

STAGE 2 ABATEMENT PLAN

**KAUFMAN NO. 1
HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
OCD No.: AP-0138**

January 3, 2020

Prepared for:



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At the request of Hilcorp Energy Company (Hilcorp), Timberwolf Environmental, LLC (Timberwolf) presents this Stage 2 Abatement Plan for the Kaufman No. 1 (Site). This document was prepared by the following Timberwolf personnel:



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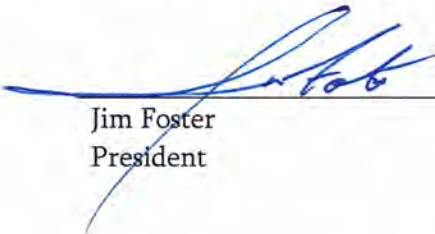
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1.0 Overview

1.1 Introduction

At the request of Hilcorp Energy Company (Hilcorp), Timberwolf Environmental, LLC (Timberwolf) presents this Stage 2 Abatement Plan for the Kaufman No. 1 (Site). The Site is located approximately 9.1 miles north of Farmington in San Juan County, New Mexico (Figures 1 – 3).

In a letter dated 08/29/19, the New Mexico Oil Conservation Division (NMOCD) notified Hilcorp that its Stage 1 Abatement Plan was administratively complete. On 11/12/19, Timberwolf received approval of a 60-day extension request for submitting the Stage 2 Abatement Plan. A copy of the extension request and approval is attached in Appendix A.

1.2 Site Description and Environmental Setting

The Site is situated on Federal land (managed by the Bureau of Land Management (BLM)) and is immediately east of the La Plata River (Figures 2 and 3). The Site is comprised of approximately 1 acre, all of which is located within the La Plata River flood plain and adjacent to riparian zones and wetlands.

The Site has been temporarily abandoned following a release in November 2018. All equipment has been taken out of service, including: storage tanks, separators, and a glycol dehydrator. Other surface equipment at the Site includes a wellhead and gas meter.

The Site is situated in a rural area and surrounding land use is predominantly recreational use and oil and gas production. According to the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), the Site soil is identified as Walrees loam, 0 to 2 percent slope. This soil series consist of a loam underlain by stratified gravelly sand; native salinity is very slightly saline to moderately saline (2.0 to 8.0 millimhos per centimeter (mmhos/cm)).

An unnamