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050973-01 12/12/18 12:51 • (DUP) R3367822-3 12/12/18 12:51

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	13.9	14.3	1	2.77		10

Laboratory Control Sample (LCS)

(LCS) R3367822-2 12/12/18 12:51

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	49.9	99.9	85.0-115	

Method Blank (MB)

(MB) R3368186-1 12/13/18 09:52

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00300			

L1051254-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1051254-03 12/13/18 09:52 • (DUP) R3368186-3 12/13/18 09:52

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	85.0	79.8	1	6.36		10

Laboratory Control Sample (LCS)

(LCS) R3368186-2 12/13/18 09:52

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

Method Blank (MB)

(MB) R3368952-1 12/15/18 17:22

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	1.17	J	0.795	10.0
Fluoride	U		0.261	1.00
Sulfate	1.93	J	0.570	50.0

L1051220-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051220-01 12/15/18 19:27 • (DUP) R3368952-3 12/15/18 19:43

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	3.50	3.22	1	8.34		20
Sulfate	621	444	1	33.3	J3	20

L1051220-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051220-01 12/15/18 19:59 • (DUP) R3368952-4 12/15/18 20:16

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	8210	7540	20	8.38		20

L1051257-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-09 12/16/18 05:02 • (DUP) R3368952-7 12/16/18 05:35

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	16.4	16.4	1	0.297		20

L1051257-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-09 12/16/18 05:18 • (DUP) R3368952-8 12/16/18 05:51

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	4300	3820	50	11.9		20
Sulfate	21400	20800	50	2.92		20

Laboratory Control Sample (LCS)

(LCS) R3368952-2 12/15/18 17:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	185	92.3	90.0-110	
Fluoride	20.0	18.0	90.0	90.0-110	
Sulfate	200	182	91.0	90.0-110	

L1051220-19 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051220-19 12/16/18 01:28 • (MS) R3368952-5 12/16/18 01:44 • (MSD) R3368952-6 12/16/18 02:01

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 %
Chloride	559	136	627	669	87.8	95.4	1	80.0-120			6.58	20
Fluoride	55.9	6.28	32.5	30.1	46.9	42.7	1	80.0-120	J6	J6	7.61	20
Sulfate	559	151	619	669	83.8	92.7	1	80.0-120			7.72	20

Method Blank (MB)

(MB) R3368146-1 12/13/18 23:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Selenium	U		0.00740	0.0100

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

(LCS) R3368146-2 12/13/18 23:40 • (LCSD) R3368146-3 12/13/18 23:43

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	0.987	0.985	98.7	98.5	80.0-120			0.218	20

L1051220-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051220-02 12/13/18 23:45 • (MS) R3368146-5 12/13/18 23:51 • (MSD) R3368146-6 12/13/18 23:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	U	1.00	1.01	100	101	1	75.0-125			0.861	20

Method Blank (MB)

(MB) R3368630-3 12/14/18 01:39

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)	*88.2*			*77.0-120*

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

(LCS) R3368630-1 12/14/18 00:38 • (LCSD) R3368630-2 12/14/18 01:00

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 %
TPH (GC/FID) Low Fraction	5.50	5.87	5.22	107	94.9	72.0-127			11.7	20
(S) a,a,a-Trifluorotoluene(FID)				*108*	*107*	*77.0-120*				

Method Blank (MB)

(MB) R3368807-5 12/16/18 22:08

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)	*91.4*			*77.0-120*

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

(LCS) R3368807-3 12/16/18 21:05 • (LCSD) R3368807-4 12/16/18 21:26

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	5.04	5.57	91.7	101	72.0-127			9.86	20
(S) a,a,a-Trifluorotoluene(FID)				*104*	*105*	*77.0-120*				

Method Blank (MB)

(MB) R3368625-2 12/14/18 04:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Naphthalene	U		0.00312	0.0125
(S) Toluene-d8	*114*			*75.0-131*
(S) Dibromofluoromethane	*85.8*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*114*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*

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

(LCS) R3368625-1 12/14/18 03:07 • (LCSD) R3368625-3 12/14/18 12:13

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	0.125	0.0900	0.0987	72.0	79.0	70.0-123			9.19	20
Naphthalene	0.125	0.0931	0.117	74.5	93.6	59.0-130		J3	22.7	20
(S) Toluene-d8				*106*	*106*	*75.0-131*				
(S) Dibromofluoromethane				*106*	*101*	*65.0-129*				
(S) a,a,a-Trifluorotoluene				*105*	*103*	*80.0-120*				
(S) 4-Bromofluorobenzene				*105*	*106*	*67.0-138*				

Method Blank (MB)

(MB) R3367728-1 12/12/18 23:59

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	*91.0*			*18.0-148*

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

(LCS) R3367728-2 12/13/18 00:12 • (LCSD) R3367728-3 12/13/18 00:26

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	25.6	25.9	51.2	51.8	50.0-150			1.17	20
(S) o-Terphenyl				*60.8*	*61.6*	*18.0-148*				

Method Blank (MB)

(MB) R3368252-3 12/14/18 00:46

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
1-Methylnaphthalene	U		0.0110	0.0333
2-Methylnaphthalene	U		0.00861	0.0333
Naphthalene	U		0.00889	0.0333
Phenol	U		0.00695	0.333
(S) Nitrobenzene-d5	*59.2*			*10.0-122*
(S) 2-Fluorobiphenyl	*59.8*			*15.0-120*
(S) p-Terphenyl-d14	*59.8*			*10.0-120*
(S) Phenol-d5	*57.1*			*10.0-120*
(S) 2-Fluorophenol	*64.6*			*12.0-120*
(S) 2,4,6-Tribromophenol	*51.4*			*10.0-127*

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

(LCS) R3368252-1 12/14/18 00:00 • (LCSD) R3368252-2 12/14/18 00:23

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 %
1-Methylnaphthalene	0.666	0.347	0.353	52.1	53.0	34.0-120			1.71	23
2-Methylnaphthalene	0.666	0.340	0.348	51.1	52.3	34.0-120			2.33	22
Naphthalene	0.666	0.342	0.346	51.4	52.0	18.0-120			1.16	24
Phenol	0.666	0.390	0.395	58.6	59.3	28.0-120			1.27	27
(S) Nitrobenzene-d5				*54.4*	*54.4*	*10.0-122*				
(S) 2-Fluorobiphenyl				*64.3*	*63.7*	*15.0-120*				
(S) p-Terphenyl-d14				*64.3*	*65.2*	*10.0-120*				
(S) Phenol-d5				*60.2*	*60.4*	*10.0-120*				
(S) 2-Fluorophenol				*69.7*	*69.7*	*12.0-120*				
(S) 2,4,6-Tribromophenol				*59.8*	*63.5*	*10.0-127*				

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.
MDL (dry)	Method Detection Limit.
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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
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.
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.

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	LAO00356
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

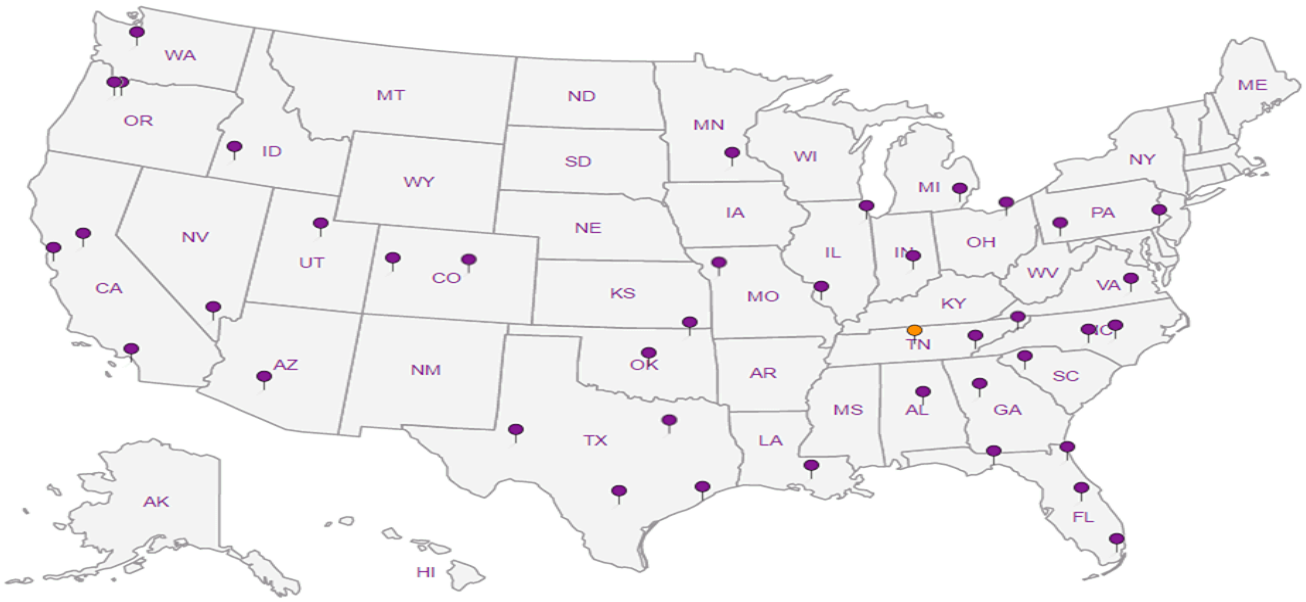
Third Party Federal Accreditations

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.



TRC Solutions - Austin, TX

505 E. Huntland Dr, Ste 250
Austin, TX 78752

Billing Information:
Accounts Payable
21 Griffin Road North
Windsor, CT 06095

Pres Chk

Report to: Julie Speer

Email To: jspeer@trcsolutions.com

Project Description: Navajo WW Effluent Pipeline Release

City/State Collected:

Phone: 512-684-3170
Fax:

Client Project #

Lab Project # TRCATX-WWEFF

Collected by (print): Fernando C. Aguirre

Site/Facility ID # NAVASO REFINERY

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L105120
A198

Acctnum: TRCATX
Template: T143547
Prelogin: P683128
TSR: 526 - Chris McCord
PB:

Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl,F,SO4 - 300 4ozClr-NoPres	GRO,V8260BTEXN 40ml/NaHSO4/Syr/MeOH	SPLP Se 4ozClr-NoPres	SV8270, DRO/MRO 4ozClr-NoPres	Remarks	Sample # (lab only)
WWPL-01	GRAB	SS	SURFACE	12.06.18	1040	6	X	X	X	X		-01/-02
WWPL-02		SS		12.06.18	1048	6	X	X	X	X		-03/-04
WWPL-03		SS		12.06.18	1057	6	X	X	X	X		-05/-06
WWPL-04		SS		12.06.18	1107	6	X	X	X	X		-07/-08
WWPL-05		SS		12.06.18	1114	6	X	X	X	X		-09/-10
WWPL-06		SS		12.06.18	1121	6	X	X	X	X		-11/-12
WWPL-07		SS		12.06.18	1130	6	X	X	X	X		-13/-14
WWPL-08		SS		12.06.18	1138	6	X	X	X	X		-15/-16
WWPL-09		SS		12.06.18	1147	6	X	X	X	X		-17/-18
WWPL-10	↓	SS	↓	12.06.18	1158	6	X	X	X	X		-19/-20

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__UPS (FedEx) __Courier _____

Tracking # 4430 3429 3299

Sample Receipt Checklist
COC Seal Present/Intact: __NP ✓Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
	12.07.18	1200			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.1-1.0 °C	Bottles Received: 60
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Carol Kemp	Date: 12/8/18	Time: 8:45

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 21, 2018

TRC Solutions - Austin, TX

Sample Delivery Group:	L1051263
Samples Received:	12/08/2018
Project Number:	
Description:	Navajo WW Effluent Pipeline Release
Site:	NAVAJO REFINERY
Report To:	Julie Speer 505 E. Huntland Dr, Ste 250 Austin, TX 78752

Entire Report Reviewed By:

Chris McCord
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.

WWPL-21 L1051263-01 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:25 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209588	1	12/12/18 15:06	12/12/18 15:18	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 02:00	ELN
Wet Chemistry by Method 300.0	WG1207925	5	12/10/18 15:04	12/15/18 14:15	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211769	1	12/17/18 14:15	12/17/18 16:12	JHH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:25	12/14/18 06:31	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/13/18 23:37	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209805	1	12/13/18 18:22	12/14/18 09:44	JNJ

WWPL-21 L1051263-02 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:25 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:16	TRB

WWPL-22 L1051263-03 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:31 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209588	1	12/12/18 15:06	12/12/18 15:18	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 02:49	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 13:31	12/14/18 06:35	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:31	12/14/18 06:49	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/13/18 23:21	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209805	1	12/13/18 18:22	12/14/18 10:30	JNJ

WWPL-22 L1051263-04 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:31 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:18	TRB

WWPL-23 L1051263-05 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:37 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209588	1	12/12/18 15:06	12/12/18 15:18	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 03:05	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 13:37	12/14/18 06:56	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:37	12/14/18 07:08	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/13/18 22:35	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209805	1	12/13/18 18:22	12/14/18 09:21	JNJ

WWPL-23 L1051263-06 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:37 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:21	TRB

WWPL-24 L1051263-07 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:44 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209588	1	12/12/18 15:06	12/12/18 15:18	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 03:22	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 13:44	12/14/18 07:17	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:44	12/14/18 07:26	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/14/18 00:09	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1209805	1	12/13/18 18:22	12/14/18 10:07	JNJ

WWLP-24 L1051263-08 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:44 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:24	TRB

WWPL-25 L1051263-09 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:51 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209588	1	12/12/18 15:06	12/12/18 15:18	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 03:38	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 13:51	12/14/18 07:39	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:51	12/14/18 07:45	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/14/18 00:25	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 19:10	MEC

WWPL-25 L1051263-10 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:51 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:27	TRB

WWPL-26 L1051263-11 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:59 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207925	1	12/10/18 15:04	12/15/18 03:55	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 13:59	12/14/18 08:00	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 13:59	12/14/18 08:04	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/14/18 00:41	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 19:33	MEC

WWPL-26 L1051263-12 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:59 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209409	1	12/12/18 08:51	12/12/18 08:51	TM
Metals (ICP) by Method 6010B	WG1210242	1	12/13/18 11:51	12/14/18 15:29	TRB

WWPL-27 L1051263-13 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 14:06 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 06:08	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 14:06	12/14/18 08:21	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 14:06	12/14/18 08:22	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/13/18 23:53	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 20:42	MEC

WWPL-27 L1051263-14 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 14:06 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:28	TRB

WWPL-28 L1051263-15 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 14:15 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 06:24	MAJ
Wet Chemistry by Method 300.0	WG1207924	10	12/10/18 16:00	12/16/18 06:40	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 14:15	12/14/18 08:42	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 14:15	12/14/18 08:41	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/14/18 00:56	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 21:05	MEC

WWPL-28 L1051263-16 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 14:15 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:30	TRB

DUP-WWPL-01 L1051263-17 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 06:57	MAJ
Wet Chemistry by Method 300.0	WG1207924	20	12/10/18 16:00	12/16/18 07:46	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 00:00	12/14/18 09:03	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 00:00	12/14/18 09:00	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210686	1	12/13/18 08:26	12/13/18 22:18	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 21:28	MEC

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

DUP-WWPL-01 L1051263-18 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:33	TRB

DUP-WWPL-02 L1051263-19 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 08:03	MAJ
Wet Chemistry by Method 300.0	WG1207924	10	12/10/18 16:00	12/16/18 08:19	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 00:00	12/14/18 09:24	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210018	1	12/06/18 00:00	12/14/18 09:18	CAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209822	1	12/13/18 06:25	12/13/18 18:57	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 21:51	MEC

DUP-WWPL-02 L1051263-20 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:41	TRB

DUP-WWPL-03 L1051263-21 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209593	1	12/12/18 14:22	12/12/18 14:39	KBC
Wet Chemistry by Method 300.0	WG1207924	1	12/10/18 16:00	12/16/18 08:35	MAJ
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1210700	25	12/06/18 00:00	12/14/18 09:45	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 00:00	12/14/18 09:31	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211776	1	12/06/18 00:00	12/16/18 17:53	JAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1209822	1	12/13/18 06:25	12/13/18 19:11	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210567	10	12/16/18 08:10	12/16/18 22:14	MEC

DUP-WWPL-03 L1051263-22 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 00:00 | Received date/time: 12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:44	TRB

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.

Chris McCord
Project Manager

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.3		1	12/12/2018 15:18	WG1209588

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	520		0.891	11.2	1	12/15/2018 02:00	WG1207925
Fluoride	13.1		0.292	1.12	1	12/15/2018 02:00	WG1207925
Sulfate	1910		3.19	280	5	12/15/2018 14:15	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.0922	J	0.0243	0.112	1	12/17/2018 16:12	WG1211769
(S) a,a,a-Trifluorotoluene(FID)	*92.7*			*77.0-120*		*12/17/2018 16:12*	WG1211769

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000448	0.00112	1	12/14/2018 06:31	WG1210018
Naphthalene	U		0.00350	0.0140	1	12/14/2018 06:31	WG1210018
(S) Toluene-d8	*123*			*75.0-131*		*12/14/2018 06:31*	WG1210018
(S) Dibromofluoromethane	*96.6*			*65.0-129*		*12/14/2018 06:31*	WG1210018
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/14/2018 06:31*	WG1210018
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/14/2018 06:31*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.53		1.80	4.48	1	12/13/2018 23:37	WG1210686
C28-C40 Oil Range	25.2		0.307	4.48	1	12/13/2018 23:37	WG1210686
(S) o-Terphenyl	*64.7*			*18.0-148*		*12/13/2018 23:37*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00996	0.0373	1	12/14/2018 09:44	WG1209805
1-Methylnaphthalene	U		0.0123	0.0373	1	12/14/2018 09:44	WG1209805
2-Methylnaphthalene	U		0.00965	0.0373	1	12/14/2018 09:44	WG1209805
Phenol	U		0.00779	0.373	1	12/14/2018 09:44	WG1209805
(S) 2-Fluorophenol	*81.6*			*12.0-120*		*12/14/2018 09:44*	WG1209805
(S) Phenol-d5	*73.1*			*10.0-120*		*12/14/2018 09:44*	WG1209805
(S) Nitrobenzene-d5	*74.8*			*10.0-122*		*12/14/2018 09:44*	WG1209805
(S) 2-Fluorobiphenyl	*78.6*			*15.0-120*		*12/14/2018 09:44*	WG1209805
(S) 2,4,6-Tribromophenol	*74.5*			*10.0-127*		*12/14/2018 09:44*	WG1209805
(S) p-Terphenyl-d14	*76.1*			*10.0-120*		*12/14/2018 09:44*	WG1209805

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.25		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:16	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.5		1	12/12/2018 15:18	WG1209588

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	228		0.888	11.2	1	12/15/2018 02:49	WG1207925
Fluoride	5.43		0.292	1.12	1	12/15/2018 02:49	WG1207925
Sulfate	111		0.637	55.9	1	12/15/2018 02:49	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.606	2.79	25	12/14/2018 06:35	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.1*			*77.0-120*		*12/14/2018 06:35*	WG1210700

Sample Narrative:

L1051263-03 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000447	0.00112	1	12/14/2018 06:49	WG1210018
Naphthalene	U		0.00349	0.0140	1	12/14/2018 06:49	WG1210018
(S) Toluene-d8	*123*			*75.0-131*		*12/14/2018 06:49*	WG1210018
(S) Dibromofluoromethane	*97.4*			*65.0-129*		*12/14/2018 06:49*	WG1210018
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/14/2018 06:49*	WG1210018
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/14/2018 06:49*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.80	4.47	1	12/13/2018 23:21	WG1210686
C28-C40 Oil Range	15.1		0.306	4.47	1	12/13/2018 23:21	WG1210686
(S) o-Terphenyl	*62.8*			*18.0-148*		*12/13/2018 23:21*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00993	0.0372	1	12/14/2018 10:30	WG1209805
1-Methylnaphthalene	U		0.0123	0.0372	1	12/14/2018 10:30	WG1209805
2-Methylnaphthalene	U		0.00962	0.0372	1	12/14/2018 10:30	WG1209805
Phenol	U		0.00777	0.372	1	12/14/2018 10:30	WG1209805
(S) 2-Fluorophenol	*86.1*			*12.0-120*		*12/14/2018 10:30*	WG1209805
(S) Phenol-d5	*76.8*			*10.0-120*		*12/14/2018 10:30*	WG1209805
(S) Nitrobenzene-d5	*80.4*			*10.0-122*		*12/14/2018 10:30*	WG1209805
(S) 2-Fluorobiphenyl	*81.9*			*15.0-120*		*12/14/2018 10:30*	WG1209805
(S) 2,4,6-Tribromophenol	*78.6*			*10.0-127*		*12/14/2018 10:30*	WG1209805
(S) p-Terphenyl-d14	*83.7*			*10.0-120*		*12/14/2018 10:30*	WG1209805

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.47		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:18	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	92.7		1	12/12/2018 15:18	WG1209588

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	369		0.858	10.8	1	12/15/2018 03:05	WG1207925
Fluoride	6.85		0.282	1.08	1	12/15/2018 03:05	WG1207925
Sulfate	624		0.615	53.9	1	12/15/2018 03:05	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.585	2.70	25	12/14/2018 06:56	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*96.8*			*77.0-120*		*12/14/2018 06:56*	WG1210700

Sample Narrative:

L1051263-05 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000432	0.00108	1	12/14/2018 07:08	WG1210018
Naphthalene	U		0.00337	0.0135	1	12/14/2018 07:08	WG1210018
(S) Toluene-d8	*120*			*75.0-131*		*12/14/2018 07:08*	WG1210018
(S) Dibromofluoromethane	*97.9*			*65.0-129*		*12/14/2018 07:08*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 07:08*	WG1210018
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/14/2018 07:08*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	2.07	J	1.74	4.32	1	12/13/2018 22:35	WG1210686
C28-C40 Oil Range	19.6		0.296	4.32	1	12/13/2018 22:35	WG1210686
(S) o-Terphenyl	*54.6*			*18.0-148*		*12/13/2018 22:35*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00959	0.0359	1	12/14/2018 09:21	WG1209805
1-Methylnaphthalene	U		0.0119	0.0359	1	12/14/2018 09:21	WG1209805
2-Methylnaphthalene	U		0.00929	0.0359	1	12/14/2018 09:21	WG1209805
Phenol	U		0.00750	0.359	1	12/14/2018 09:21	WG1209805
(S) 2-Fluorophenol	*90.6*			*12.0-120*		*12/14/2018 09:21*	WG1209805
(S) Phenol-d5	*80.5*			*10.0-120*		*12/14/2018 09:21*	WG1209805
(S) Nitrobenzene-d5	*81.5*			*10.0-122*		*12/14/2018 09:21*	WG1209805
(S) 2-Fluorobiphenyl	*86.7*			*15.0-120*		*12/14/2018 09:21*	WG1209805
(S) 2,4,6-Tribromophenol	*74.8*			*10.0-127*		*12/14/2018 09:21*	WG1209805
(S) p-Terphenyl-d14	*85.2*			*10.0-120*		*12/14/2018 09:21*	WG1209805

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.34		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:21	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.0		1	12/12/2018 15:18	WG1209588

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	124		0.894	11.2	1	12/15/2018 03:22	WG1207925
Fluoride	7.90		0.293	1.12	1	12/15/2018 03:22	WG1207925
Sulfate	733		0.641	56.2	1	12/15/2018 03:22	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.609	2.81	25	12/14/2018 07:17	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*96.3*			*77.0-120*		*12/14/2018 07:17*	WG1210700

Sample Narrative:

L1051263-07 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000450	0.00112	1	12/14/2018 07:26	WG1210018
Naphthalene	U		0.00351	0.0141	1	12/14/2018 07:26	WG1210018
(S) Toluene-d8	*124*			*75.0-131*		*12/14/2018 07:26*	WG1210018
(S) Dibromofluoromethane	*97.8*			*65.0-129*		*12/14/2018 07:26*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 07:26*	WG1210018
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 07:26*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	2.43	J	1.81	4.50	1	12/14/2018 00:09	WG1210686
C28-C40 Oil Range	16.9		0.308	4.50	1	12/14/2018 00:09	WG1210686
(S) o-Terphenyl	*68.5*			*18.0-148*		*12/14/2018 00:09*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00999	0.0374	1	12/14/2018 10:07	WG1209805
1-Methylnaphthalene	U		0.0124	0.0374	1	12/14/2018 10:07	WG1209805
2-Methylnaphthalene	U		0.00968	0.0374	1	12/14/2018 10:07	WG1209805
Phenol	U		0.00781	0.374	1	12/14/2018 10:07	WG1209805
(S) 2-Fluorophenol	*76.2*			*12.0-120*		*12/14/2018 10:07*	WG1209805
(S) Phenol-d5	*69.2*			*10.0-120*		*12/14/2018 10:07*	WG1209805
(S) Nitrobenzene-d5	*71.2*			*10.0-122*		*12/14/2018 10:07*	WG1209805
(S) 2-Fluorobiphenyl	*72.4*			*15.0-120*		*12/14/2018 10:07*	WG1209805
(S) 2,4,6-Tribromophenol	*70.2*			*10.0-127*		*12/14/2018 10:07*	WG1209805
(S) p-Terphenyl-d14	*70.2*			*10.0-120*		*12/14/2018 10:07*	WG1209805

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.36		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:24	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.6		1	12/12/2018 15:18	WG1209588

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	133		0.877	11.0	1	12/15/2018 03:38	WG1207925
Fluoride	4.16		0.288	1.10	1	12/15/2018 03:38	WG1207925
Sulfate	41.4	J	0.629	55.2	1	12/15/2018 03:38	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.598	2.76	25	12/14/2018 07:39	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.4*			*77.0-120*		*12/14/2018 07:39*	WG1210700

Sample Narrative:

L1051263-09 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000441	0.00110	1	12/14/2018 07:45	WG1210018
Naphthalene	U		0.00344	0.0138	1	12/14/2018 07:45	WG1210018
(S) Toluene-d8	*125*			*75.0-131*		*12/14/2018 07:45*	WG1210018
(S) Dibromofluoromethane	*95.8*			*65.0-129*		*12/14/2018 07:45*	WG1210018
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/14/2018 07:45*	WG1210018
(S) 4-Bromofluorobenzene	*110*			*67.0-138*		*12/14/2018 07:45*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.92		1.78	4.41	1	12/14/2018 00:25	WG1210686
C28-C40 Oil Range	35.9		0.302	4.41	1	12/14/2018 00:25	WG1210686
(S) o-Terphenyl	*65.7*			*18.0-148*		*12/14/2018 00:25*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0981	0.367	10	12/16/2018 19:10	WG1210567
1-Methylnaphthalene	U		0.121	0.367	10	12/16/2018 19:10	WG1210567
2-Methylnaphthalene	U		0.0950	0.367	10	12/16/2018 19:10	WG1210567
Phenol	U		0.0767	3.67	10	12/16/2018 19:10	WG1210567
(S) 2-Fluorophenol	*83.2*			*12.0-120*		*12/16/2018 19:10*	WG1210567
(S) Phenol-d5	*73.7*			*10.0-120*		*12/16/2018 19:10*	WG1210567
(S) Nitrobenzene-d5	*73.4*			*10.0-122*		*12/16/2018 19:10*	WG1210567
(S) 2-Fluorobiphenyl	*71.2*			*15.0-120*		*12/16/2018 19:10*	WG1210567
(S) 2,4,6-Tribromophenol	*58.9*			*10.0-127*		*12/16/2018 19:10*	WG1210567
(S) p-Terphenyl-d14	*77.8*			*10.0-120*		*12/16/2018 19:10*	WG1210567

Sample Narrative:

L1051263-09 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.53		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:27	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.2		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	186		0.901	11.3	1	12/15/2018 03:55	WG1207925
Fluoride	5.35		0.296	1.13	1	12/15/2018 03:55	WG1207925
Sulfate	55.1	J P1	0.646	56.7	1	12/15/2018 03:55	WG1207925

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.614	2.83	25	12/14/2018 08:00	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.5*			*77.0-120*		*12/14/2018 08:00*	WG1210700

Sample Narrative:

L1051263-11 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000453	0.00113	1	12/14/2018 08:04	WG1210018
Naphthalene	0.00383	J	0.00354	0.0142	1	12/14/2018 08:04	WG1210018
(S) Toluene-d8	*122*			*75.0-131*		*12/14/2018 08:04*	WG1210018
(S) Dibromofluoromethane	*97.6*			*65.0-129*		*12/14/2018 08:04*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 08:04*	WG1210018
(S) 4-Bromofluorobenzene	*104*			*67.0-138*		*12/14/2018 08:04*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.53	J	1.83	4.53	1	12/14/2018 00:41	WG1210686
C28-C40 Oil Range	26.5		0.311	4.53	1	12/14/2018 00:41	WG1210686
(S) o-Terphenyl	*51.1*			*18.0-148*		*12/14/2018 00:41*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.101	0.378	10	12/16/2018 19:33	WG1210567
1-Methylnaphthalene	U		0.125	0.378	10	12/16/2018 19:33	WG1210567
2-Methylnaphthalene	U		0.0976	0.378	10	12/16/2018 19:33	WG1210567
Phenol	U		0.0788	3.78	10	12/16/2018 19:33	WG1210567
(S) 2-Fluorophenol	*74.4*			*12.0-120*		*12/16/2018 19:33*	WG1210567
(S) Phenol-d5	*67.3*			*10.0-120*		*12/16/2018 19:33*	WG1210567
(S) Nitrobenzene-d5	*65.3*			*10.0-122*		*12/16/2018 19:33*	WG1210567
(S) 2-Fluorobiphenyl	*64.7*			*15.0-120*		*12/16/2018 19:33*	WG1210567
(S) 2,4,6-Tribromophenol	*59.1*			*10.0-127*		*12/16/2018 19:33*	WG1210567
(S) p-Terphenyl-d14	*71.2*			*10.0-120*		*12/16/2018 19:33*	WG1210567

Sample Narrative:

L1051263-11 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 8:51:47 AM	WG1209409
Fluid	2		12/12/2018 8:51:47 AM	WG1209409
Final pH	8.34		12/12/2018 8:51:47 AM	WG1209409

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 15:29	WG1210242

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.7		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	58.0		0.928	11.7	1	12/16/2018 06:08	WG1207924
Fluoride	5.31		0.305	1.17	1	12/16/2018 06:08	WG1207924
Sulfate	64.1		0.665	58.3	1	12/16/2018 06:08	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.632	2.92	25	12/14/2018 08:21	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.8*			*77.0-120*		*12/14/2018 08:21*	WG1210700

Sample Narrative:

L1051263-13 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000467	0.00117	1	12/14/2018 08:22	WG1210018
Naphthalene	0.00396	J	0.00364	0.0146	1	12/14/2018 08:22	WG1210018
(S) Toluene-d8	*123*			*75.0-131*		*12/14/2018 08:22*	WG1210018
(S) Dibromofluoromethane	*100*			*65.0-129*		*12/14/2018 08:22*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 08:22*	WG1210018
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/14/2018 08:22*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.49	J	1.88	4.67	1	12/13/2018 23:53	WG1210686
C28-C40 Oil Range	22.4		0.320	4.67	1	12/13/2018 23:53	WG1210686
(S) o-Terphenyl	*68.2*			*18.0-148*		*12/13/2018 23:53*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.104	0.389	10	12/16/2018 20:42	WG1210567
1-Methylnaphthalene	U		0.128	0.389	10	12/16/2018 20:42	WG1210567
2-Methylnaphthalene	U		0.100	0.389	10	12/16/2018 20:42	WG1210567
Phenol	U		0.0811	3.89	10	12/16/2018 20:42	WG1210567
(S) 2-Fluorophenol	*79.3*			*12.0-120*		*12/16/2018 20:42*	WG1210567
(S) Phenol-d5	*69.8*			*10.0-120*		*12/16/2018 20:42*	WG1210567
(S) Nitrobenzene-d5	*67.0*			*10.0-122*		*12/16/2018 20:42*	WG1210567
(S) 2-Fluorobiphenyl	*67.9*			*15.0-120*		*12/16/2018 20:42*	WG1210567
(S) 2,4,6-Tribromophenol	*59.7*			*10.0-127*		*12/16/2018 20:42*	WG1210567
(S) p-Terphenyl-d14	*74.6*			*10.0-120*		*12/16/2018 20:42*	WG1210567

Sample Narrative:

L1051263-13 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.49		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:28	WG1210243

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.8		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	2200		8.95	113	10	12/16/2018 06:40	WG1207924
Fluoride	4.97		0.294	1.13	1	12/16/2018 06:24	WG1207924
Sulfate	5770		6.42	563	10	12/16/2018 06:40	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.610	2.81	25	12/14/2018 08:42	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.1*			*77.0-120*		*12/14/2018 08:42*	WG1210700

Sample Narrative:

L1051263-15 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000450	0.00113	1	12/14/2018 08:41	WG1210018
Naphthalene	U		0.00351	0.0141	1	12/14/2018 08:41	WG1210018
(S) Toluene-d8	*122*			*75.0-131*		*12/14/2018 08:41*	WG1210018
(S) Dibromofluoromethane	*96.7*			*65.0-129*		*12/14/2018 08:41*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 08:41*	WG1210018
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 08:41*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.22	J	1.81	4.50	1	12/14/2018 00:56	WG1210686
C28-C40 Oil Range	21.4		0.308	4.50	1	12/14/2018 00:56	WG1210686
(S) o-Terphenyl	*67.2*			*18.0-148*		*12/14/2018 00:56*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.100	0.375	10	12/16/2018 21:05	WG1210567
1-Methylnaphthalene	U		0.124	0.375	10	12/16/2018 21:05	WG1210567
2-Methylnaphthalene	U		0.0969	0.375	10	12/16/2018 21:05	WG1210567
Phenol	U		0.0782	3.75	10	12/16/2018 21:05	WG1210567
(S) 2-Fluorophenol	*78.2*			*12.0-120*		*12/16/2018 21:05*	WG1210567
(S) Phenol-d5	*70.7*			*10.0-120*		*12/16/2018 21:05*	WG1210567
(S) Nitrobenzene-d5	*69.6*			*10.0-122*		*12/16/2018 21:05*	WG1210567
(S) 2-Fluorobiphenyl	*69.6*			*15.0-120*		*12/16/2018 21:05*	WG1210567
(S) 2,4,6-Tribromophenol	*68.7*			*10.0-127*		*12/16/2018 21:05*	WG1210567
(S) p-Terphenyl-d14	*76.1*			*10.0-120*		*12/16/2018 21:05*	WG1210567

Sample Narrative:

L1051263-15 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.71		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:30	WG1210243

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.1		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	5070		18.0	227	20	12/16/2018 07:46	WG1207924
Fluoride	5.67		0.296	1.13	1	12/16/2018 06:57	WG1207924
Sulfate	1290		12.9	1130	20	12/16/2018 07:46	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.615	2.84	25	12/14/2018 09:03	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.3*			*77.0-120*		*12/14/2018 09:03*	WG1210700

Sample Narrative:

L1051263-17 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000454	0.00113	1	12/14/2018 09:00	WG1210018
Naphthalene	U		0.00354	0.0142	1	12/14/2018 09:00	WG1210018
(S) Toluene-d8	*121*			*75.0-131*		*12/14/2018 09:00*	WG1210018
(S) Dibromofluoromethane	*94.6*			*65.0-129*		*12/14/2018 09:00*	WG1210018
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/14/2018 09:00*	WG1210018
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/14/2018 09:00*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	2.10	J	1.83	4.54	1	12/13/2018 22:18	WG1210686
C28-C40 Oil Range	14.5		0.311	4.54	1	12/13/2018 22:18	WG1210686
(S) o-Terphenyl	*48.6*			*18.0-148*		*12/13/2018 22:18*	WG1210686

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.101	0.378	10	12/16/2018 21:28	WG1210567
1-Methylnaphthalene	U		0.125	0.378	10	12/16/2018 21:28	WG1210567
2-Methylnaphthalene	U		0.0977	0.378	10	12/16/2018 21:28	WG1210567
Phenol	U		0.0789	3.78	10	12/16/2018 21:28	WG1210567
(S) 2-Fluorophenol	*75.9*			*12.0-120*		*12/16/2018 21:28*	WG1210567
(S) Phenol-d5	*66.1*			*10.0-120*		*12/16/2018 21:28*	WG1210567
(S) Nitrobenzene-d5	*65.2*			*10.0-122*		*12/16/2018 21:28*	WG1210567
(S) 2-Fluorobiphenyl	*65.5*			*15.0-120*		*12/16/2018 21:28*	WG1210567
(S) 2,4,6-Tribromophenol	*58.3*			*10.0-127*		*12/16/2018 21:28*	WG1210567
(S) p-Terphenyl-d14	*67.6*			*10.0-120*		*12/16/2018 21:28*	WG1210567

Sample Narrative:

L1051263-17 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.65		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:33	WG1210243

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.8		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	4300		0.896	11.3	10	12/16/2018 08:19	WG1207924
Fluoride	3.19		0.294	1.13	1	12/16/2018 08:03	WG1207924
Sulfate	293		0.642	56.3	1	12/16/2018 08:03	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.611	2.82	25	12/14/2018 09:24	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*95.4*			*77.0-120*		*12/14/2018 09:24*	WG1210700

Sample Narrative:

L1051263-19 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000451	0.00113	1	12/14/2018 09:18	WG1210018
Naphthalene	0.00455	J	0.00352	0.0141	1	12/14/2018 09:18	WG1210018
(S) Toluene-d8	*124*			*75.0-131*		*12/14/2018 09:18*	WG1210018
(S) Dibromofluoromethane	*95.3*			*65.0-129*		*12/14/2018 09:18*	WG1210018
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/14/2018 09:18*	WG1210018
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 09:18*	WG1210018

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	4.02	J	1.81	4.51	1	12/13/2018 18:57	WG1209822
C28-C40 Oil Range	16.4		0.309	4.51	1	12/13/2018 18:57	WG1209822
(S) o-Terphenyl	*68.5*			*18.0-148*		*12/13/2018 18:57*	WG1209822

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.100	0.375	10	12/16/2018 21:51	WG1210567
1-Methylnaphthalene	U		0.124	0.375	10	12/16/2018 21:51	WG1210567
2-Methylnaphthalene	U		0.0970	0.375	10	12/16/2018 21:51	WG1210567
Phenol	U		0.0783	3.75	10	12/16/2018 21:51	WG1210567
(S) 2-Fluorophenol	*77.6*			*12.0-120*		*12/16/2018 21:51*	WG1210567
(S) Phenol-d5	*68.0*			*10.0-120*		*12/16/2018 21:51*	WG1210567
(S) Nitrobenzene-d5	*67.1*			*10.0-122*		*12/16/2018 21:51*	WG1210567
(S) 2-Fluorobiphenyl	*69.2*			*15.0-120*		*12/16/2018 21:51*	WG1210567
(S) 2,4,6-Tribromophenol	*64.2*			*10.0-127*		*12/16/2018 21:51*	WG1210567
(S) p-Terphenyl-d14	*76.2*			*10.0-120*		*12/16/2018 21:51*	WG1210567

Sample Narrative:

L1051263-19 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.69		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:41	WG1210243

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.7		1	12/12/2018 14:39	WG1209593

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	102		0.886	11.1	1	12/16/2018 08:35	WG1207924
Fluoride	7.29		0.291	1.11	1	12/16/2018 08:35	WG1207924
Sulfate	720		0.635	55.7	1	12/16/2018 08:35	WG1207924

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.604	2.79	25	12/14/2018 09:45	WG1210700
(S) a,a,a-Trifluorotoluene(FID)	*94.9*			*77.0-120*		*12/14/2018 09:45*	WG1210700

Sample Narrative:

L1051263-21 WG1210700: Lowest possible dilution. Client prepped stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000446	0.00111	1	12/14/2018 09:31	WG1210179
Naphthalene	U		0.00348	0.0139	1	12/16/2018 17:53	WG1211776
(S) Toluene-d8	*115*			*75.0-131*		*12/14/2018 09:31*	WG1210179
(S) Toluene-d8	*111*			*75.0-131*		*12/16/2018 17:53*	WG1211776
(S) Dibromofluoromethane	*89.0*			*65.0-129*		*12/14/2018 09:31*	WG1210179
(S) Dibromofluoromethane	*89.3*			*65.0-129*		*12/16/2018 17:53*	WG1211776
(S) a,a,a-Trifluorotoluene	*114*			*80.0-120*		*12/14/2018 09:31*	WG1210179
(S) a,a,a-Trifluorotoluene	*106*			*80.0-120*		*12/16/2018 17:53*	WG1211776
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/14/2018 09:31*	WG1210179
(S) 4-Bromofluorobenzene	*94.0*			*67.0-138*		*12/16/2018 17:53*	WG1211776

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	5.72		1.79	4.46	1	12/13/2018 19:11	WG1209822
C28-C40 Oil Range	20.4		0.305	4.46	1	12/13/2018 19:11	WG1209822
(S) o-Terphenyl	*71.9*			*18.0-148*		*12/13/2018 19:11*	WG1209822

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0991	0.371	10	12/16/2018 22:14	WG1210567
1-Methylnaphthalene	U		0.123	0.371	10	12/16/2018 22:14	WG1210567
2-Methylnaphthalene	U		0.0960	0.371	10	12/16/2018 22:14	WG1210567
Phenol	U		0.0775	3.71	10	12/16/2018 22:14	WG1210567
(S) 2-Fluorophenol	*81.3*			*12.0-120*		*12/16/2018 22:14*	WG1210567
(S) Phenol-d5	*71.4*			*10.0-120*		*12/16/2018 22:14*	WG1210567
(S) Nitrobenzene-d5	*70.5*			*10.0-122*		*12/16/2018 22:14*	WG1210567
(S) 2-Fluorobiphenyl	*72.9*			*15.0-120*		*12/16/2018 22:14*	WG1210567
(S) 2,4,6-Tribromophenol	*66.4*			*10.0-127*		*12/16/2018 22:14*	WG1210567
(S) p-Terphenyl-d14	*79.6*			*10.0-120*		*12/16/2018 22:14*	WG1210567

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	

Sample Narrative:

L1051263-21 WG1210567: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.05		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:44	WG1210243

Method Blank (MB)

(MB) R3367853-1 12/12/18 15:18

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1051263-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1051263-09 12/12/18 15:18 • (DUP) R3367853-3 12/12/18 15:18

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	90.6	90.4	1	0.291		10

Laboratory Control Sample (LCS)

(LCS) R3367853-2 12/12/18 15:18

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

Method Blank (MB)

(MB) R3367847-1 12/12/18 14:39

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

L1051300-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1051300-03 12/12/18 14:39 • (DUP) R3367847-3 12/12/18 14:39

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	82.9	84.8	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3367847-2 12/12/18 14:39

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

Method Blank (MB)

(MB) R3368952-1 12/15/18 17:22

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	1.17	J	0.795	10.0
Fluoride	U		0.261	1.00
Sulfate	1.93	J	0.570	50.0

L1051220-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051220-01 12/15/18 19:27 • (DUP) R3368952-3 12/15/18 19:43

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	3.50	3.22	1	8.34		20
Sulfate	621	444	1	33.3	J3	20

L1051220-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051220-01 12/15/18 19:59 • (DUP) R3368952-4 12/15/18 20:16

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	8210	7540	20	8.38		20

L1051257-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-09 12/16/18 05:02 • (DUP) R3368952-7 12/16/18 05:35

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	16.4	16.4	1	0.297		20

L1051257-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-09 12/16/18 05:18 • (DUP) R3368952-8 12/16/18 05:51

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	4300	3820	50	11.9		20
Sulfate	21400	20800	50	2.92		20

Laboratory Control Sample (LCS)

(LCS) R3368952-2 12/15/18 17:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	185	92.3	90.0-110	
Fluoride	20.0	18.0	90.0	90.0-110	
Sulfate	200	182	91.0	90.0-110	

L1051220-19 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051220-19 12/16/18 01:28 • (MS) R3368952-5 12/16/18 01:44 • (MSD) R3368952-6 12/16/18 02:01

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 %
Chloride	559	136	627	669	87.8	95.4	1	80.0-120			6.58	20
Fluoride	55.9	6.28	32.5	30.1	46.9	42.7	1	80.0-120	J6	J6	7.61	20
Sulfate	559	151	619	669	83.8	92.7	1	80.0-120			7.72	20

Method Blank (MB)

(MB) R3368526-1 12/14/18 17:14

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	U		0.795	10.0
Fluoride	U		0.261	1.00
Sulfate	U		0.570	50.0

L1051257-21 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-21 12/14/18 18:03 • (DUP) R3368526-3 12/14/18 18:19

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	17.6	17.9	1	1.47		20

L1051257-21 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-21 12/14/18 18:36 • (DUP) R3368526-4 12/14/18 18:52

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3640	4050	10	10.7		20

L1051263-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1051263-11 12/15/18 03:55 • (DUP) R3368526-7 12/15/18 04:11

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	186	224	1	18.2		20
Fluoride	5.35	5.46	1	1.97		20
Sulfate	55.1	76.2	1	32.1	P1	20

L1051257-21 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-21 12/15/18 10:09 • (DUP) R3368526-8 12/15/18 10:25

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	20300	19100	50	5.76		20

Laboratory Control Sample (LCS)

(LCS) R3368526-2 12/14/18 17:30

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	208	104	90.0-110	
Fluoride	20.0	20.3	101	90.0-110	
Sulfate	200	209	104	90.0-110	

L1051257-39 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051257-39 12/14/18 22:26 • (MS) R3368526-5 12/14/18 22:42 • (MSD) R3368526-6 12/14/18 23:32

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 %
Chloride	587	299	936	954	108	112	1	80.0-120			1.97	20
Fluoride	58.7	17.7	57.6	56.9	67.9	66.7	1	80.0-120	J6	J6	1.22	20
Sulfate	587	14000	15800	17200	314	557	1	80.0-120	E V	E V	8.61	20

Method Blank (MB)

(MB) R3368432-1 12/14/18 14:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Selenium	U		0.00740	0.0100

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

(LCS) R3368432-2 12/14/18 14:12 • (LCSD) R3368432-3 12/14/18 14:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	0.976	0.980	97.6	98.0	80.0-120			0.399	20

L1051257-22 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051257-22 12/14/18 14:18 • (MS) R3368432-5 12/14/18 14:23 • (MSD) R3368432-6 12/14/18 14:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	0.0204	1.07	1.08	105	106	1	75.0-125			0.753	20

Method Blank (MB)

(MB) R3368434-1 12/14/18 17:09

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Selenium	U		0.00740	0.0100

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

(LCS) R3368434-2 12/14/18 17:12 • (LCSD) R3368434-3 12/14/18 17:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Selenium	1.00	0.966	0.962	96.6	96.2	80.0-120			0.479	20

L1051516-20 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051516-20 12/14/18 17:17 • (MS) R3368434-5 12/14/18 17:22 • (MSD) R3368434-6 12/14/18 17:25

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Selenium	1.00	U	0.978	0.981	97.8	98.1	1	75.0-125			0.263	20

Method Blank (MB)

(MB) R3368630-3 12/14/18 01:39

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)	*88.2*			*77.0-120*

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

(LCS) R3368630-1 12/14/18 00:38 • (LCSD) R3368630-2 12/14/18 01:00

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 %
TPH (GC/FID) Low Fraction	5.50	5.87	5.22	107	94.9	72.0-127			11.7	20
(S) a,a,a-Trifluorotoluene(FID)				*108*	*107*	*77.0-120*				

Method Blank (MB)

(MB) R3368912-3 12/17/18 15:29

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)	*92.2*			*77.0-120*

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

(LCS) R3368912-1 12/17/18 13:52 • (LCSD) R3368912-2 12/17/18 14:13

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	4.80	4.87	87.4	88.6	72.0-127			1.36	20
(S) a,a,a-Trifluorotoluene(FID)				*103*	*102*	*77.0-120*				

Method Blank (MB)

(MB) R3368197-3 12/14/18 03:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Naphthalene	U		0.00312	0.0125
(S) Toluene-d8	*123*			*75.0-131*
(S) Dibromofluoromethane	*99.7*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*
(S) 4-Bromofluorobenzene	*104*			*67.0-138*

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

(LCS) R3368197-1 12/14/18 01:53 • (LCSD) R3368197-2 12/14/18 02:11

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	0.125	0.126	0.123	101	98.5	70.0-123			2.17	20
Naphthalene	0.125	0.111	0.122	88.6	97.4	59.0-130			9.54	20
(S) Toluene-d8				*120*	*119*	*75.0-131*				
(S) Dibromofluoromethane				*104*	*105*	*65.0-129*				
(S) a,a,a-Trifluorotoluene				*115*	*113*	*80.0-120*				
(S) 4-Bromofluorobenzene				*107*	*108*	*67.0-138*				

L1052100-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1052100-02 12/14/18 03:44 • (MS) R3368197-4 12/14/18 09:37 • (MSD) R3368197-5 12/14/18 09:56

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 %
Benzene	0.125	ND	0.0621	0.105	49.7	84.2	1	10.0-149		J3	51.5	37
Naphthalene	0.125	ND	0.0906	0.105	68.4	79.8	1	10.0-160			14.6	36
(S) Toluene-d8					*120*	*120*		*75.0-131*				
(S) Dibromofluoromethane					*94.6*	*94.6*		*65.0-129*				
(S) a,a,a-Trifluorotoluene					*111*	*112*		*80.0-120*				
(S) 4-Bromofluorobenzene					*107*	*103*		*67.0-138*				

Method Blank (MB)

(MB) R3368625-2 12/14/18 04:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
(S) Toluene-d8	*114*			*75.0-131*
(S) Dibromofluoromethane	*85.8*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*114*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*

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

(LCS) R3368625-1 12/14/18 03:07 • (LCSD) R3368625-3 12/14/18 12:13

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	0.125	0.0900	0.0987	72.0	79.0	70.0-123			9.19	20
(S) Toluene-d8				*106*	*106*	*75.0-131*				
(S) Dibromofluoromethane				*106*	*101*	*65.0-129*				
(S) a,a,a-Trifluorotoluene				*105*	*103*	*80.0-120*				
(S) 4-Bromofluorobenzene				*105*	*106*	*67.0-138*				

Method Blank (MB)

(MB) R3368818-2 12/16/18 17:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Naphthalene	U		0.00312	0.0125
(S) Toluene-d8	*112*			*75.0-131*
(S) Dibromofluoromethane	*88.5*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*

Laboratory Control Sample (LCS)

(LCS) R3368818-1 12/16/18 16:21

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Naphthalene	0.125	0.0983	78.6	59.0-130	
(S) Toluene-d8			*108*	*75.0-131*	
(S) Dibromofluoromethane			*106*	*65.0-129*	
(S) a,a,a-Trifluorotoluene			*102*	*80.0-120*	
(S) 4-Bromofluorobenzene			*106*	*67.0-138*	

Method Blank (MB)

(MB) R3368134-1 12/13/18 16:55

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	*91.0*			*18.0-148*

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

(LCS) R3368134-2 12/13/18 17:22 • (LCSD) R3368134-3 12/13/18 17:35

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 %
Extractable Petroleum Hydrocarbon	50.0	36.1	35.5	72.2	71.0	50.0-150			1.68	20
C10-C28 Diesel Range	50.0	40.0	39.6	80.0	79.2	50.0-150			1.01	20
(S) o-Terphenyl				*83.5*	*81.5*	*18.0-148*				

L1051391-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051391-04 12/13/18 19:25 • (MS) R3368134-4 12/13/18 19:38 • (MSD) R3368134-5 12/13/18 19:52

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 %
Extractable Petroleum Hydrocarbon	61.4	18.1	50.0	51.3	51.9	56.9	2	50.0-150			2.69	20
C10-C28 Diesel Range	61.4	U	49.2	49.0	69.1	72.1	2	50.0-150			0.505	20
(S) o-Terphenyl					*72.6*	*72.7*		*18.0-148*				

Method Blank (MB)

(MB) R3368363-1 12/13/18 21:33

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	*84.2*			*18.0-148*

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

(LCS) R3368363-2 12/13/18 21:47 • (LCSD) R3368363-3 12/13/18 22:04

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	27.8	27.9	55.6	55.8	50.0-150			0.359	20
(S) o-Terphenyl				*64.7*	*64.0*	*18.0-148*				

L1051263-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051263-05 12/13/18 22:35 • (MS) R3368363-4 12/13/18 22:50 • (MSD) R3368363-5 12/13/18 23:06

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	53.9	2.07	33.3	34.7	58.0	60.6	1	50.0-150			4.12	20
(S) o-Terphenyl					*58.9*	*61.7*		*18.0-148*				

Method Blank (MB)

(MB) R3368440-3 12/14/18 08:58

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
1-Methylnaphthalene	U		0.0110	0.0333
2-Methylnaphthalene	U		0.00861	0.0333
Naphthalene	U		0.00889	0.0333
Phenol	U		0.00695	0.333
(S) Nitrobenzene-d5	*78.4*			*10.0-122*
(S) 2-Fluorobiphenyl	*82.0*			*15.0-120*
(S) p-Terphenyl-d14	*88.9*			*10.0-120*
(S) Phenol-d5	*75.4*			*10.0-120*
(S) 2-Fluorophenol	*85.4*			*12.0-120*
(S) 2,4,6-Tribromophenol	*72.1*			*10.0-127*

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

(LCS) R3368440-1 12/14/18 08:12 • (LCSD) R3368440-2 12/14/18 08:35

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 %
1-Methylnaphthalene	0.666	0.486	0.450	73.0	67.6	34.0-120			7.69	23
2-Methylnaphthalene	0.666	0.485	0.446	72.8	67.0	34.0-120			8.38	22
Naphthalene	0.666	0.490	0.440	73.6	66.1	18.0-120			10.8	24
Phenol	0.666	0.573	0.517	86.0	77.6	28.0-120			10.3	27
(S) Nitrobenzene-d5				*74.5*	*67.9*	*10.0-122*				
(S) 2-Fluorobiphenyl				*94.6*	*85.9*	*15.0-120*				
(S) p-Terphenyl-d14				*102*	*92.8*	*10.0-120*				
(S) Phenol-d5				*87.8*	*79.6*	*10.0-120*				
(S) 2-Fluorophenol				*102*	*93.2*	*12.0-120*				
(S) 2,4,6-Tribromophenol				*93.1*	*80.5*	*10.0-127*				

L1051257-29 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051257-29 12/14/18 15:06 • (MS) R3368440-4 12/14/18 15:29 • (MSD) R3368440-5 12/14/18 15:52

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 %
1-Methylnaphthalene	0.701	U	0.499	0.480	71.2	72.4	2	10.0-120			3.87	36
2-Methylnaphthalene	0.701	U	0.495	0.474	70.6	71.4	2	10.0-120			4.35	37
Naphthalene	0.701	U	0.497	0.479	70.9	72.2	2	10.0-120			3.67	35
Phenol	0.701	U	0.538	0.514	76.7	77.5	2	12.0-120			4.60	38
(S) Nitrobenzene-d5					*71.2*	*72.7*		*10.0-122*				
(S) 2-Fluorobiphenyl					*84.4*	*84.1*		*15.0-120*				

L1051257-29 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051257-29 12/14/18 15:06 • (MS) R3368440-4 12/14/18 15:29 • (MSD) R3368440-5 12/14/18 15:52

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 %
(S) p-Terphenyl-d14					*106*	*102*		*10.0-120*				
(S) Phenol-d5					*75.0*	*76.8*		*10.0-120*				
(S) 2-Fluorophenol					*84.0*	*87.8*		*12.0-120*				
(S) 2,4,6-Tribromophenol					*98.2*	*96.2*		*10.0-127*				

Sample Narrative:

OS: Dilution due to matrix impact during extract concentration procedure

Method Blank (MB)

(MB) R3368856-3 12/16/18 15:43

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
1-Methylnaphthalene	U		0.0110	0.0333
2-Methylnaphthalene	U		0.00861	0.0333
Naphthalene	U		0.00889	0.0333
Phenol	U		0.00695	0.333
(S) Nitrobenzene-d5	*87.4*			*10.0-122*
(S) 2-Fluorobiphenyl	*82.0*			*15.0-120*
(S) p-Terphenyl-d14	*94.9*			*10.0-120*
(S) Phenol-d5	*82.9*			*10.0-120*
(S) 2-Fluorophenol	*93.1*			*12.0-120*
(S) 2,4,6-Tribromophenol	*82.0*			*10.0-127*

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

(LCS) R3368856-1 12/16/18 14:57 • (LCSD) R3368856-2 12/16/18 15:20

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 %
1-Methylnaphthalene	0.666	0.430	0.429	64.6	64.4	34.0-120			0.233	23
2-Methylnaphthalene	0.666	0.430	0.429	64.6	64.4	34.0-120			0.233	22
Naphthalene	0.666	0.421	0.418	63.2	62.8	18.0-120			0.715	24
Phenol	0.666	0.512	0.504	76.9	75.7	28.0-120			1.57	27
(S) Nitrobenzene-d5				*70.9*	*68.5*	*10.0-122*				
(S) 2-Fluorobiphenyl				*83.5*	*82.0*	*15.0-120*				
(S) p-Terphenyl-d14				*93.7*	*92.2*	*10.0-120*				
(S) Phenol-d5				*84.5*	*80.3*	*10.0-120*				
(S) 2-Fluorophenol				*95.9*	*91.0*	*12.0-120*				
(S) 2,4,6-Tribromophenol				*90.8*	*89.3*	*10.0-127*				

L1051263-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051263-11 12/16/18 19:33 • (MS) R3368856-4 12/16/18 19:56 • (MSD) R3368856-5 12/16/18 20:19

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 %
1-Methylnaphthalene	0.744	U	0.444	0.426	59.8	57.8	10	10.0-120			4.17	36
2-Methylnaphthalene	0.744	U	0.431	0.414	57.9	56.2	10	10.0-120			4.03	37
Naphthalene	0.744	U	0.451	0.415	60.7	56.3	10	10.0-120			8.38	35
Phenol	0.744	U	0.442	0.427	59.5	58.0	10	12.0-120			3.39	38
(S) Nitrobenzene-d5					*61.0*	*56.6*		*10.0-122*				
(S) 2-Fluorobiphenyl					*61.9*	*55.4*		*15.0-120*				

L1051263-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051263-11 12/16/18 19:33 • (MS) R3368856-4 12/16/18 19:56 • (MSD) R3368856-5 12/16/18 20:19

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 %
(S) p-Terphenyl-d14					*71.0*	*59.7*		*10.0-120*				
(S) Phenol-d5					*62.8*	*55.1*		*10.0-120*				
(S) 2-Fluorophenol					*71.5*	*63.1*		*12.0-120*				
(S) 2,4,6-Tribromophenol					*57.6*	*49.7*		*10.0-127*				

Sample Narrative:

OS: Dilution due to matrix

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.
MDL (dry)	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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
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.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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	LAO00356
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

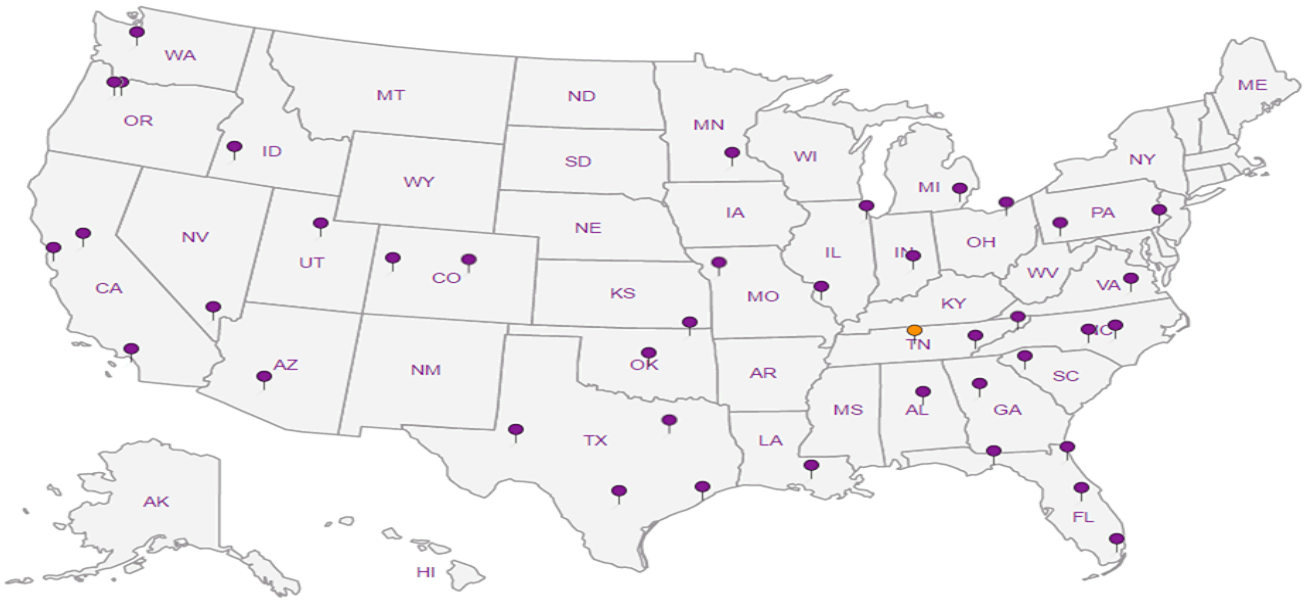
Third Party Federal Accreditations

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.



TRC Solutions - Austin, TX

505 E. Huntland Dr, Ste 250
Austin, TX 78752

Billing Information:
Accounts Payable
21 Griffin Road North
Windsor, CT 06095

Pres Chk

Report to: **Julie Speer**

Email To: jspeer@trcsolutions.com

Project Description: **Navajo WW Effluent Pipeline Release**

City/State Collected:

Phone: **512-684-3170**
Fax:

Client Project #

Lab Project # **TRCATX-WWEFF**

Collected by (print): Fernando C. Aguirre

Site/Facility ID # NAVAJO REFINERY

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl,F,SO4 - 300 4ozClr-NoPres	GRO,V8260BTEXN 40ml/NaHSO4/Syr/MeOH	SPLP Se 4ozClr-NoPres	SV8270, DRO/MRO 4ozClr-NoPres	Remarks	Sample # (lab only)
WWPL-21	GRAB	SS	Surface	12.06.18	1325	6	X	X	X	X		-01/-02
WWPL-22		SS		12.06.18	1331	6	X	X	X	X		-03/-04
WWPL-23		SS		12.06.18	1357	6	X	X	X	X		-05/-06
WWPL-24		SS		12.06.18	1344	6	X	X	X	X		-07/-08
WWPL-25		SS		12.06.18	1351	6	X	X	X	X		-09/-10
WWPL-26		SS		12.06.18	1359	6	X	X	X	X		-11/-12
WWPL-27		SS		12.06.18	1406	6	X	X	X	X		-13/-14
WWPL-28		SS		12.06.18	1415	6	X	X	X	X		-15/-16
Dup-WWPL-01		SS		12.06.18	—	6	X	X	X	X		-17/-18
Dup-WWPL-02		SS		12.06.18	—	6	X	X	X	X		-19/-20
Dup-WWPL-03		SS		12.06.18	—	6	X	X	X	X		-21/-22

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS ✓ FedEx __ Courier _____

Tracking # 4430 3429 3336

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
[signature]	12.07.18	1200	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			[signature]

Trip Blank Received: Yes / (No)
HCL / MeoH
TBR

Temp: 0.2 °C Bottles Received: 66

Date: 12/8/18 Time: 0845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

Sample Receipt Checklist
COC Seal Present/Intact: __NP ✓Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD SCREEN: <0.5 mR/hr

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1051263

B030

Acctnum: TRCATX
Template: T143547
Prelogin: P683128
TSR: 526 - Chris McCord
PB:
Shipped Via:

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 20, 2018

TRC Solutions - Austin, TX

Sample Delivery Group:	L1051516
Samples Received:	12/10/2018
Project Number:	
Description:	Navajo WW Effluent Pipeline Release
Site:	NAVAJO REFINERY
Report To:	Julie Speer 505 E. Huntland Dr, Ste 250 Austin, TX 78752

Entire Report Reviewed By:

Chris McCord
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.

TABLE OF CONTENTS

WWPL-11 L1051516-01 Solid

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 12:07	12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 02:13	ELN
Wet Chemistry by Method 300.0	WG1208616	5	12/12/18 16:25	12/18/18 02:29	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25	12/06/18 12:07	12/17/18 04:35	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1210179	1	12/06/18 12:07	12/14/18 11:13	DWR
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211776	1	12/06/18 12:07	12/16/18 18:13	JAH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 03:35	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/17/18 02:47	LEA

WWPL-12 L1051516-02 Solid

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 12:16	12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 02:46	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	26	12/06/18 12:16	12/17/18 04:56	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.04	12/06/18 12:16	12/15/18 01:09	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 03:51	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/16/18 23:44	LEA

WWPL-13 L1051516-03 Solid

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 12:24	12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 03:35	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25.75	12/06/18 12:24	12/17/18 05:17	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.03	12/06/18 12:24	12/15/18 01:29	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 04:06	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/16/18 22:58	LEA

WWPL-14 L1051516-04 Solid

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 12:33	12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 03:51	ELN
Wet Chemistry by Method 300.0	WG1208616	5	12/12/18 16:25	12/18/18 04:41	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	26	12/06/18 12:33	12/17/18 05:38	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.04	12/06/18 12:33	12/15/18 01:50	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 04:22	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/17/18 00:53	LEA

WWPL-15 L1051516-05 Solid

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 12:42	12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 04:57	ELN
Wet Chemistry by Method 300.0	WG1208616	5	12/12/18 16:25	12/18/18 05:14	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25.75	12/06/18 12:42	12/17/18 06:00	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.03	12/06/18 12:42	12/15/18 02:10	JHH

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

WWPL-15 L1051516-05 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:42 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 04:38	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	1	12/16/18 08:26	12/16/18 22:35	LEA

WWPL-16 L1051516-06 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:48 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209797	1	12/13/18 12:14	12/13/18 12:24	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 05:30	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25.75	12/06/18 12:48	12/17/18 06:21	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.03	12/06/18 12:48	12/15/18 02:30	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	2	12/13/18 12:50	12/14/18 04:54	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/17/18 00:30	LEA

WWPL-17 L1051516-07 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:55 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209798	1	12/13/18 11:58	12/13/18 12:11	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 05:47	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25	12/06/18 12:55	12/17/18 06:42	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1	12/06/18 12:55	12/15/18 02:50	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 05:10	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/17/18 00:07	LEA

WWPL-18 L1051516-08 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:02 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209798	1	12/13/18 11:58	12/13/18 12:11	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 06:03	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25.25	12/06/18 13:02	12/17/18 07:03	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.01	12/06/18 13:02	12/15/18 03:10	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	2	12/13/18 12:50	12/14/18 05:25	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	2	12/16/18 08:26	12/17/18 01:16	LEA

WWPL-19 L1051516-09 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:08 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209798	1	12/13/18 11:58	12/13/18 12:11	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 06:52	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25.25	12/06/18 13:08	12/17/18 07:24	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1.01	12/06/18 13:08	12/15/18 03:31	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 05:41	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	4	12/16/18 08:26	12/17/18 03:56	LEA

WWPL-20 L1051516-10 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:17 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1209798	1	12/13/18 11:58	12/13/18 12:11	KBC
Wet Chemistry by Method 300.0	WG1208616	1	12/12/18 16:25	12/18/18 07:25	ELN
Wet Chemistry by Method 300.0	WG1208616	5	12/12/18 16:25	12/18/18 07:42	ELN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1211189	25	12/06/18 13:17	12/17/18 07:45	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1211213	1	12/06/18 13:17	12/15/18 03:51	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1210067	1	12/13/18 12:50	12/14/18 05:57	AAT
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1210570	4	12/16/18 08:26	12/17/18 04:19	LEA

WWPL-11 L1051516-11 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:07 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:47	TRB

WWPL-12 L1051516-12 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:16 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:49	TRB

WWPL-13 L1051516-13 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:24 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:52	TRB

WWPL-14 L1051516-14 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:33 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:55	TRB

WWPL-15 L1051516-15 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:42 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:58	TRB

WWPL-16 L1051516-16 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:48 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 18:00	TRB

WWPL-17 L1051516-17 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 12:55 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 18:03	TRB

WWPL-18 L1051516-18 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:02 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 18:06	TRB

WWPL-19 L1051516-19 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:08 | Received date/time: 12/10/18 09:30

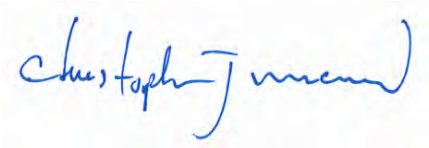
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:01	TRB

WWPL-20 L1051516-20 GW

Collected by: Fernando C. Aguirre | Collected date/time: 12/06/18 13:17 | Received date/time: 12/10/18 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1209412	1	12/12/18 09:33	12/12/18 09:33	TM
Metals (ICP) by Method 6010B	WG1210243	1	12/13/18 11:53	12/14/18 17:17	TRB

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.



Chris McCord
Project Manager

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	78.0		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	3090		5.10	64.1	5	12/18/2018 02:29	WG1208616
Fluoride	5.82		0.335	1.28	1	12/18/2018 02:13	WG1208616
Sulfate	1000		0.731	64.1	1	12/18/2018 02:13	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.798	J	0.695	3.20	25	12/17/2018 04:35	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*91.9*			*77.0-120*		*12/17/2018 04:35*	WG1211189

Sample Narrative:

L1051516-01 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000513	0.00128	1	12/14/2018 11:13	WG1210179
Naphthalene	0.00748	J	0.00400	0.0160	1	12/16/2018 18:13	WG1211776
(S) Toluene-d8	*113*			*75.0-131*		*12/14/2018 11:13*	WG1210179
(S) Toluene-d8	*111*			*75.0-131*		*12/16/2018 18:13*	WG1211776
(S) Dibromofluoromethane	*93.1*			*65.0-129*		*12/14/2018 11:13*	WG1210179
(S) Dibromofluoromethane	*93.6*			*65.0-129*		*12/16/2018 18:13*	WG1211776
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/14/2018 11:13*	WG1210179
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/16/2018 18:13*	WG1211776
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/14/2018 11:13*	WG1210179
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/16/2018 18:13*	WG1211776

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.52	J	2.06	5.13	1	12/14/2018 03:35	WG1210067
C28-C40 Oil Range	12.0		0.351	5.13	1	12/14/2018 03:35	WG1210067
(S) o-Terphenyl	*58.5*			*18.0-148*		*12/14/2018 03:35*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0228	0.0854	2	12/17/2018 02:47	WG1210570
1-Methylnaphthalene	U		0.0282	0.0854	2	12/17/2018 02:47	WG1210570
2-Methylnaphthalene	U		0.0220	0.0854	2	12/17/2018 02:47	WG1210570
Phenol	U		0.0178	0.854	2	12/17/2018 02:47	WG1210570
(S) 2-Fluorophenol	*50.9*			*12.0-120*		*12/17/2018 02:47*	WG1210570
(S) Phenol-d5	*44.3*			*10.0-120*		*12/17/2018 02:47*	WG1210570
(S) Nitrobenzene-d5	*45.8*			*10.0-122*		*12/17/2018 02:47*	WG1210570
(S) 2-Fluorobiphenyl	*45.8*			*15.0-120*		*12/17/2018 02:47*	WG1210570
(S) 2,4,6-Tribromophenol	*44.8*			*10.0-127*		*12/17/2018 02:47*	WG1210570
(S) p-Terphenyl-d14	*50.5*			*10.0-120*		*12/17/2018 02:47*	WG1210570

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	

Sample Narrative:

L1051516-01 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	82.6		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	413		0.963	12.1	1	12/18/2018 02:46	WG1208616
Fluoride	5.50		0.316	1.21	1	12/18/2018 02:46	WG1208616
Sulfate	303		0.690	60.6	1	12/18/2018 02:46	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.683	3.15	26	12/17/2018 04:56	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*93.1*			*77.0-120*		*12/17/2018 04:56*	WG1211189

Sample Narrative:

L1051516-02 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000504	0.00126	1.04	12/15/2018 01:09	WG1211213
Naphthalene	0.00952	J	0.00392	0.0157	1.04	12/15/2018 01:09	WG1211213
(S) Toluene-d8	*114*			*75.0-131*		*12/15/2018 01:09*	WG1211213
(S) Dibromofluoromethane	*93.9*			*65.0-129*		*12/15/2018 01:09*	WG1211213
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/15/2018 01:09*	WG1211213
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/15/2018 01:09*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	8.19		1.95	4.84	1	12/14/2018 03:51	WG1210067
C28-C40 Oil Range	29.3		0.332	4.84	1	12/14/2018 03:51	WG1210067
(S) o-Terphenyl	*74.6*			*18.0-148*		*12/14/2018 03:51*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0216	0.0807	2	12/16/2018 23:44	WG1210570
1-Methylnaphthalene	U		0.0266	0.0807	2	12/16/2018 23:44	WG1210570
2-Methylnaphthalene	U		0.0208	0.0807	2	12/16/2018 23:44	WG1210570
Phenol	U		0.0168	0.807	2	12/16/2018 23:44	WG1210570
(S) 2-Fluorophenol	*46.2*			*12.0-120*		*12/16/2018 23:44*	WG1210570
(S) Phenol-d5	*41.5*			*10.0-120*		*12/16/2018 23:44*	WG1210570
(S) Nitrobenzene-d5	*41.4*			*10.0-122*		*12/16/2018 23:44*	WG1210570
(S) 2-Fluorobiphenyl	*41.7*			*15.0-120*		*12/16/2018 23:44*	WG1210570
(S) 2,4,6-Tribromophenol	*41.5*			*10.0-127*		*12/16/2018 23:44*	WG1210570
(S) p-Terphenyl-d14	*47.5*			*10.0-120*		*12/16/2018 23:44*	WG1210570

Sample Narrative:

L1051516-02 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	75.5		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1040		1.05	13.3	1	12/18/2018 03:35	WG1208616
Fluoride	12.5		0.346	1.33	1	12/18/2018 03:35	WG1208616
Sulfate	681		0.755	66.3	1	12/18/2018 03:35	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.741	3.41	25.75	12/17/2018 05:17	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*92.6*			*77.0-120*		*12/17/2018 05:17*	WG1211189

Sample Narrative:

L1051516-03 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000546	0.00136	1.03	12/15/2018 01:29	WG1211213
Naphthalene	0.00595	J	0.00425	0.0171	1.03	12/15/2018 01:29	WG1211213
(S) Toluene-d8	*111*			*75.0-131*		*12/15/2018 01:29*	WG1211213
(S) Dibromofluoromethane	*91.4*			*65.0-129*		*12/15/2018 01:29*	WG1211213
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/15/2018 01:29*	WG1211213
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/15/2018 01:29*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		2.13	5.30	1	12/14/2018 04:06	WG1210067
C28-C40 Oil Range	8.64		0.363	5.30	1	12/14/2018 04:06	WG1210067
(S) o-Terphenyl	*58.3*			*18.0-148*		*12/14/2018 04:06*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0236	0.0882	2	12/16/2018 22:58	WG1210570
1-Methylnaphthalene	U		0.0292	0.0882	2	12/16/2018 22:58	WG1210570
2-Methylnaphthalene	U		0.0228	0.0882	2	12/16/2018 22:58	WG1210570
Phenol	U		0.0184	0.882	2	12/16/2018 22:58	WG1210570
(S) 2-Fluorophenol	*43.2*			*12.0-120*		*12/16/2018 22:58*	WG1210570
(S) Phenol-d5	*38.5*			*10.0-120*		*12/16/2018 22:58*	WG1210570
(S) Nitrobenzene-d5	*37.0*			*10.0-122*		*12/16/2018 22:58*	WG1210570
(S) 2-Fluorobiphenyl	*38.5*			*15.0-120*		*12/16/2018 22:58*	WG1210570
(S) 2,4,6-Tribromophenol	*31.5*			*10.0-127*		*12/16/2018 22:58*	WG1210570
(S) p-Terphenyl-d14	*42.4*			*10.0-120*		*12/16/2018 22:58*	WG1210570

Sample Narrative:

L1051516-03 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	65.0		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	3040		6.13	77.0	5	12/18/2018 04:41	WG1208616
Fluoride	4.68	J6	0.402	1.54	1	12/18/2018 03:51	WG1208616
Sulfate	892	J6	0.878	77.0	1	12/18/2018 03:51	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.868	4.00	26	12/17/2018 05:38	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*92.3*			*77.0-120*		*12/17/2018 05:38*	WG1211189

Sample Narrative:

L1051516-04 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000640	0.00160	1.04	12/15/2018 01:50	WG1211213
Naphthalene	0.0134	J	0.00499	0.0200	1.04	12/15/2018 01:50	WG1211213
(S) Toluene-d8	*111*			*75.0-131*		*12/15/2018 01:50*	WG1211213
(S) Dibromofluoromethane	*92.3*			*65.0-129*		*12/15/2018 01:50*	WG1211213
(S) a,a,a-Trifluorotoluene	*107*			*80.0-120*		*12/15/2018 01:50*	WG1211213
(S) 4-Bromofluorobenzene	*104*			*67.0-138*		*12/15/2018 01:50*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		2.48	6.16	1	12/14/2018 04:22	WG1210067
C28-C40 Oil Range	3.14	J	0.422	6.16	1	12/14/2018 04:22	WG1210067
(S) o-Terphenyl	*68.5*			*18.0-148*		*12/14/2018 04:22*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0274	0.103	2	12/17/2018 00:53	WG1210570
1-Methylnaphthalene	U		0.0339	0.103	2	12/17/2018 00:53	WG1210570
2-Methylnaphthalene	U		0.0265	0.103	2	12/17/2018 00:53	WG1210570
Phenol	U		0.0214	1.03	2	12/17/2018 00:53	WG1210570
(S) 2-Fluorophenol	*48.7*			*12.0-120*		*12/17/2018 00:53*	WG1210570
(S) Phenol-d5	*43.9*			*10.0-120*		*12/17/2018 00:53*	WG1210570
(S) Nitrobenzene-d5	*42.8*			*10.0-122*		*12/17/2018 00:53*	WG1210570
(S) 2-Fluorobiphenyl	*43.4*			*15.0-120*		*12/17/2018 00:53*	WG1210570
(S) 2,4,6-Tribromophenol	*41.8*			*10.0-127*		*12/17/2018 00:53*	WG1210570
(S) p-Terphenyl-d14	*48.6*			*10.0-120*		*12/17/2018 00:53*	WG1210570

Sample Narrative:

L1051516-04 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.4		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1530		4.40	55.3	5	12/18/2018 05:14	WG1208616
Fluoride	5.62		0.289	1.11	1	12/18/2018 04:57	WG1208616
Sulfate	190		0.631	55.3	1	12/18/2018 04:57	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.619	2.85	25.75	12/17/2018 06:00	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*92.2*			*77.0-120*		*12/17/2018 06:00*	WG1211189

Sample Narrative:

L1051516-05 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000456	0.00114	1.03	12/15/2018 02:10	WG1211213
Naphthalene	0.00563	J	0.00355	0.0142	1.03	12/15/2018 02:10	WG1211213
(S) Toluene-d8	*110*			*75.0-131*		*12/15/2018 02:10*	WG1211213
(S) Dibromofluoromethane	*90.4*			*65.0-129*		*12/15/2018 02:10*	WG1211213
(S) a,a,a-Trifluorotoluene	*108*			*80.0-120*		*12/15/2018 02:10*	WG1211213
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/15/2018 02:10*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	3.41	J	1.78	4.43	1	12/14/2018 04:38	WG1210067
C28-C40 Oil Range	17.0		0.303	4.43	1	12/14/2018 04:38	WG1210067
(S) o-Terphenyl	*66.3*			*18.0-148*		*12/14/2018 04:38*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.00984	0.0369	1	12/16/2018 22:35	WG1210570
1-Methylnaphthalene	U		0.0122	0.0369	1	12/16/2018 22:35	WG1210570
2-Methylnaphthalene	U		0.00953	0.0369	1	12/16/2018 22:35	WG1210570
Phenol	U		0.00769	0.369	1	12/16/2018 22:35	WG1210570
(S) 2-Fluorophenol	*44.5*			*12.0-120*		*12/16/2018 22:35*	WG1210570
(S) Phenol-d5	*40.8*			*10.0-120*		*12/16/2018 22:35*	WG1210570
(S) Nitrobenzene-d5	*38.8*			*10.0-122*		*12/16/2018 22:35*	WG1210570
(S) 2-Fluorobiphenyl	*40.3*			*15.0-120*		*12/16/2018 22:35*	WG1210570
(S) 2,4,6-Tribromophenol	*41.1*			*10.0-127*		*12/16/2018 22:35*	WG1210570
(S) p-Terphenyl-d14	*46.1*			*10.0-120*		*12/16/2018 22:35*	WG1210570

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	77.5		1	12/13/2018 12:24	WG1209797

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	132		1.03	12.9	1	12/18/2018 05:30	WG1208616
Fluoride	8.07		0.337	1.29	1	12/18/2018 05:30	WG1208616
Sulfate	219		0.736	64.5	1	12/18/2018 05:30	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.721	3.32	25.75	12/17/2018 06:21	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*92.2*			*77.0-120*		*12/17/2018 06:21*	WG1211189

Sample Narrative:

L1051516-06 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000532	0.00133	1.03	12/15/2018 02:30	WG1211213
Naphthalene	0.00510	J	0.00414	0.0166	1.03	12/15/2018 02:30	WG1211213
(S) Toluene-d8	*109*			*75.0-131*		*12/15/2018 02:30*	WG1211213
(S) Dibromofluoromethane	*90.3*			*65.0-129*		*12/15/2018 02:30*	WG1211213
(S) a,a,a-Trifluorotoluene	*107*			*80.0-120*		*12/15/2018 02:30*	WG1211213
(S) 4-Bromofluorobenzene	*105*			*67.0-138*		*12/15/2018 02:30*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	9.11	J	4.16	10.3	2	12/14/2018 04:54	WG1210067
C28-C40 Oil Range	44.0		0.707	10.3	2	12/14/2018 04:54	WG1210067
(S) o-Terphenyl	*81.2*			*18.0-148*		*12/14/2018 04:54*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0230	0.0860	2	12/17/2018 00:30	WG1210570
1-Methylnaphthalene	U		0.0284	0.0860	2	12/17/2018 00:30	WG1210570
2-Methylnaphthalene	U		0.0222	0.0860	2	12/17/2018 00:30	WG1210570
Phenol	U		0.0179	0.860	2	12/17/2018 00:30	WG1210570
(S) 2-Fluorophenol	*46.0*			*12.0-120*		*12/17/2018 00:30*	WG1210570
(S) Phenol-d5	*41.4*			*10.0-120*		*12/17/2018 00:30*	WG1210570
(S) Nitrobenzene-d5	*43.6*			*10.0-122*		*12/17/2018 00:30*	WG1210570
(S) 2-Fluorobiphenyl	*41.8*			*15.0-120*		*12/17/2018 00:30*	WG1210570
(S) 2,4,6-Tribromophenol	*41.9*			*10.0-127*		*12/17/2018 00:30*	WG1210570
(S) p-Terphenyl-d14	*47.9*			*10.0-120*		*12/17/2018 00:30*	WG1210570

Sample Narrative:

L1051516-06 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	79.5		1	12/13/2018 12:11	WG1209798

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	296		0.999	12.6	1	12/18/2018 05:47	WG1208616
Fluoride	13.7		0.328	1.26	1	12/18/2018 05:47	WG1208616
Sulfate	638		0.717	62.9	1	12/18/2018 05:47	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.685	J	0.681	3.14	25	12/17/2018 06:42	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*94.7*			*77.0-120*		*12/17/2018 06:42*	WG1211189

Sample Narrative:

L1051516-07 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000503	0.00126	1	12/15/2018 02:50	WG1211213
Naphthalene	0.00649	J	0.00392	0.0157	1	12/15/2018 02:50	WG1211213
(S) Toluene-d8	*107*			*75.0-131*		*12/15/2018 02:50*	WG1211213
(S) Dibromofluoromethane	*94.0*			*65.0-129*		*12/15/2018 02:50*	WG1211213
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/15/2018 02:50*	WG1211213
(S) 4-Bromofluorobenzene	*106*			*67.0-138*		*12/15/2018 02:50*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	2.16	J	2.02	5.03	1	12/14/2018 05:10	WG1210067
C28-C40 Oil Range	12.5		0.344	5.03	1	12/14/2018 05:10	WG1210067
(S) o-Terphenyl	*66.1*			*18.0-148*		*12/14/2018 05:10*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0224	0.0837	2	12/17/2018 00:07	WG1210570
1-Methylnaphthalene	U		0.0277	0.0837	2	12/17/2018 00:07	WG1210570
2-Methylnaphthalene	U		0.0216	0.0837	2	12/17/2018 00:07	WG1210570
Phenol	U		0.0175	0.837	2	12/17/2018 00:07	WG1210570
(S) 2-Fluorophenol	*47.9*			*12.0-120*		*12/17/2018 00:07*	WG1210570
(S) Phenol-d5	*43.1*			*10.0-120*		*12/17/2018 00:07*	WG1210570
(S) Nitrobenzene-d5	*42.5*			*10.0-122*		*12/17/2018 00:07*	WG1210570
(S) 2-Fluorobiphenyl	*42.8*			*15.0-120*		*12/17/2018 00:07*	WG1210570
(S) 2,4,6-Tribromophenol	*40.8*			*10.0-127*		*12/17/2018 00:07*	WG1210570
(S) p-Terphenyl-d14	*48.3*			*10.0-120*		*12/17/2018 00:07*	WG1210570

Sample Narrative:

L1051516-07 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	76.5		1	12/13/2018 12:11	WG1209798

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	196		1.04	13.1	1	12/18/2018 06:03	WG1208616
Fluoride	5.19		0.341	1.31	1	12/18/2018 06:03	WG1208616
Sulfate	36.2	B J	0.745	65.4	1	12/18/2018 06:03	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.716	3.30	25.25	12/17/2018 07:03	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*93.2*			*77.0-120*		*12/17/2018 07:03*	WG1211189

Sample Narrative:

L1051516-08 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000528	0.00132	1.01	12/15/2018 03:10	WG1211213
Naphthalene	0.00973	J	0.00412	0.0165	1.01	12/15/2018 03:10	WG1211213
(S) Toluene-d8	*107*			*75.0-131*		*12/15/2018 03:10*	WG1211213
(S) Dibromofluoromethane	*94.7*			*65.0-129*		*12/15/2018 03:10*	WG1211213
(S) a,a,a-Trifluorotoluene	*109*			*80.0-120*		*12/15/2018 03:10*	WG1211213
(S) 4-Bromofluorobenzene	*103*			*67.0-138*		*12/15/2018 03:10*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		4.21	10.5	2	12/14/2018 05:25	WG1210067
C28-C40 Oil Range	24.8		0.716	10.5	2	12/14/2018 05:25	WG1210067
(S) o-Terphenyl	*70.7*			*18.0-148*		*12/14/2018 05:25*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0233	0.0871	2	12/17/2018 01:16	WG1210570
1-Methylnaphthalene	U		0.0288	0.0871	2	12/17/2018 01:16	WG1210570
2-Methylnaphthalene	U		0.0225	0.0871	2	12/17/2018 01:16	WG1210570
Phenol	U		0.0182	0.871	2	12/17/2018 01:16	WG1210570
(S) 2-Fluorophenol	*39.4*			*12.0-120*		*12/17/2018 01:16*	WG1210570
(S) Phenol-d5	*34.8*			*10.0-120*		*12/17/2018 01:16*	WG1210570
(S) Nitrobenzene-d5	*34.8*			*10.0-122*		*12/17/2018 01:16*	WG1210570
(S) 2-Fluorobiphenyl	*35.1*			*15.0-120*		*12/17/2018 01:16*	WG1210570
(S) 2,4,6-Tribromophenol	*31.9*			*10.0-127*		*12/17/2018 01:16*	WG1210570
(S) p-Terphenyl-d14	*38.5*			*10.0-120*		*12/17/2018 01:16*	WG1210570

Sample Narrative:

L1051516-08 WG1210570: Dilution due to matrix impact during extract concentration procedure

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	69.3		1	12/13/2018 12:11	WG1209798

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1350		1.15	14.4	1	12/18/2018 06:52	WG1208616
Fluoride	5.50		0.376	1.44	1	12/18/2018 06:52	WG1208616
Sulfate	143		0.822	72.1	1	12/18/2018 06:52	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.790	3.64	25.25	12/17/2018 07:24	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*91.5*			*77.0-120*		*12/17/2018 07:24*	WG1211189

Sample Narrative:

L1051516-09 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000583	0.00146	1.01	12/15/2018 03:31	WG1211213
Naphthalene	0.0140	J	0.00454	0.0182	1.01	12/15/2018 03:31	WG1211213
(S) Toluene-d8	*109*			*75.0-131*		*12/15/2018 03:31*	WG1211213
(S) Dibromofluoromethane	*92.9*			*65.0-129*		*12/15/2018 03:31*	WG1211213
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*		*12/15/2018 03:31*	WG1211213
(S) 4-Bromofluorobenzene	*108*			*67.0-138*		*12/15/2018 03:31*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		2.32	5.77	1	12/14/2018 05:41	WG1210067
C28-C40 Oil Range	10.6		0.395	5.77	1	12/14/2018 05:41	WG1210067
(S) o-Terphenyl	*71.6*			*18.0-148*		*12/14/2018 05:41*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0513	0.192	4	12/17/2018 03:56	WG1210570
1-Methylnaphthalene	U		0.0635	0.192	4	12/17/2018 03:56	WG1210570
2-Methylnaphthalene	U		0.0496	0.192	4	12/17/2018 03:56	WG1210570
Phenol	U		0.0401	1.92	4	12/17/2018 03:56	WG1210570
(S) 2-Fluorophenol	*47.3*			*12.0-120*		*12/17/2018 03:56*	WG1210570
(S) Phenol-d5	*41.7*			*10.0-120*		*12/17/2018 03:56*	WG1210570
(S) Nitrobenzene-d5	*41.8*			*10.0-122*		*12/17/2018 03:56*	WG1210570
(S) 2-Fluorobiphenyl	*43.9*			*15.0-120*		*12/17/2018 03:56*	WG1210570
(S) 2,4,6-Tribromophenol	*37.0*			*10.0-127*		*12/17/2018 03:56*	WG1210570
(S) p-Terphenyl-d14	*46.4*			*10.0-120*		*12/17/2018 03:56*	WG1210570

Sample Narrative:

L1051516-09 WG1210570: Dilution due to matrix

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.4		1	12/13/2018 12:11	WG1209798

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1070		0.890	11.2	1	12/18/2018 07:25	WG1208616
Fluoride	7.07		0.292	1.12	1	12/18/2018 07:25	WG1208616
Sulfate	1280		3.19	280	5	12/18/2018 07:42	WG1208616

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.612	J	0.606	2.80	25	12/17/2018 07:45	WG1211189
(S) a,a,a-Trifluorotoluene(FID)	*92.0*			*77.0-120*		*12/17/2018 07:45*	WG1211189

Sample Narrative:

L1051516-10 WG1211189: Lowest possible dilution. Stir bars received improperly prepped.

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

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.000448	0.00112	1	12/15/2018 03:51	WG1211213
Naphthalene	0.00600	J	0.00349	0.0140	1	12/15/2018 03:51	WG1211213
(S) Toluene-d8	*109*			*75.0-131*		*12/15/2018 03:51*	WG1211213
(S) Dibromofluoromethane	*93.5*			*65.0-129*		*12/15/2018 03:51*	WG1211213
(S) a,a,a-Trifluorotoluene	*110*			*80.0-120*		*12/15/2018 03:51*	WG1211213
(S) 4-Bromofluorobenzene	*107*			*67.0-138*		*12/15/2018 03:51*	WG1211213

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.80	4.48	1	12/14/2018 05:57	WG1210067
C28-C40 Oil Range	13.2		0.307	4.48	1	12/14/2018 05:57	WG1210067
(S) o-Terphenyl	*68.2*			*18.0-148*		*12/14/2018 05:57*	WG1210067

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Naphthalene	U		0.0398	0.149	4	12/17/2018 04:19	WG1210570
1-Methylnaphthalene	U		0.0492	0.149	4	12/17/2018 04:19	WG1210570
2-Methylnaphthalene	U		0.0385	0.149	4	12/17/2018 04:19	WG1210570
Phenol	U		0.0311	1.49	4	12/17/2018 04:19	WG1210570
(S) 2-Fluorophenol	*40.2*			*12.0-120*		*12/17/2018 04:19*	WG1210570
(S) Phenol-d5	*36.1*			*10.0-120*		*12/17/2018 04:19*	WG1210570
(S) Nitrobenzene-d5	*34.0*			*10.0-122*		*12/17/2018 04:19*	WG1210570
(S) 2-Fluorobiphenyl	*37.0*			*15.0-120*		*12/17/2018 04:19*	WG1210570
(S) 2,4,6-Tribromophenol	*36.4*			*10.0-127*		*12/17/2018 04:19*	WG1210570
(S) p-Terphenyl-d14	*40.7*			*10.0-120*		*12/17/2018 04:19*	WG1210570

Sample Narrative:

L1051516-10 WG1210570: Dilution due to matrix

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.73		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:47	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.22		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:49	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.24		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:52	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.26		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:55	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.23		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:58	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.97		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 18:00	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.83		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 18:03	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.75		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 18:06	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	7.72		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:01	WG1210243

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/12/2018 9:33:50 AM	WG1209412
Fluid	2		12/12/2018 9:33:50 AM	WG1209412
Final pH	8.02		12/12/2018 9:33:50 AM	WG1209412

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	U		0.00740	0.0100	1	12/14/2018 17:17	WG1210243

Method Blank (MB)

(MB) R3368165-1 12/13/18 12:24

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1051515-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1051515-01 12/13/18 12:24 • (DUP) R3368165-3 12/13/18 12:24

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	79.7	74.6	1	6.67		10

Laboratory Control Sample (LCS)

(LCS) R3368165-2 12/13/18 12:24

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

Method Blank (MB)

(MB) R3368163-1 12/13/18 12:11

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1051516-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1051516-08 12/13/18 12:11 • (DUP) R3368163-3 12/13/18 12:11

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	76.5	76.0	1	0.603		10

Laboratory Control Sample (LCS)

(LCS) R3368163-2 12/13/18 12:11

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

Method Blank (MB)

(MB) R3369221-1 12/17/18 20:35

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	1.11	J	0.795	10.0
Fluoride	U		0.261	1.00
Sulfate	2.85	J	0.570	50.0

L1051257-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-17 12/17/18 23:28 • (DUP) R3369221-3 12/18/18 00:34

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Fluoride	29.8	29.2	1	2.35		20

L1051257-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-17 12/18/18 00:18 • (DUP) R3369221-4 12/18/18 00:51

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	7180	7750	20	7.70		20

L1051811-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1051811-04 12/18/18 08:47 • (DUP) R3369221-7 12/18/18 09:04

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	90.7	88.8	1	2.10		20
Fluoride	3.09	2.96	1	4.23		20
Sulfate	702	698	1	0.605		20

L1051257-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1051257-17 12/18/18 11:47 • (DUP) R3369221-8 12/18/18 12:03

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	23600	23900	50	1.25		20

Laboratory Control Sample (LCS)

(LCS) R3369221-2 12/17/18 20:52

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	209	105	90.0-110	
Fluoride	20.0	20.4	102	90.0-110	
Sulfate	200	208	104	90.0-110	

L1051516-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051516-04 12/18/18 03:51 • (MS) R3369221-5 12/18/18 04:08 • (MSD) R3369221-6 12/18/18 04:24

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 %
Chloride	770	3030	2740	4210	0.000	153	1	80.0-120	E J6	E J3 J5	42.0	20
Fluoride	77.0	4.68	55.7	50.2	66.3	59.1	1	80.0-120	J6	J6	10.4	20
Sulfate	770	892	1350	1580	59.6	88.9	1	80.0-120	J6	E	15.4	20

Method Blank (MB)

(MB) R3368434-1 12/14/18 17:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Selenium	U		0.00740	0.0100

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

(LCS) R3368434-2 12/14/18 17:12 • (LCSD) R3368434-3 12/14/18 17:14

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	0.966	0.962	96.6	96.2	80.0-120			0.479	20

L1051516-20 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051516-20 12/14/18 17:17 • (MS) R3368434-5 12/14/18 17:22 • (MSD) R3368434-6 12/14/18 17:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Selenium	1.00	U	0.978	0.981	97.8	98.1	1	75.0-125			0.263	20

Method Blank (MB)

(MB) R3368805-5 12/16/18 22:08

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)	*91.4*			*77.0-120*

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

(LCS) R3368805-3 12/16/18 21:05 • (LCSD) R3368805-4 12/16/18 21:26

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	5.04	5.57	91.7	101	72.0-127			9.86	20
(S) a,a,a-Trifluorotoluene(FID)				*104*	*105*	*77.0-120*				

Method Blank (MB)

(MB) R3368625-2 12/14/18 04:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
(S) Toluene-d8	*114*			*75.0-131*
(S) Dibromofluoromethane	*85.8*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*114*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*

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

(LCS) R3368625-1 12/14/18 03:07 • (LCSD) R3368625-3 12/14/18 12:13

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	0.125	0.0900	0.0987	72.0	79.0	70.0-123			9.19	20
(S) Toluene-d8				*106*	*106*	*75.0-131*				
(S) Dibromofluoromethane				*106*	*101*	*65.0-129*				
(S) a,a,a-Trifluorotoluene				*105*	*103*	*80.0-120*				
(S) 4-Bromofluorobenzene				*105*	*106*	*67.0-138*				

Method Blank (MB)

(MB) R3368580-3 12/15/18 00:49

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Naphthalene	U		0.00312	0.0125
(S) Toluene-d8	*115*			*75.0-131*
(S) Dibromofluoromethane	*86.0*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*113*			*80.0-120*
(S) 4-Bromofluorobenzene	*106*			*67.0-138*

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

(LCS) R3368580-1 12/14/18 23:28 • (LCSD) R3368580-2 12/14/18 23:48

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	0.125	0.0920	0.0879	73.6	70.3	70.0-123			4.53	20
Naphthalene	0.125	0.0915	0.0947	73.2	75.8	59.0-130			3.51	20
(S) Toluene-d8				*109*	*105*	*75.0-131*				
(S) Dibromofluoromethane				*105*	*102*	*65.0-129*				
(S) a,a,a-Trifluorotoluene				*103*	*104*	*80.0-120*				
(S) 4-Bromofluorobenzene				*102*	*106*	*67.0-138*				

Method Blank (MB)

(MB) R3368818-2 12/16/18 17:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Naphthalene	U		0.00312	0.0125
(S) Toluene-d8	*112*			*75.0-131*
(S) Dibromofluoromethane	*88.5*			*65.0-129*
(S) a,a,a-Trifluorotoluene	*111*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*

Laboratory Control Sample (LCS)

(LCS) R3368818-1 12/16/18 16:21

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Naphthalene	0.125	0.0983	78.6	59.0-130	
(S) Toluene-d8			*108*	*75.0-131*	
(S) Dibromofluoromethane			*106*	*65.0-129*	
(S) a,a,a-Trifluorotoluene			*102*	*80.0-120*	
(S) 4-Bromofluorobenzene			*106*	*67.0-138*	

Method Blank (MB)

(MB) R3368362-1 12/14/18 02:31

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	*66.4*			*18.0-148*

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

(LCS) R3368362-2 12/14/18 02:47 • (LCSD) R3368362-3 12/14/18 03:03

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 %
Extractable Petroleum Hydrocarbon	50.0	26.2	25.1	52.4	50.2	50.0-150			4.29	20
C10-C28 Diesel Range	50.0	27.9	27.0	55.8	54.0	50.0-150			3.28	20
(S) o-Terphenyl				*70.7*	*64.3*	*18.0-148*				

Method Blank (MB)

(MB) R3368681-3 12/16/18 20:41

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Naphthalene	U		0.00889	0.0333
2-Methylnaphthalene	U		0.00861	0.0333
Phenol	U		0.00695	0.333
1-Methylnaphthalene	U		0.0110	0.0333
(S) 2-Fluorophenol	*61.1*			*12.0-120*
(S) Phenol-d5	*54.5*			*10.0-120*
(S) Nitrobenzene-d5	*54.1*			*10.0-122*
(S) 2-Fluorobiphenyl	*54.7*			*15.0-120*
(S) 2,4,6-Tribromophenol	*50.8*			*10.0-127*
(S) p-Terphenyl-d14	*60.7*			*10.0-120*

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

(LCS) R3368681-1 12/16/18 19:55 • (LCSD) R3368681-2 12/16/18 20:18

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 %
Naphthalene	0.666	0.320	0.307	48.0	46.1	18.0-120			4.15	24
2-Methylnaphthalene	0.666	0.320	0.310	48.0	46.5	34.0-120			3.17	22
Phenol	0.666	0.372	0.354	55.9	53.2	28.0-120			4.96	27
1-Methylnaphthalene	0.666	0.323	0.312	48.5	46.8	34.0-120			3.46	23
(S) 2-Fluorophenol				*62.5*	*59.3*	*12.0-120*				
(S) Phenol-d5				*55.1*	*52.6*	*10.0-120*				
(S) Nitrobenzene-d5				*48.9*	*46.8*	*10.0-122*				
(S) 2-Fluorobiphenyl				*56.5*	*53.5*	*15.0-120*				
(S) 2,4,6-Tribromophenol				*58.6*	*56.6*	*10.0-127*				
(S) p-Terphenyl-d14				*63.4*	*60.7*	*10.0-120*				

L1051399-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051399-06 12/16/18 21:04 • (MS) R3368681-4 12/16/18 21:27 • (MSD) R3368681-5 12/16/18 21:50

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 %
Naphthalene	0.875	U	0.272	0.271	31.1	30.9	1	10.0-120			0.484	35
2-Methylnaphthalene	0.875	U	0.293	0.286	33.5	32.7	1	10.0-120			2.27	37
Phenol	0.875	U	0.0812	0.104	9.28	11.9	1	12.0-120	J6	J6	24.7	38
1-Methylnaphthalene	0.875	U	0.301	0.297	34.4	33.9	1	10.0-120			1.32	36
(S) 2-Fluorophenol					*31.1*	*28.7*		*12.0-120*				
(S) Phenol-d5					*8.44*	*10.9*		*10.0-120*	J2			

L1051399-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1051399-06 12/16/18 21:04 • (MS) R3368681-4 12/16/18 21:27 • (MSD) R3368681-5 12/16/18 21:50

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 %
(S) Nitrobenzene-d5					*31.8*	*30.9*		*10.0-122*				
(S) 2-Fluorobiphenyl					*35.1*	*33.9*		*15.0-120*				
(S) 2,4,6-Tribromophenol					*39.9*	*36.6*		*10.0-127*				
(S) p-Terphenyl-d14					*49.8*	*47.7*		*10.0-120*				

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.
MDL (dry)	Method Detection Limit.
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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
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.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
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.
J3	The associated batch QC was outside the established quality control range for precision.
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.

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	LAO00356
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

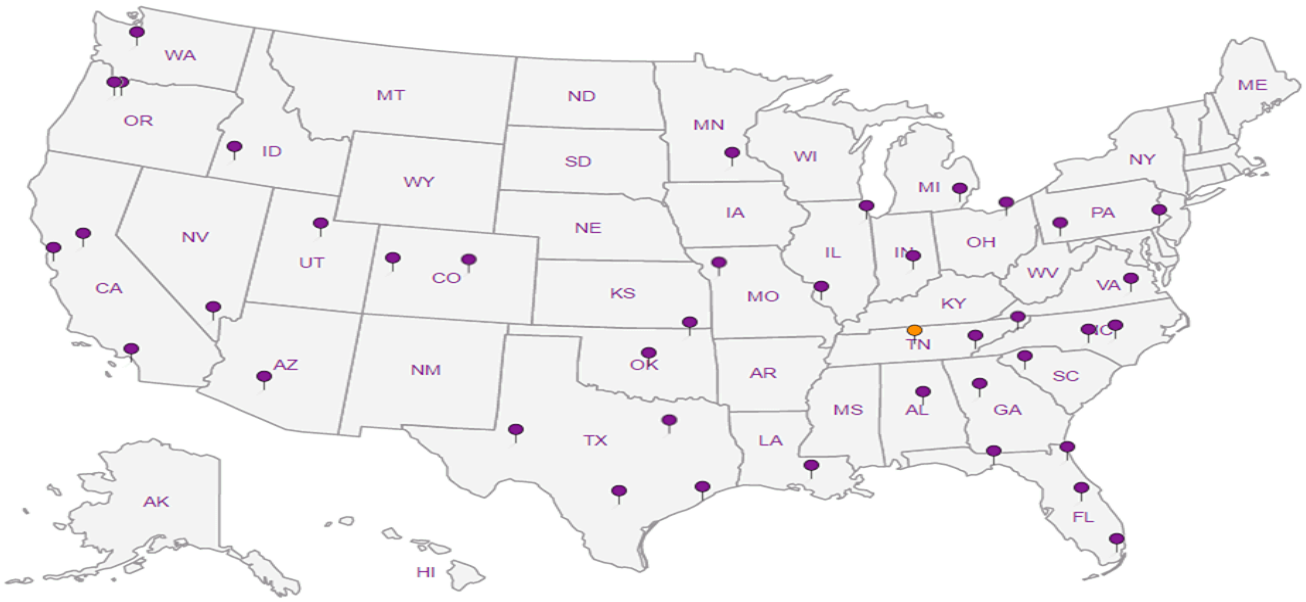
Third Party Federal Accreditations

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.



TRC Solutions - Austin, TX

505 E. Huntland Dr, Ste 250
Austin, TX 78752

Billing Information:
Accounts Payable
21 Griffin Road North
Windsor, CT 06095

Pres Chk

Report to: Julie Speer

Email To: jspeer@trcsolutions.com

Project Description: Navajo WW Effluent Pipeline Release

City/State Collected:

Phone: 512-684-3170
Fax:

Client Project #

Lab Project # TRCATX-WWEFF

Collected by (print): Fernando C. Aguirre

Site/Facility ID # NAVAJO REFINERY

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl,F,SO4 - 300 4ozClr-NoPres	GRO,V8260BTEXN 40ml/NaHSO4/Syr/MeOH	SPLP Se 4ozClr-NoPres	SV8270, DRO/MRO 4ozClr-NoPres	Remarks	Sample # (lab only)
WWPL-11	GRAB	SS	Surface	12.06.18	1207	6	X	X	X	X		01/11
WWPL-12		SS		12.06.18	1216	6	X	X	X	X		02/12
WWPL-13		SS		12.06.18	1224	6	X	X	X	X		03/13
WWPL-14		SS		12.06.18	1233	6	X	X	X	X		04/14
WWPL-15		SS		12.06.18	1242	6	X	X	X	X		05/15
WWPL-16		SS		12.06.18	1248	6	X	X	X	X		06/16
WWPL-17		SS		12.06.18	1255	6	X	X	X	X		07/17
WWPL-18		SS		12.06.18	1302	6	X	X	X	X		08/18
WWPL-19		SS		12.06.18	FCR ~~1308~~ 1308	6	X	X	X	X		09/19
WWPL-20	↓	SS	↓	12.06.18	~~FCR 1407~~ 1315	6	X	X	X	X		10/20

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 443034293325

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L105156

E055

Acctnum: TRCATX
Template: T143547
Prelogin: P683128
TSR: 526 - Chris McCord
PB:
Shipped Via:

Sample Receipt Checklist
COC Seal Present/Intact: NP ___Y ___N
COC Signed/Accurate: ___Y ___N
Bottles arrive intact: ___Y ___N
Correct bottles used: ___Y ___N
Sufficient volume sent: ___Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ___Y ___N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	12.07.18	1200	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No HCL / MeoH TBR

Temp: 0.1 °C Bottles Received: 60

Date: 12/10/18 Time: 0930

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 27, 2018

TRC Solutions - Austin, TX

Sample Delivery Group:	L1054659
Samples Received:	12/08/2018
Project Number:	
Description:	Navajo WW Effluent Pipeline Release
Site:	NAVAJO REFINERY
Report To:	Julie Speer 505 E. Huntland Dr, Ste 250 Austin, TX 78752

Entire Report Reviewed By:

Chris McCord
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.

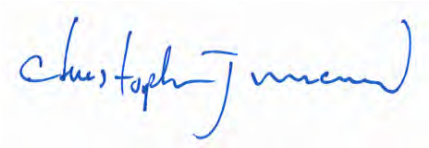
TABLE OF CONTENTS

WWPL-02 L1054659-01 WW

Collected by	Collected date/time	Received date/time
Fernando C. Aguirre	12/06/18 10:48	12/08/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1312	WG1214600	1	12/21/18 11:08	12/21/18 11:08	RT
Wet Chemistry by Method 300.0	WG1215390	10	12/26/18 21:50	12/26/18 21:50	MAJ

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.



Chris McCord
Project Manager

Preparation by Method 1312

Analyte	Result	Qualifier	Prep date / time	Batch
SPLP Extraction	-		12/21/2018 11:08:32 AM	WG1214600
Fluid	DIH2O		12/21/2018 11:08:32 AM	WG1214600
Final pH	7.27		12/21/2018 11:08:32 AM	WG1214600

Wet Chemistry by Method 300.0

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	419		0.519	10.0	10	12/26/2018 21:50	WG1215390

Method Blank (MB)

(MB) R3371410-1 12/26/18 09:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.0519	1.00

L1054033-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054033-01 12/26/18 13:22 • (DUP) R3371410-3 12/26/18 13:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	23.7	24.0	1	1.12		20

L1054652-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1054652-05 12/26/18 20:33 • (DUP) R3371410-7 12/26/18 21:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	12.6	12.5	1	0.384		20

Laboratory Control Sample (LCS)

(LCS) R3371410-2 12/26/18 10:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40.0	39.1	97.6	90.0-110	

L1054033-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1054033-01 12/26/18 13:22 • (MS) R3371410-4 12/26/18 13:52

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	23.7	72.0	96.6	1	80.0-120	

L1054326-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1054326-01 12/26/18 18:14 • (MS) R3371410-5 12/26/18 18:30 • (MSD) R3371410-6 12/26/18 18:45

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50.0	63.1	110	109	93.7	91.3	1	80.0-120	E	E	1.12	20

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.
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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).

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Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
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Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
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Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

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A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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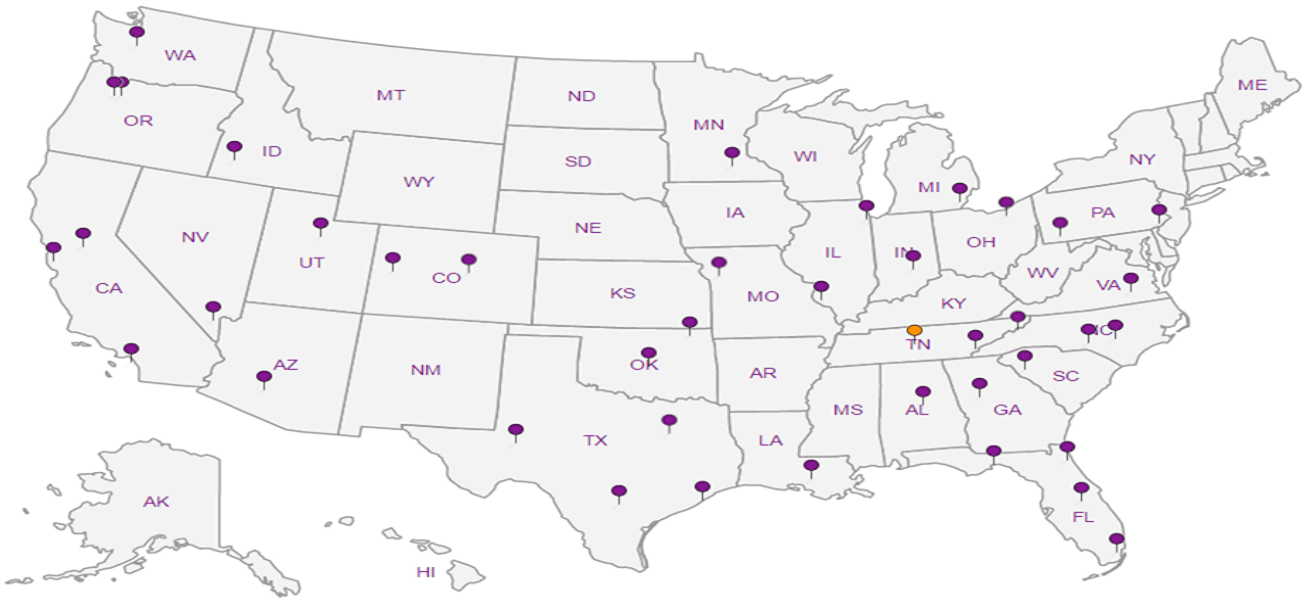


TRC Solutions - Austin, TX

505 E. Huntland Dr, Ste 250
Austin, TX 78752

Billing Information:
Accounts Payable
21 Griffin Road North
Windsor, CT 06095

Pres Chk

Report to: Julie Speer

Email To: jspeer@trcsolutions.com

Project Description: Navajo WW Effluent Pipeline Release

City/State Collected:

Phone: 512-684-3170
Fax:

Client Project #

Lab Project # TRCATX-WWEFF

Collected by (print): Fernando C. Aguirre

Site/Facility ID # NAVAJO REFINERY

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl,F,SO4 - 300 4ozClr-NoPres	GRO,V8260BTEXN 40ml/NaHSO4/Syr/MeOH	SPLP Se 4ozClr-NoPres	SV8270, DRO/MRO 4ozClr-NoPres								
WWPL-01	GRAB	SS	SURFACE	12.06.18	1040	6	X	X	X	X								-01
WWPL-02		SS		12.06.18	1048	6	X	X	X	X								-02
WWPL-03		SS		12.06.18	1057	6	X	X	X	X								-03
WWPL-04		SS		12.06.18	1107	6	X	X	X	X								-04
WWPL-05		SS		12.06.18	1114	6	X	X	X	X								-05
WWPL-06		SS		12.06.18	1121	6	X	X	X	X								-06
WWPL-07		SS		12.06.18	1130	6	X	X	X	X								-07
WWPL-08		SS		12.06.18	1138	6	X	X	X	X								-08
WWPL-09		SS		12.06.18	1147	6	X	X	X	X								-09
WWPL-10	↓	SS	↓	12.06.18	1158	6	X	X	X	X								-10

-61

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: ___ UPS (FedEx) ___ Courier _____

Tracking # 4430 3479 3899

Relinquished by: (Signature) — Date: 12.07.18 — Time: 1200 — Received by: (Signature)

Relinquished by: (Signature) — Date: — Time: — Received by: (Signature)

Relinquished by: (Signature) — Date: — Time: — Received for lab by: (Signature) Carol Kemp — Date: 12/8/18 — Time: 8:45

Trip Blank Received: Yes / No
HCL / MeOH
TR#

Temp: 1.1-1.0 °C — Bottles Received: 60

Hold:

Condition: NCF / (OK)

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

If preservation required by Login: Date/Time

Pace Analytical
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Chain of Custody Page ___ of ___

Lab # L1054659
A198
L1054659

Acctnum: TRCATX
Template: T143547
Prelogin: P683128
TSR: 526 - Chris McCord
PB:

Shipped Via:
Remarks | Sample # (lab only)

N 12/19/18

Andy Vann

From: Chris McCord
Sent: Wednesday, December 19, 2018 3:52 PM
To: Login; Sample Storage
Subject: L1051220 *TRCATX* Relog

Please relog L1051220-03 for SPLP CHLORIDE. Log as R5 due 12/27.

CHLORIDE will need to be logged as a WW to report method 300.

Thanks,
Christopher McCord
Project Manager

Pace Analytical National Center for Testing & Innovation
12065 Lebanon Road | Mt. Juliet, TN 37122
615.773.3281 | Cell 615.504.3183
cmccord@pacenational.com|pacenational.com

ESC Lab Sciences is now Pace Analytical National Center for Testing & Innovation! Please make note of my new email address and website.

& Innovation! Please make note of my new email address and website.

From: Speer, Julie [mailto:JSpeer@trcsolutions.com]
Sent: Wednesday, December 19, 2018 2:14 PM
To: Chris McCord
Subject: RE: Pace National Report & EDD for Navajo WW Effluent Pipeline Release L1051220

Chris,

Is it possible to run chloride SPLP on sample WWPL-02 (L1051220-03)?

Thank you,

Julie Speer, PG, EIT
TRC Austin
Office: (512) 684-3148
Cell: (512) 431-8184

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

January 17, 2019

TRC Solutions - Austin, TX

Sample Delivery Group:	L1059923
Samples Received:	01/08/2019
Project Number:	322192.0000.0000
Description:	Artesia Release

Report To: Julie Speer
505 E. Huntland Dr, Ste 250
Austin, TX 78752

Entire Report Reviewed By:

Chris McCord
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.

TABLE OF CONTENTS

WWPLBG-01 L1059923-01 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 01/04/19 13:06 | Received date/time: 01/08/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1222141	1	01/11/19 09:41	01/11/19 10:05	KDW
Wet Chemistry by Method 300.0	WG1222532	5	01/12/19 12:12	01/12/19 17:17	ELN

WWPLBG-02 L1059923-02 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 01/04/19 13:12 | Received date/time: 01/08/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1222141	1	01/11/19 09:41	01/11/19 10:05	KDW
Wet Chemistry by Method 300.0	WG1222532	1	01/12/19 12:12	01/12/19 17:31	ELN

WWPLBG-03 L1059923-03 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 01/04/19 13:16 | Received date/time: 01/08/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1222141	1	01/11/19 09:41	01/11/19 10:05	KDW
Wet Chemistry by Method 300.0	WG1222532	1	01/12/19 12:12	01/12/19 17:46	ELN

WWPLBG-04 L1059923-04 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 01/04/19 13:20 | Received date/time: 01/08/19 08:30

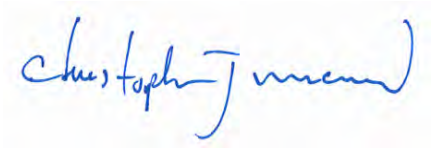
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1222141	1	01/11/19 09:41	01/11/19 10:05	KDW
Wet Chemistry by Method 300.0	WG1222532	1	01/12/19 12:12	01/12/19 18:29	ELN

WWPLBG-05 L1059923-05 Solid

Collected by: Fernando C. Aguirre | Collected date/time: 01/04/19 13:28 | Received date/time: 01/08/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1222141	1	01/11/19 09:41	01/11/19 10:05	KDW
Wet Chemistry by Method 300.0	WG1222532	1	01/12/19 12:12	01/12/19 18:44	ELN

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.



Chris McCord
Project Manager

This data package consists of this signature page, the laboratory review checklist, and the following reportable data as applicable:

R1 - Field chain-of-custody documentation;

R2 - Sample identification cross-reference;

R3 - Test reports (analytical data sheets) for each environmental sample that includes:

a. Items consistent with NELAC Chapter 5,

b. dilution factors,

c. preparation methods,

d. cleanup methods, and

e. if required for the project, tentatively identified compounds (TICs).

R4 - Surrogate recovery data including:

a. Calculated recovery (%R), and

b. The laboratory's surrogate QC limits.

R5 - Test reports/summary forms for blank samples;

R6 - Test reports/summary forms for laboratory control samples (LCSs) including:

a. LCS spiking amounts,

b. Calculated %R for each analyte, and

c. The laboratory's LCS QC limits.

R7 - Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a. Samples associated with the MS/MSD clearly identified,

b. MS/MSD spiking amounts,

c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,

d. Calculated %Rs and relative percent differences (RPDs), and

e. The laboratory's MS/MSD QC limits

R8 - Laboratory analytical duplicate (if applicable) recovery and precision:

a. The amount of analyte measured in the duplicate,

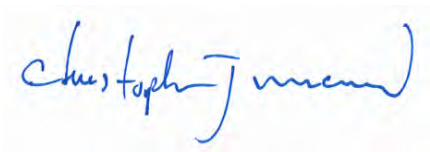
b. The calculated RPD, and

c. The laboratory's QC limits for analytical duplicates.

R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.

R10 - Other problems or anomalies.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.



Chris McCord
Project Manager

Laboratory Review Checklist: Reportable Data

Laboratory Name: ESC Lab Sciences	LRC Date: 01/17/2019 16:36
Project Name: Artesia Release	Laboratory Job Number: L1059923-01, 02, 03, 04 and 05
Reviewer Name: Chris McCord	Prep Batch Number(s): WG1222141 and WG1222532

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?			X		
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?		X			1
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?	X				
		If required for the project, are TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?			X		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?		X			2
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				

1. Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Supporting Data

Laboratory Name: ESC Lab Sciences	LRC Date: 01/17/2019 16:36
Project Name: Artesia Release	Laboratory Job Number: L1059923-01, 02, 03, 04 and 05
Reviewer Name: Chris McCord	Prep Batch Number(s): WG1222141 and WG1222532

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?			X		
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	Mass spectral tuning					
		Was the appropriate compound for the method used for tuning?			X		
		Were ion abundance data within the method-required QC limits?			X		
S4	O	Internal standards (IS)					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC Section 5.5.10)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?			X		
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs)					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results					
		Were percent recoveries within method QC limits?			X		
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chapter 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs)					
		Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Review Checklist: Exception Reports

Laboratory Name: ESC Lab Sciences	LRC Date: 01/17/2019 16:36
Project Name: Artesia Release	Laboratory Job Number: L1059923-01, 02, 03, 04 and 05
Reviewer Name: Chris McCord	Prep Batch Number(s): WG1222141 and WG1222532

ER #[1]	Description
1	WG1222532 R3375792-3 and 4: The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
2	300.0 WG1222532 Chloride: Relative Percent Difference is outside of established control limits.

1. Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.7		1	01/11/2019 10:05	WG1222141

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg	mg/kg		date / time	
Chloride	3160		4.64	10.0	58.3	5	01/12/2019 17:17	WG1222532

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.6		1	01/11/2019 10:05	WG1222141

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg	mg/kg		date / time	
Chloride	640		0.878	10.0	11.0	1	01/12/2019 17:31	WG1222532

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.3		1	01/11/2019 10:05	WG1222141

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg	mg/kg		date / time	
Chloride	361		0.890	10.0	11.2	1	01/12/2019 17:46	WG1222532

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	88.8		1	01/11/2019 10:05	WG1222141

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg	mg/kg		date / time	
Chloride	413		0.896	10.0	11.3	1	01/12/2019 18:29	WG1222532

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	86.6		1	01/11/2019 10:05	WG1222141

Wet Chemistry by Method 300.0

Analyte	Result (dry)	Qualifier	SDL (dry)	Unadj. MQL	MQL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg	mg/kg		date / time	
Chloride	927		0.919	10.0	11.6	1	01/12/2019 18:44	WG1222532

Method Blank (MB)

(MB) R3375315-1 01/11/19 10:05

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1059923-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1059923-01 01/11/19 10:05 • (DUP) R3375315-3 01/11/19 10:05

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	85.7	85.7	1	0.00420		10

Laboratory Control Sample (LCS)

(LCS) R3375315-2 01/11/19 10:05

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

Method Blank (MB)

(MB) R3375792-1 01/12/19 15:50

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	9.74	J	0.795	10.0

L1060206-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1060206-01 01/12/19 18:58 • (DUP) R3375792-5 01/12/19 19:13

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	157	141	1	10.9		20

L1060206-15 Original Sample (OS) • Duplicate (DUP)

(OS) L1060206-15 01/12/19 23:04 • (DUP) R3375792-6 01/12/19 23:18

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	71.1	53.4	1	28.4	J3	20

Laboratory Control Sample (LCS)

(LCS) R3375792-2 01/12/19 16:05

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	220	110	90.0-110	

L1059923-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1059923-01 01/12/19 16:34 • (MS) R3375792-3 01/12/19 16:48 • (MSD) R3375792-4 01/12/19 17:03

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 %
Chloride	583	2950	3540	3560	101	105	1	80.0-120	E	E	0.641	20

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.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
SDL	Sample Detection Limit.
SDL (dry)	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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
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.

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	LAO00356
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

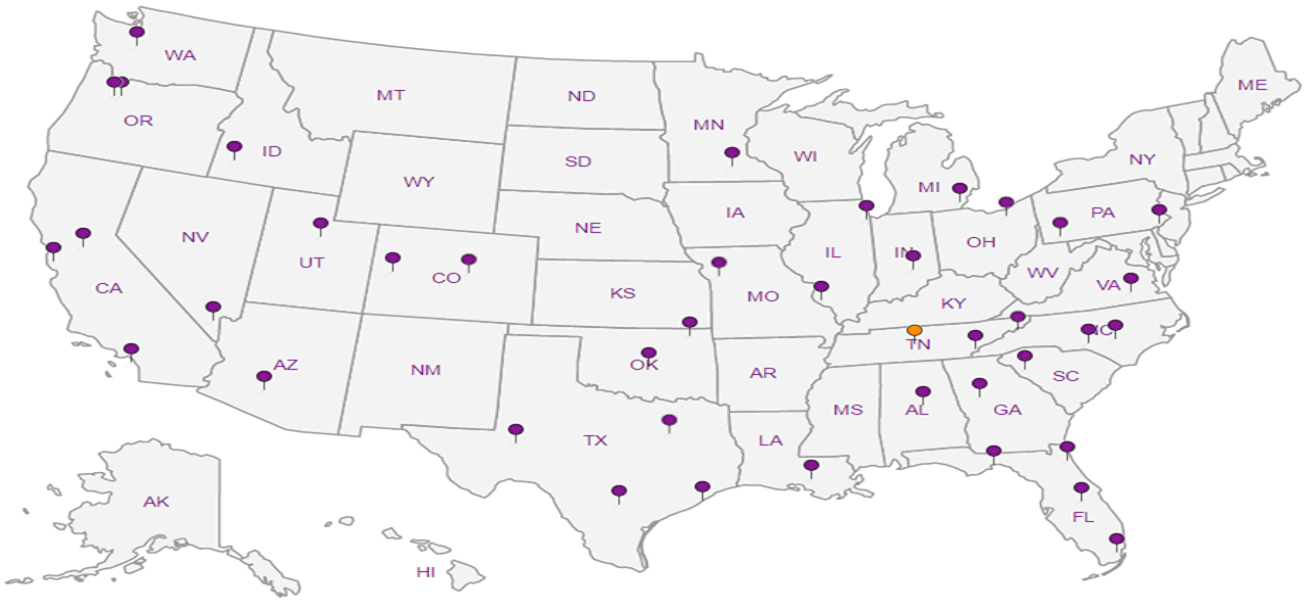
Third Party Federal Accreditations

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.



TRC Solutions - Austin, TX

505 E. Huntland Dr, Ste 250
Austin, TX 78752

Billing Information:
Accounts Payable
21 Griffin Road North
Windsor, CT 06095

Pres Chk

Report to: **Julie Speer**

Email To: jspeer@trcsolutions.com

Project Description: **Artesia Release**

City/State Collected:

Phone: **512-684-3170**
Fax:

Client Project # 322192.0000.0000

Lab Project # **TRCATX-ARTESIA**

Collected by (print): Fernando C. Herrera

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Anions, DRO/MRO 4ozClr-NoPres	MRCRA8 4ozClr-NoPres	V8260, GRO 40mlAmb/MeOH5ml/Syr	CHLORIDES - 500 9oz. Clr -NO PRES							Remarks	Sample # (lab only)
WWPLBG-01	GRAB	SS	Surface	01.04.19	1306	1				X								-01
WWPLBG-02		SS		01.04.19	1312	1				X								02
WWPLBG-03		SS		01.04.19	1316	1				X								03
WWPLBG-04		SS		01.04.19	1320	1				X								04
WWPLBG-05	GRAB	SS	Surface	01.04.19	1328	1				X								05
		SS																
		SS																
		SS																
		SS																
		SS																

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__UPS __FedEx __Courier _____

Tracking # 4430 3429 2811; 2800

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

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Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1059923

T: 1212

Acctnum: **TRCATX**
Template: **T144521**
Prelogin: **P687777**
TSR: **526 - Chris McCord**
PB:
Shipped Via:

Sample Receipt Checklist
COC Seal Present/Intact: NP ✓Y N
COC Signed/Accurate: ✓Y N
Bottles arrive intact: ✓Y N
Correct bottles used: ✓Y N
Sufficient volume sent: ✓Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / (NO) HCL / MeoH TBR	If preservation required by Login: Date/Time
	01.07.19	1500			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.6 +0.2 °C Bottles Received: 8 73	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 1/8/19 Time: 0830	Hold: / Condition: NCF / OK

Andy Vann

From: Jason Romer
Sent: Thursday, January 10, 2019 2:44 PM
To: Jeremy W. Watkins
Cc: Login; Chris McCord
Subject: RE: TRCATX
Attachments: Scan1.pdf

Per client:

For samples WPL-01 through WPL-26, BG-01 through BG-05, and Dup-01 through Dup-03, please proceed with analysis for DRO, GRO, arsenic, chloride, fluoride, and sulfate.

Also, please analyze samples WWPLBG-01 through WWPLBG-05 as a **separate SDG**, and these samples are to be analyzed for chloride only.

Thanks,

Jason Romer
Project Manager

Pace Analytical National Center for Testing & Innovation
12065 Lebanon Road | Mt. Juliet, TN 37122
615.773.9713
jromer@pacenational.com | pacenational.com

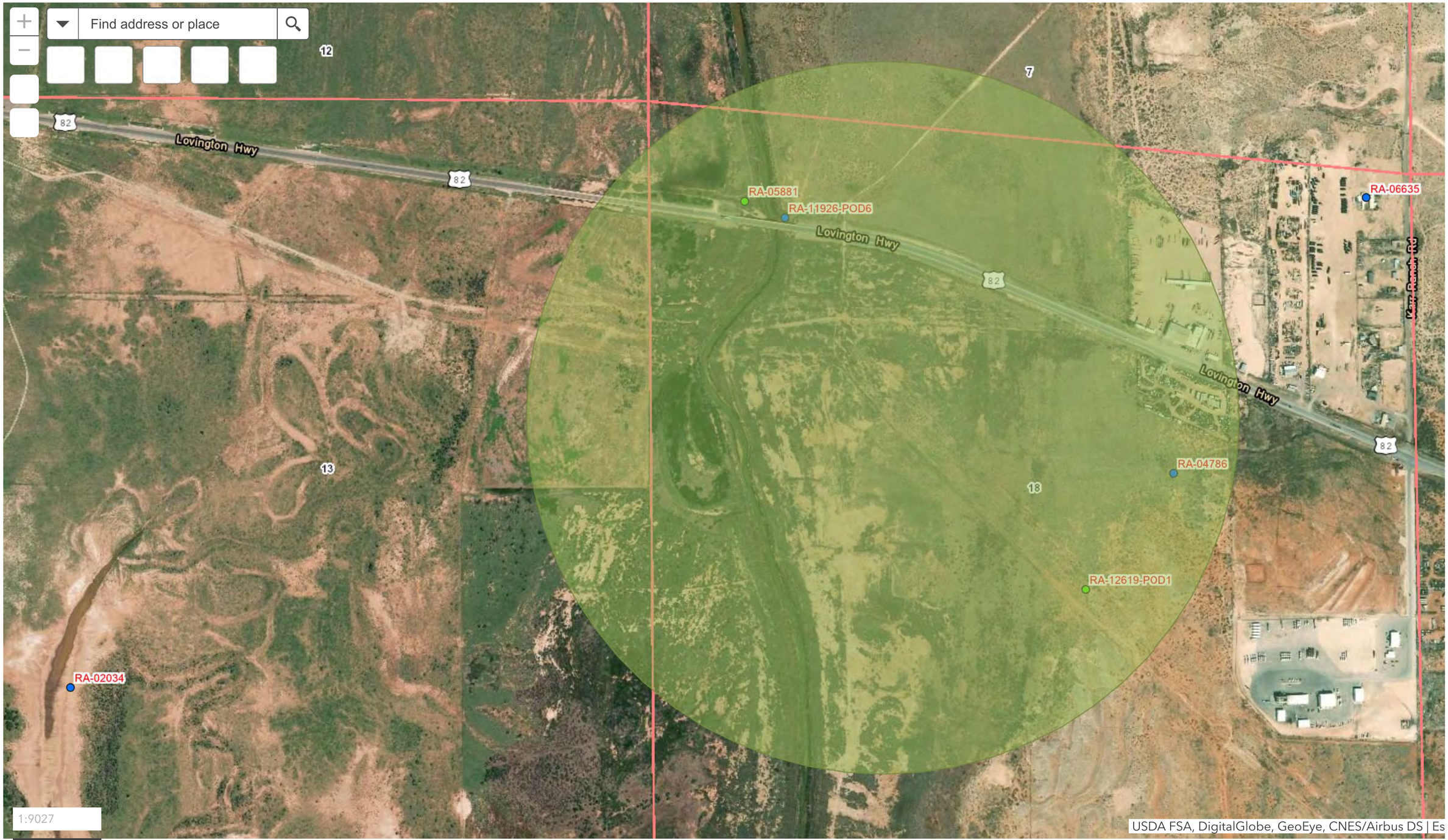
From: Jeremy W. Watkins
Sent: Tuesday, January 08, 2019 4:34 PM
To: Jason Romer
Subject: TRCATX

ATTACHMENT C

Summary of Potential Fresh Water Wells Located within 0.5-miles of the Release Location

OSE POD Locations

Water Rights Look Up



-104.306 32.841 Degrees

Points of Diversion (Water Wells) Identified within 0.5-miles of September 2018 Wastewater Effluent Pipeline Release

POD #	POD Status	Basin	Groundwater Source	Install Date	Well Depth (ft)	Primary Purpose/Use	Total Diversion (acre-ft/year)	Owner Name	Owner Address	Comments
RA 04786	Active	Roswell Artesian	Artesian	3/1/1963	138	Domestic	3.00	Dave Collier	Star Route East Artesia, NM	No residence present on parcel.
RA 12619	Pending	Roswell Artesian	NA	NA	Proposed 535	Domestic & Livestock	0.00	Legeta Hammond	PO Box 1765 Artesia, NM	Permit issued 5/4/2018; installation status unknown. No residence present on parcel.
RA 05881	Pending	Roswell Artesian	NA	NA	NA	Construction of Public Works	0.00	Woods Construction Co.	PO Box 238 Artesia, NM	Permit issued 1/21/1974, but POD Status is pending; permit requires meter, but well is not metered according to NM OSE records. Status unkown.
RA 11926	Active	Roswell Artesian	Shallow	5/9/2013	20	Monitor	0.00	Navajo Refining Company	PO Box 159 Artesia, NM	NM OSE mapped location incorrect.

NA = Not Available

Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Friday, January 4, 2019 11:35 AM
To: Chavez, Carl J, EMNRD
Cc: Griswold, Jim, EMNRD; Tsinnajinnie, Leona, NMENV; Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy)
Subject: [EXT] 2019-01-04 Initial C-141 form WW Effluent Release 2018-12-29.pdf
Attachments: 2019-01-04 Initial C-141 form WW Effluent Release 2018-12-29.pdf

Carl,
Please see the attached initial C-141 form for the waste water effluent release on 12/29/18. We will be following up shortly with a final report for the event.
If you have any questions or comments, please let us know.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

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: **HollyFrontier Navajo Refining LLC**	OGRID **15694**
Contact Name: **Robert Combs**	Contact Telephone: **575-746-5382**
Contact email: **Robert.Combs@hollyfrontier.com**	Incident # *(assigned by OCD)*
Contact mailing address: **501 E. Main St., Artesia, NM 88210**	

Location of Release Source

Latitude **32°51'15.41"N (32.854281)** Longitude **104°21'40.72"W (-104.361311)**
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: **Navajo Refining LLC**	Site Type: **Petroleum Refinery**
Date Release Discovered: **12/29/2018**	API# *(if applicable)*: **N/A**

Unit Letter	Section	Township	Range	County
	10 & 11	**17S**	**26E**	**Eddy**

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☒ Private (*Name:* **HollyFrontier Navajo Refining LLC**)

Nature and Volume of Release

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)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride 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) **Non-hazardous treated wastewater effluent**	Volume/Weight Released (provide units) **greater than 25 bbls**	Volume/Weight Recovered (provide units) **270 bbls**

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Cause of Release

The release occurred due to a failed collar on the pipeline that conveys treated wastewater from the Artesia refinery to offsite injection wells for disposal. The release was discovered based on a change in pipeline flow/pressure monitoring parameters. Wastewater effluent discharge pumps located at the refinery were immediately shut down and in-line valves were closed to minimize flow back. The release location and extent of the release area are shown on the attached figures.

The released wastewater reached Eagle Draw, which is an ephemeral watercourse located approximately 50 feet north of the release location. Eagle Draw primarily flows only following rain events and was dry at the time of the release. Therefore, the released wastewater did not come in contact with any surface water.

Free liquids were recovered with a vacuum truck and returned to the refinery wastewater treatment unit. The pipeline was repaired and returned to service on 12/30/18. A sample representative of the released wastewater was collected for laboratory analysis on 12/29/18. Laboratory results and further assessment actions are pending.

Was this a major release as defined by 19.15.29.7(A) NMAC?	If YES, for what reason(s) does the responsible party consider this a major release?
☒ Yes ☐ No	**Release volume is estimated to be greater than 25 bbls and released material reached an ephemeral watercourse (Eagle Draw) that was dry at the time of the release.**

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?

Robert Combs (Navajo Refining) called and left a voicemail for Carl Chavez (Oil Conservation Division) on 12/29/18 at 12:17 pm.

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 not been undertaken, explain why:

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.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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.

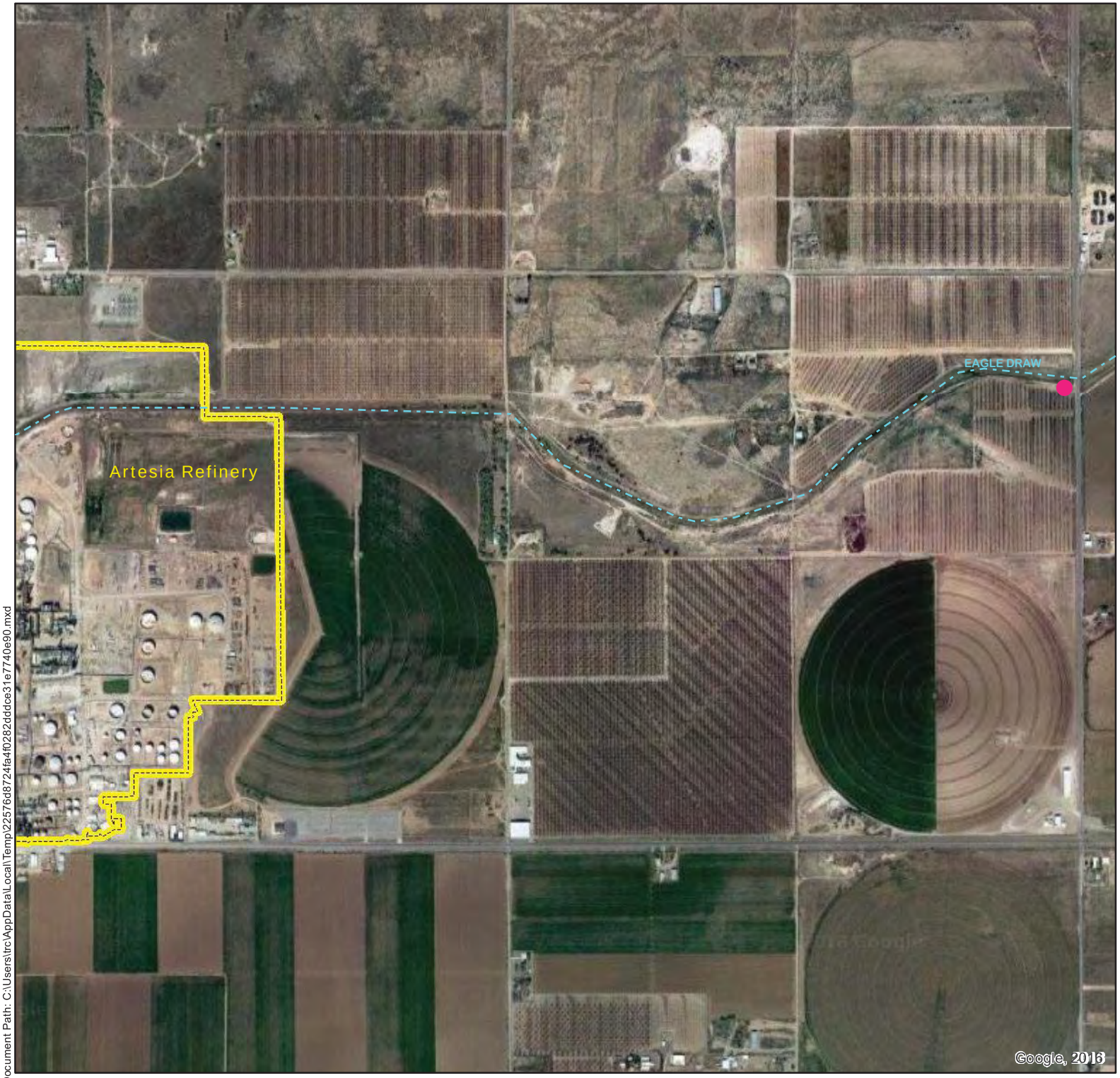
Printed Name: **Robert Combs** Title: **Environmental Specialist**

Signature: [signature] Date: 1/4/19

email: **Robert.Combs@hollyfrontier.com** Telephone: **575-746-5382**

OCD Only

Received by: _____ Date: _____



LEGEND

- FENCE
- WASTEWATER EFFLUENT PIPELINE RELEASE LOCATION, 12/29/2018

RELEASE LOCATION MAP - DECEMBER 2018 WASTEWATER EFFLUENT PIPELINE
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, GW-028
EDDY COUNTY, NEW MEXICO

N

0 0.225 0.45
mi

TRC
Results you can rely on
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

Document Path: C:\Users\trc\AppData\Local\Temp\225776d8724fa4f0282dddce31e7740e90.mxd

2018-12-29 Effluent Release

Legend

Varies 3'-6' wide

229

Excavated Area

N Hall

APPROXIMATE
EXTENT OF RELEASE

APPROXIMATE
RELEASE LOCATION

Google earth

N

200 ft

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, December 4, 2018 9:47 AM
To: 'Combs, Robert'
Cc: Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Griswold, Jim, EMNRD; Tsinnajinnie, Leona, NMENV; Speer, Julie (JSpeer@trcsolutions.com)
Subject: RE: [EXT] RE: Recent Artesia Refinery Power Outage and WWTS Releases

Robert:

Good morning.

The New Mexico Oil Conservation Division (OCD) will review the Closure Report and provide any final comments, etc.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Monday, December 3, 2018 1:10 PM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis (Randy) <Lewis.Dade@HollyFrontier.com>; Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us>; Tsinnajinnie, Leona, NMENV <Leona.Tsinnajinnie@state.nm.us>; Speer, Julie (JSpeer@trcsolutions.com) <JSpeer@trcsolutions.com>
Subject: RE: [EXT] RE: Recent Artesia Refinery Power Outage and WWTS Releases

Carl,

Navajo will be conducting soil sampling activities this week at the Artesia refinery to further assess the two wastewater releases that were discovered on 9/23/18 and 9/24/18. Both releases were associated with a refinery power outage and each initial C-141 form was submitted to OCD on 9/28/18. Upon receipt of the soil analytical results, Navajo will submit either a closure report or a remediation plan to OCD for review. Navajo plans to submit the closure report or remediation plan to OCD by 12/23/18, but will notify OCD immediately if there are any delays associated with the laboratory analyses.

Please let me know if you have any questions or would like to discuss.

Thank you,

Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, September 28, 2018 5:20 PM
To: Combs, Robert
Subject: RE: [EXT] RE: Recent Artesia Refinery Power Outage and WWTS Releases

Robert:

Received. Thank you.

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Friday, September 28, 2018 3:18 PM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Cc: VanHorn, Kristen, NMENV <Kristen.VanHorn@state.nm.us>; Denton, Scott <Scott.Denton@HollyFrontier.com>; Dade, Lewis (Randy) <Lewis.Dade@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Speer, Julie (JSpeer@trcsolutions.com) <JSpeer@trcsolutions.com>
Subject: [EXT] RE: Recent Artesia Refinery Power Outage and WWTS Releases

Carl,
Attached, please find the C-141 forms for the two releases related to the refinery power outage this past week. Each form includes a map with the spill location indicated. The characterization/remediation plans for these events are forthcoming, pending receipt of the water sample analyses.
If you have any questions or would like to discuss, please let me know.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, September 26, 2018 11:33 AM
To: Combs, Robert
Cc: VanHorn, Kristen, NMENV
Subject: Recent Artesia Refinery Power Outage and WWTS Releases

Robert:

I received your voice msg. from Monday, 9/24 at 16:04 regarding the power outage and 2 associated WWTS releases: 1) in the heart of refinery, and 2) effluent pipeline E of the refinery. C-141s are to follow.

You did not provide all of the information (see highlighted permit section below) in your verbal notification. Could you please provide the full verbal information to OCD and NMED before COB today?

2. C. Release Reporting: The Permittee shall comply with the following permit conditions, pursuant to 20.6.2.1203 NMAC, and may report a release using an OCD form C-141 , if it determines that a release of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, has occurred. The Permittee shall report unauthorized releases of water contaminants in accordance with any additional commitments made in its approved Contingency Plan. If the Permittee determines that any constituent exceeds the standards specified at 20.6.2.3103 NMAC, then it shall report a release to OCD.

1. Oral Notification: As soon as possible after learning of such a release, but in no event, more than twenty-four (24) hours thereafter, the Permittee shall notify OCD of a release. The Permittee shall provide the following:

• the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Permittee;
• the name and location of the facility;
• the date, time, location, and duration of the release;
• the source and cause of release;
• a description of the release, including its chemical composition;
• the estimated volume of the release; and,
• any corrective or abatement actions taken to mitigate immediate environmental damage from the release.

2. Written Notification: Within one week after the Permittee has discovered a release, the Permittee shall send initial written notification (may use an OCD form C-141 with attachments) to OCD verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.

3. Corrective Action: The Permittee shall undertake such corrective actions as are necessary and appropriate to contain and remove or mitigate the damage caused by the release along with the filing of subsequent corrective action reports with the OCD.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us

“Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?” (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see “Publications”)**

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Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Friday, September 28, 2018 3:18 PM
To: Chavez, Carl J, EMNRD
Cc: VanHorn, Kristen, NMENV; Denton, Scott; Dade, Lewis (Randy); Sahba, Arsin M.; Speer, Julie (JSpeer@trcsolutions.com)
Subject: [EXT] RE: Recent Artesia Refinery Power Outage and WWTS Releases
Attachments: 2018-09-28 Initial C141 - Sept2018 WWTP with map.pdf; 2018-09-28 Initial C141 - Sept2018 WW Pipeline with map.pdf

Carl,
Attached, please find the C-141 forms for the two releases related to the refinery power outage this past week. Each form includes a map with the spill location indicated. The characterization/remediation plans for these events are forthcoming, pending receipt of the water sample analyses.
If you have any questions or would like to discuss, please let me know.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, September 26, 2018 11:33 AM
To: Combs, Robert
Cc: VanHorn, Kristen, NMENV
Subject: Recent Artesia Refinery Power Outage and WWTS Releases

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• the name, address, and telephone number of the person or persons in charge of the facility, as well as of the Permittee;
• the name and location of the facility;
• the date, time, location, and duration of the release;
• the source and cause of release;
• a description of the release, including its chemical composition;
• the estimated volume of the release; and,
• any corrective or abatement actions taken to mitigate immediate environmental damage from the release.
2. Written Notification: Within one week after the Permittee has discovered a release, the Permittee shall send initial written notification (may use an OCD form C-141 with attachments) to OCD verifying the prior oral notification as to each of the foregoing items and providing any appropriate additions or corrections to the information contained in the prior oral notification.
3. Corrective Action: The Permittee shall undertake such corrective actions as are necessary and appropriate to contain and remove or mitigate the damage caused by the release along with the filing of subsequent corrective action reports with the OCD.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
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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: **HollyFrontier Navajo Refining LLC**	OGRID **15694**
Contact Name: **Robert Combs**	Contact Telephone: **575-746-5382**
Contact email: **Robert.Combs@hollyfrontier.com**	Incident # *(assigned by OCD)*
Contact mailing address: **501 E. Main St., Artesia, NM 88210**	

Location of Release Source

Latitude **32°51'1.15"N (32.85032)** Longitude **104°23'34.61"W (-104.39295)**
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: **HollyFrontier Navajo Refining LLC**	Site Type: **Petroleum Refinery**
Date Release Discovered: **9/23/2018, approx. 22:50**	API# *(if applicable)*: **N/A**

Unit Letter	Section	Township	Range	County
	9	**17S**	**26E**	**Eddy**

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☒ Private (*Name:* **HollyFrontier Navajo Refining LLC**)

Nature and Volume of Release

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)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride 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) **Non-hazardous treated wastewater**	Volume/Weight Released (provide units) **greater than 25 bbls**	Volume/Weight Recovered (provide units) **Volume unknown, free liquids were recovered and pumped into the refinery process sewer (which feed into the refinery wastewater treatment plant).**

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Cause of Release

The refinery experienced a power outage at 19:41 on 9/23/18 that lasted approximately 6 hours. The power outage caused a wastewater surge tank (T-897) to overflow into the refinery process area containment, which drains into the refinery process sewers. Some of the released wastewater overtopped the secondary containment and then flowed through a nearby road culvert to a depression north of the wastewater treatment unit. The release location and extent of the release area outside the secondary containment is shown on the attached figure. The release did not reach any watercourses.

The release from the surge tank occurred at 19:44 on 9/23/18. However, the occurrence and duration of the release (i.e., overtopping) from the refinery process area containment is unknown. Free liquids were recovered from outside the secondary containment and placed into the refinery process sewer. A sample representative of the released wastewater was collected for laboratory analysis. Laboratory results and further assessment actions are pending.

Was this a major release as defined by 19.15.29.7(A) NMAC?	If YES, for what reason(s) does the responsible party consider this a major release?
☒ Yes ☐ No	**Release volume is estimated to be greater than 25 bbls.**

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?

Robert Combs (Navajo) called and left a voicemail for Carl Chavez (Oil Conservation Division) on 9/24/18 at 16:04.

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 not been undertaken, explain why:

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.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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.

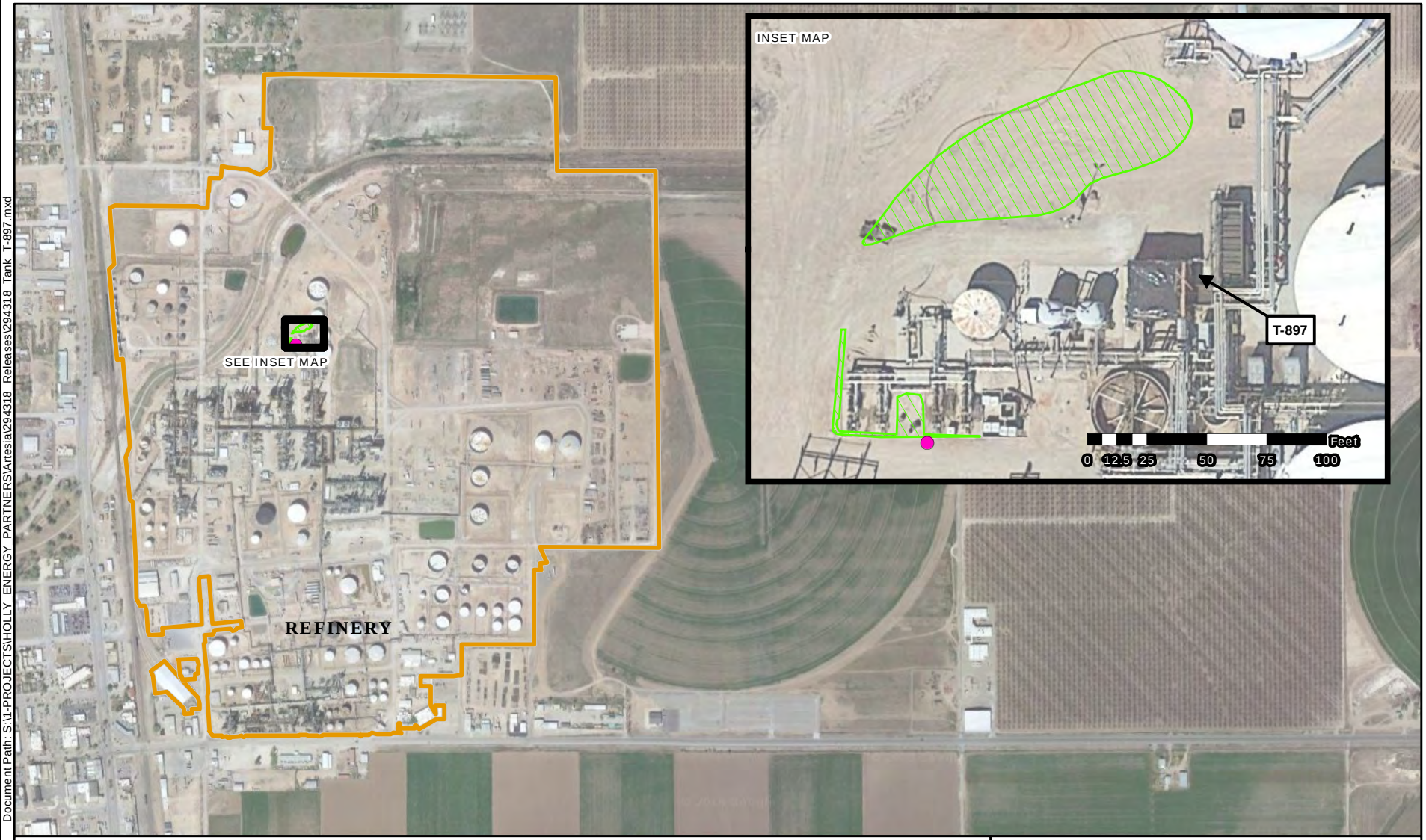
Printed Name: **Robert Combs** Title: **Environmental Specialist**

Signature: [signature] Date: 9/28/18

email: **Robert.Combs@hollyfrontier.com** Telephone: **575-746-5382**

OCD Only

Received by: _____ Date: _____



Document Path: S:\1-PROJECTS\HOLLY_ENERGY_PARTNERS\Artesia\294318_Releases\294318_Tank_T-897.mxd

LEGEND

- WASTEWATER TREATMENT PLANT TREATED WASTEWATER RELEASE LOCATION FROM SECONDARY CONTAINMENT (9/23/18)
- EXTENT OF RELEASE
- FENCELINE

N

0 500 1,000
Feet

SOURCE: BASE MAP AERIAL IMAGE FROM GOOGLE EARTH AND THEIR DATA PARTNERS, 3/12/2016.

SEPTEMBER 2018 WASTEWATER RELEASE, TANK T-897 AT REFINERY WASTEWATER TREATMENT PLANT

HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

PROJECT NUMBER: 294318	FILE NAME: 294318_Tank_T-897
AUTHOR: MHORN	DATE: 9/28/2018

TRC
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE 1

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, November 29, 2017 10:38 AM
To: 'Combs, Robert'
Cc: Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Griswold, Jim, EMNRD
Subject: RE: 2017-10-22 Effluent Pipeline Release

Robert, et al.:

The New Mexico Oil Conservation Division (OCD) approves the corrective action(s) approach for the above subject release documented by Navajo below.

OCD awaits the receipt of the Final C-141 with attachments verifying soils have been remediated from the pipeline release.

Please contact me if you have questions. Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]
Sent: Wednesday, November 1, 2017 6:56 AM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis (Randy) <Lewis.Dade@HollyFrontier.com>
Subject: RE: 2017-10-22 Effluent Pipeline Release

Carl,

Please see below for our remediation plan for the wastewater effluent release on 10/22/17. The release occurred from the Navajo pipeline that conveys treated wastewater from Navajo's Artesia Refinery (refinery) to injection wells for disposal in accordance with Discharge Permit GW-028 and UIC permits.

1. Actions completed:
    a. Operations noticed flow and pressure changes and immediately shut down the pipeline.
    b. The leak location was found and area was excavated to enable repairs of the line.
    c. The impacted area was defined by wet soil, there was no staining present. Personnel used paint to outline the wet area.

d. Free liquids, primarily from within the excavation, were removed by vacuum truck and returned to the refinery.

e. A sample of the discharge water was collected near the pipeline pumps within the refinery and submitted for analysis of WQCC constituents (20.6.2.3103 A-C).

f. Soil removed from the excavation was segregated by appearance with wet soil defined as impacted and dry soil as not impacted.

g. The line was put back in service on 10/24/17.

2. Future Actions Pending Completion:

a. Backfill of the excavation is underway utilizing sand from an off-site source to fill around the pipeline and will be completed using the dry excavation material. This is ongoing and expected to be complete by 11/3/17.

b. The wet impacted soil from the line repair excavation will be characterized and disposed.

c. Five discrete surface samples will be collected from within the outlined area to provide impacted concentrations and five discrete samples will be collected outside of the wet area to provide background concentrations. The samples will be analyzed for COCs that exceeded WQCC standards in the water effluent collected within the refinery. One duplicate sample will be collected from within the spill area and background location. Based on the attached preliminary report for the released water, the soil will be analyzed for fluoride, chloride, sulfate, iron, and DRO. Adequate sample volume will be collected for potential SPLP analysis.

d. If the samples within the spill area (surface impacts) exceed the average concentrations of the background samples, those parameters will be analyzed for SPLP to determine leachability. If the SPLP concentrations exceed the WQCC standards, then those areas that exceed will be excavated to average background concentrations.

e. Excavation of the area with SPLP exceedances will be limited due to the presence of several other buried pipelines and will proceed as needed.

f. Confirmation samples will be collected from the bottom of the excavation for surface impacts. The confirmation samples will be analyzed for the same constituents that exceeded the WQCC standard for SPLP and results will be compared to the average background concentrations. The confirmation samples will also be analyzed for SPLP if concentrations exceed the average background concentrations. Additional excavation will be conducted as necessary.

g. A letter report with findings and actions taken will be prepared and submitted to OCD with the Final C-141 form. This submittal will include all analytical reports, photos, copies of any waste manifests, and a discussion of the investigation findings.

We intend to implement this remediation plan (Item 2 above) by 11/3/17. Please reply to this email with any comments, or give me a call to discuss.

Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159

Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, October 31, 2017 4:51 PM
To: Combs, Robert
Subject: RE: 2017-10-22 Effluent Pipeline Release

Robert:

The New Mexico Oil Conservation Division is in receipt of your C-141 submittal and will respond soon.

Also, after speaking with you this afternoon, a remediation plan will soon be submitted.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see "Publications")**

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]
Sent: Friday, October 27, 2017 3:34 PM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis (Randy) <Lewis.Dade@HollyFrontier.com>; Orosco, Richard <Richard.Orosco@HollyFrontier.com>
Subject: 2017-10-22 Effluent Pipeline Release

Carl,
Please see the attached initial C-141 form for the effluent pipeline release from 10/22/17.
If you have any questions please call to discuss.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

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Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Friday, October 27, 2017 3:34 PM
To: Chavez, Carl J, EMNRD
Cc: Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Orosco, Richard
Subject: 2017-10-22 Effluent Pipeline Release
Attachments: 2017-10-22 Effluent Leak Initial C-141.pdf

Carl,
Please see the attached initial C-141 form for the effluent pipeline release from 10/22/17.
If you have any questions please call to discuss.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

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

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

Form C-141
Revised April 3, 2017

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company: HollyFrontier Navajo Refining LLC	Contact Robert Combs
Address: 501 E. Main, Artesia, NM 88210	Telephone No. 575-746-5382
Facility Name: HollyFrontier Navajo Refining LLC	Facility Type Petroleum Refinery

Surface Owner	Mineral Owner	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County

Latitude 32°51'12.59"N **Longitude** 104°22'41.30"W NAD83

NATURE OF RELEASE

Type of Release Treated Refinery waste water effluent	Volume of Release: >25 bbls	Volume Recovered: TBD
Source of Release Effluent pipeline	Date and Hour of Occurrence 10/22/17, ~9:15 a.m.	Date and Hour of Discovery 10/22/17, ~11:00 a.m.
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Carl Chavez, OCD Santa Fe, left message	
By Whom? Robert Combs	Date and Hour 10/22/17 1:05 p.m.	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.* The treated waste water effluent pipeline developed a leak at approximately 9:15 a.m. on 10/22/17 as determined by the decrease in the effluent line pressure and increase in discharge flow. The pipeline pumps were shut down immediately.

Describe Area Affected and Cleanup Action Taken.*
The leak location was identified at approximately 11:00 a.m. on 10/22/17 at the Bolton Rd crossing, adjacent to Eagle Draw; an aerial photo is attached with the spill location indicated. The leak occurred within a steel cased section of the pipeline that passes below Bolton Rd. The water reached the surface on the east side of Bolton Rd and flowed to the south and southeast of the leak location, but did not enter Eagle Draw. A contract company was called to excavate and make line repairs. Soil was piled along the sidewalls of the waterway and impacted soil was segregated based on appearance (no staining present, only based on wet soil). Vacuum trucks were used to recover free liquid and returned the water to the refinery. The recovered volume will be reported with the final C-141 form.
A water sample was collected from the pipeline near the effluent pipeline pumps and submitted for analysis of WQCC standards (20.6.2.3103A-C NMAC). Pending those results, the site will be characterized for any parameters that exceed the standards.
The segregated (wet) material will be disposed at a non-hazardous waste facility as well as any remediation waste from the surface cleanup, if appropriate. A final C-141 form will be submitted following these actions as well as photos, analytical results, and any disposal records.

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

Signature:	OIL CONSERVATION DIVISION	
Printed Name: Robert Combs	Approved by Environmental Specialist:	
Title: Environmental Specialist	Approval Date:	Expiration Date:
E-mail Address: robert.combs@hollyfrontier.com	Conditions of Approval:	Attached ☐
Date: 10/27/17 Phone: 575-746-5382		

* Attach Additional Sheets If Necessary

HFNR Release 10/22/17

Release location and spill area

Legend

10/22/17 WW Effluent Release Location, 32°51'12.59"N, 104°22'41.30"W

10/22/17 WW Effluent Release Location, 32°51'12.59"N, 104°22'41.30"W

Google earth

N

90 ft

Analytical Report
Lab Order **1710C41**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project:
Collection Date:
Lab ID: 1710C41-002
Matrix: TRIP BLANK
Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0096		µg/L	1	10/25/2017 11:08:44 PM	34591
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Toluene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Ethylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Naphthalene	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1-Methylnaphthalene	ND	4.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
2-Methylnaphthalene	ND	4.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Acetone	ND	10		µg/L	1	10/25/2017 9:53:00 AM	R46616
Bromobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Bromodichloromethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Bromoform	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Bromomethane	ND	3.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
2-Butanone	ND	10		µg/L	1	10/25/2017 9:53:00 AM	R46616
Carbon disulfide	ND	10		µg/L	1	10/25/2017 9:53:00 AM	R46616
Carbon Tetrachloride	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Chlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Chloroethane	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Chloroform	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Chloromethane	ND	3.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
2-Chlorotoluene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
4-Chlorotoluene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
cis-1,2-DCE	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Dibromochloromethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Dibromomethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1-Dichloroethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1-Dichloroethene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2-Dichloropropane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project:
Collection Date:
Lab ID: 1710C41-002 **Matrix:** TRIP BLANK **Received Date:** 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,3-Dichloropropane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
2,2-Dichloropropane	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1-Dichloropropene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Hexachlorobutadiene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
2-Hexanone	ND	10		µg/L	1	10/25/2017 9:53:00 AM	R46616
Isopropylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
4-Isopropyltoluene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
4-Methyl-2-pentanone	ND	10		µg/L	1	10/25/2017 9:53:00 AM	R46616
Methylene Chloride	ND	3.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
n-Butylbenzene	ND	3.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
n-Propylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
sec-Butylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Styrene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
tert-Butylbenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
trans-1,2-DCE	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Trichlorofluoromethane	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Vinyl chloride	ND	1.0		µg/L	1	10/25/2017 9:53:00 AM	R46616
Xylenes, Total	ND	1.5		µg/L	1	10/25/2017 9:53:00 AM	R46616
Surr: 1,2-Dichloroethane-d4	99.6	70-130		%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: 4-Bromofluorobenzene	99.6	70-130		%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: Dibromofluoromethane	103	70-130		%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: Toluene-d8	100	70-130		%Rec	1	10/25/2017 9:53:00 AM	R46616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report
Lab Order **1710C41**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project:
Lab ID: 1710C41-001 **Matrix:** AQUEOUS

Client Sample ID: Waste Water Effluent to Wells
Collection Date: 10/23/2017 9:45:00 AM
Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **JLF**	
Arsenic	0.019	0.0010	*	mg/L	1	10/25/2017 9:34:41 PM	C46652
Lead	ND	0.00050		mg/L	1	10/25/2017 9:34:41 PM	C46652
Selenium	0.041	0.0010		mg/L	1	10/25/2017 9:34:41 PM	C46652
Uranium	0.00070	0.00050		mg/L	1	10/25/2017 9:34:41 PM	C46652
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Fluoride	30	2.0	*	mg/L	20	10/25/2017 9:36:11 AM	R46679
Chloride	710	25		mg/L	50	10/25/2017 12:17:30 PM	R46679
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	10/25/2017 9:23:47 AM	R46679
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	10/25/2017 9:23:47 AM	R46679
Sulfate	920	10		mg/L	20	10/25/2017 9:36:11 AM	R46679
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	2680	40.0	*D	mg/L	1	10/26/2017 8:06:00 PM	34626
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.88		H	pH units	1	10/26/2017 5:49:34 PM	R46730
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **pmf**	
Aluminum	0.34	0.020	*	mg/L	1	10/25/2017 7:52:43 PM	A46658
Barium	0.010	0.0020		mg/L	1	10/25/2017 7:52:43 PM	A46658
Boron	0.13	0.040		mg/L	1	10/25/2017 7:52:43 PM	A46658
Cadmium	ND	0.0020		mg/L	1	10/25/2017 7:52:43 PM	A46658
Chromium	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Cobalt	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Copper	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Iron	1.8	0.20	*	mg/L	10	10/25/2017 7:59:56 PM	A46658
Manganese	0.14	0.0020	*	mg/L	1	10/25/2017 7:52:43 PM	A46658
Molybdenum	0.014	0.0080		mg/L	1	10/25/2017 7:52:43 PM	A46658
Nickel	ND	0.010		mg/L	1	10/25/2017 7:52:43 PM	A46658
Silver	ND	0.0050		mg/L	1	10/25/2017 7:52:43 PM	A46658
Zinc	0.094	0.010		mg/L	1	10/25/2017 7:52:43 PM	A46658
EPA METHOD 245.1: MERCURY						Analyst: **MED**	
Mercury	ND	0.00020		mg/L	1	10/27/2017 12:52:27 PM	34672
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0092		µg/L	1	10/25/2017 10:53:29 PM	34591
EPA METHOD 8082A: PCB'S						Analyst: **SCC**	
Aroclor 1016	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1221	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1232	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report
Lab Order **1710C41**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project:
Lab ID: 1710C41-001 **Matrix:** AQUEOUS

Client Sample ID: Waste Water Effluent to Wells
Collection Date: 10/23/2017 9:45:00 AM
Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8082A: PCB'S						Analyst: **SCC**	
Aroclor 1242	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1248	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1254	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1260	ND	1.0		µg/L	1	10/26/2017 2:09:00 PM	34612
Surr: Decachlorobiphenyl	67.6	50.4-123		%Rec	1	10/26/2017 2:09:00 PM	34612
Surr: Tetrachloro-m-xylene	64.8	41.2-147		%Rec	1	10/26/2017 2:09:00 PM	34612
EPA METHOD 8015M/D: DIESEL RANGE						Analyst: **TOM**	
Diesel Range Organics (DRO)	7.2	1.0		mg/L	1	10/27/2017 9:11:41 AM	34668
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	10/27/2017 9:11:41 AM	34668
Surr: DNOP	119	77.5-161		%Rec	1	10/27/2017 9:11:41 AM	34668
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	0.10	D	mg/L	2	10/25/2017 10:25:51 AM	G46639
Surr: BFB	114	69.3-150	D	%Rec	2	10/25/2017 10:25:51 AM	G46639
EPA METHOD 8310: PAHS						Analyst: **SCC**	
Naphthalene	ND	2.0		µg/L	1	10/26/2017 12:18:00 PM	34613
1-Methylnaphthalene	ND	2.0		µg/L	1	10/26/2017 12:18:00 PM	34613
2-Methylnaphthalene	ND	2.0		µg/L	1	10/26/2017 12:18:00 PM	34613
Acenaphthylene	ND	2.5		µg/L	1	10/26/2017 12:18:00 PM	34613
Acenaphthene	ND	2.0		µg/L	1	10/26/2017 12:18:00 PM	34613
Fluorene	ND	0.80		µg/L	1	10/26/2017 12:18:00 PM	34613
Phenanthrene	ND	0.60		µg/L	1	10/26/2017 12:18:00 PM	34613
Anthracene	ND	0.60		µg/L	1	10/26/2017 12:18:00 PM	34613
Fluoranthene	ND	0.30		µg/L	1	10/26/2017 12:18:00 PM	34613
Pyrene	ND	0.30		µg/L	1	10/26/2017 12:18:00 PM	34613
Benz(a)anthracene	ND	0.070		µg/L	1	10/26/2017 12:18:00 PM	34613
Chrysene	ND	0.20		µg/L	1	10/26/2017 12:18:00 PM	34613
Benzo(b)fluoranthene	ND	0.10		µg/L	1	10/26/2017 12:18:00 PM	34613
Benzo(k)fluoranthene	ND	0.070		µg/L	1	10/26/2017 12:18:00 PM	34613
Benzo(a)pyrene	ND	0.070		µg/L	1	10/26/2017 12:18:00 PM	34613
Dibenz(a,h)anthracene	ND	0.12		µg/L	1	10/26/2017 12:18:00 PM	34613
Benzo(g,h,i)perylene	ND	0.12		µg/L	1	10/26/2017 12:18:00 PM	34613
Indeno(1,2,3-cd)pyrene	ND	0.25		µg/L	1	10/26/2017 12:18:00 PM	34613
Surr: Benzo(e)pyrene	83.6	49.1-127		%Rec	1	10/26/2017 12:18:00 PM	34613
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Toluene	7.0	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Ethylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project:
Lab ID: 1710C41-001 **Matrix:** AQUEOUS

Client Sample ID: Waste Water Effluent to Wells
Collection Date: 10/23/2017 9:45:00 AM
Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Methyl tert-butyl ether (MTBE)	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,4-Trimethylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,3,5-Trimethylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2-Dichloroethane (EDC)	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2-Dibromoethane (EDB)	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Naphthalene	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1-Methylnaphthalene	ND	8.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
2-Methylnaphthalene	ND	8.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Acetone	27	20	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Bromobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Bromodichloromethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Bromoform	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Bromomethane	ND	6.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
2-Butanone	ND	20	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Carbon disulfide	ND	20	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Carbon Tetrachloride	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Chlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Chloroethane	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Chloroform	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Chloromethane	ND	6.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
2-Chlorotoluene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
4-Chlorotoluene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
cis-1,2-DCE	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
cis-1,3-Dichloropropene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2-Dibromo-3-chloropropane	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Dibromochloromethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Dibromomethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2-Dichlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,3-Dichlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,4-Dichlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Dichlorodifluoromethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1-Dichloroethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1-Dichloroethene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2-Dichloropropane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,3-Dichloropropane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
2,2-Dichloropropane	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1-Dichloropropene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Hexachlorobutadiene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
2-Hexanone	ND	20	D	µg/L	2	10/25/2017 9:23:00 AM	R46616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Waste Water Effluent to Wells
Project:
Collection Date: 10/23/2017 9:45:00 AM
Lab ID: 1710C41-001 **Matrix:** AQUEOUS **Received Date:** 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Isopropylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
4-Isopropyltoluene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
4-Methyl-2-pentanone	ND	20	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Methylene Chloride	ND	6.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
n-Butylbenzene	ND	6.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
n-Propylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
sec-Butylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Styrene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
tert-Butylbenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,1,2-Tetrachloroethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,2,2-Tetrachloroethane	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Tetrachloroethene (PCE)	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
trans-1,2-DCE	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
trans-1,3-Dichloropropene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,3-Trichlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,4-Trichlorobenzene	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,1-Trichloroethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,2-Trichloroethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Trichloroethene (TCE)	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Trichlorofluoromethane	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,3-Trichloropropane	ND	4.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Vinyl chloride	ND	2.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Xylenes, Total	ND	3.0	D	µg/L	2	10/25/2017 9:23:00 AM	R46616
Surr: 1,2-Dichloroethane-d4	99.8	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: 4-Bromofluorobenzene	96.9	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: Dibromofluoromethane	103	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: Toluene-d8	101	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
TOTAL PHENOLICS BY SW-846 9067						Analyst: **SCC**	
Phenolics	39	2.5		µg/L	1	10/26/2017	34649

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500CN E-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Cyanide	0.0117		0.00500	1	10/30/2017 13:10	WG1036070

Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>
Sent: Friday, January 4, 2019 11:35 AM
To: Chavez, Carl J, EMNRD
Cc: Griswold, Jim, EMNRD; Tsinnajinnie, Leona, NMENV; Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy)
Subject: [EXT] 2019-01-04 Initial C-141 form WW Effluent Release 2018-12-29.pdf
Attachments: 2019-01-04 Initial C-141 form WW Effluent Release 2018-12-29.pdf

Carl,
Please see the attached initial C-141 form for the waste water effluent release on 12/29/18. We will be following up shortly with a final report for the event.
If you have any questions or comments, please let us know.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

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: **HollyFrontier Navajo Refining LLC**	OGRID **15694**
Contact Name: **Robert Combs**	Contact Telephone: **575-746-5382**
Contact email: **Robert.Combs@hollyfrontier.com**	Incident # *(assigned by OCD)*
Contact mailing address: **501 E. Main St., Artesia, NM 88210**	

Location of Release Source

Latitude **32°51'15.41"N (32.854281)** Longitude **104°21'40.72"W (-104.361311)**
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: **Navajo Refining LLC**	Site Type: **Petroleum Refinery**
Date Release Discovered: **12/29/2018**	API# *(if applicable)*: **N/A**

Unit Letter	Section	Township	Range	County
	10 & 11	**17S**	**26E**	**Eddy**

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☒ Private (*Name:* **HollyFrontier Navajo Refining LLC**)

Nature and Volume of Release

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)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride 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) **Non-hazardous treated wastewater effluent**	Volume/Weight Released (provide units) **greater than 25 bbls**	Volume/Weight Recovered (provide units) **270 bbls**

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Cause of Release

The release occurred due to a failed collar on the pipeline that conveys treated wastewater from the Artesia refinery to offsite injection wells for disposal. The release was discovered based on a change in pipeline flow/pressure monitoring parameters. Wastewater effluent discharge pumps located at the refinery were immediately shut down and in-line valves were closed to minimize flow back. The release location and extent of the release area are shown on the attached figures.

The released wastewater reached Eagle Draw, which is an ephemeral watercourse located approximately 50 feet north of the release location. Eagle Draw primarily flows only following rain events and was dry at the time of the release. Therefore, the released wastewater did not come in contact with any surface water.

Free liquids were recovered with a vacuum truck and returned to the refinery wastewater treatment unit. The pipeline was repaired and returned to service on 12/30/18. A sample representative of the released wastewater was collected for laboratory analysis on 12/29/18. Laboratory results and further assessment actions are pending.

Was this a major release as defined by 19.15.29.7(A) NMAC?	If YES, for what reason(s) does the responsible party consider this a major release?
☒ Yes ☐ No	**Release volume is estimated to be greater than 25 bbls and released material reached an ephemeral watercourse (Eagle Draw) that was dry at the time of the release.**

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?

Robert Combs (Navajo Refining) called and left a voicemail for Carl Chavez (Oil Conservation Division) on 12/29/18 at 12:17 pm.

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 not been undertaken, explain why:

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.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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.

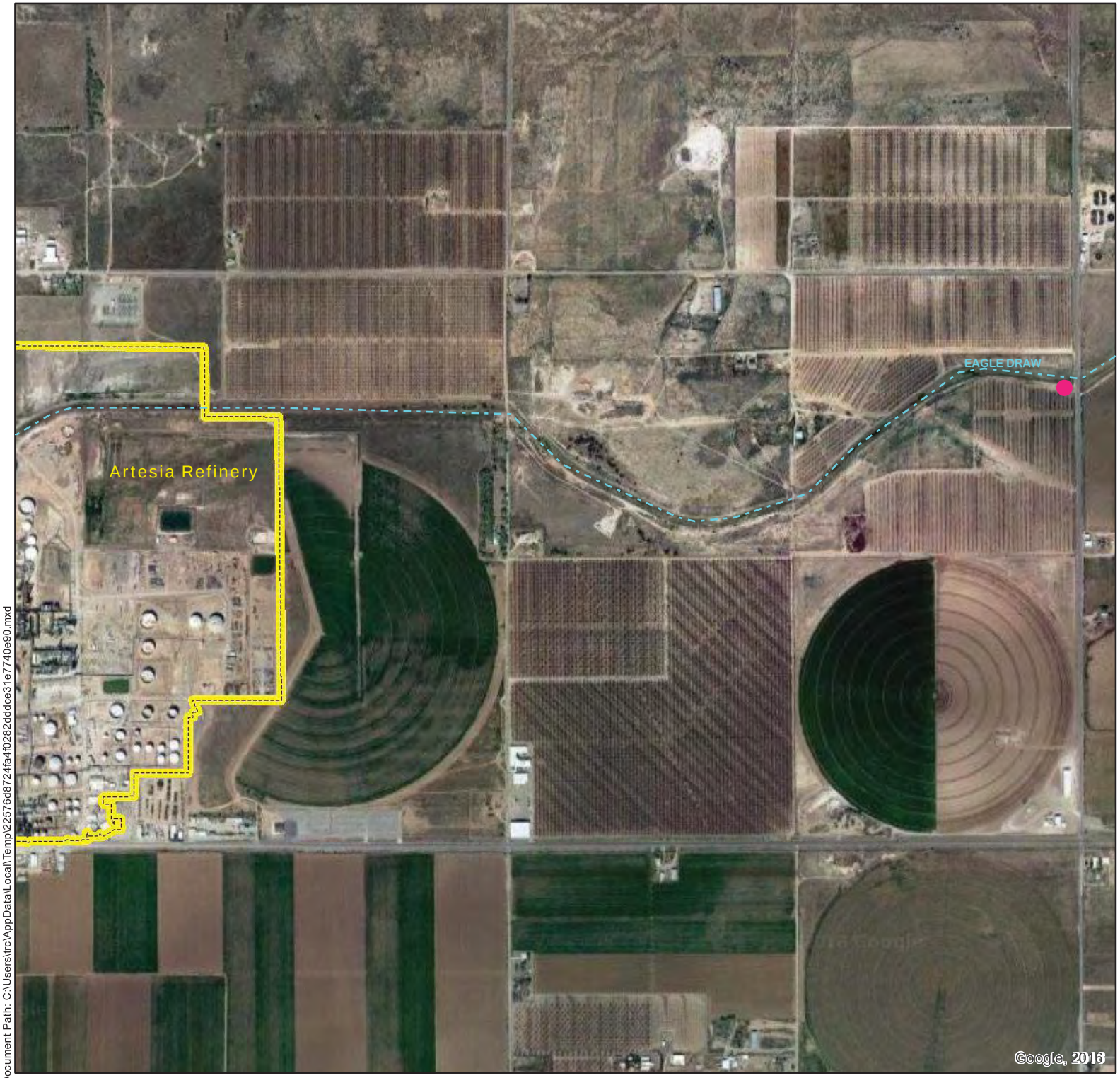
Printed Name: **Robert Combs** Title: **Environmental Specialist**

Signature: [signature] Date: 1/4/19

email: **Robert.Combs@hollyfrontier.com** Telephone: **575-746-5382**

OCD Only

Received by: _____ Date: _____



LEGEND

- FENCE
- WASTEWATER EFFLUENT PIPELINE RELEASE LOCATION, 12/29/2018

RELEASE LOCATION MAP - DECEMBER 2018 WASTEWATER EFFLUENT PIPELINE
HOLLYFRONTIER NAVAJO REFINING LLC
ARTESIA REFINERY, GW-028
EDDY COUNTY, NEW MEXICO

N

0 0.225 0.45
mi

TRC
Results you can rely on
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

Document Path: C:\Users\trc\AppData\Local\Temp\225776d8724fa4f0282dddce31e7740e90.mxd

2018-12-29 Effluent Release

Legend

Varies 3'-6' wide

229

Excavated Area

N Hall

APPROXIMATE
EXTENT OF RELEASE

APPROXIMATE
RELEASE LOCATION

Google earth

N

200 ft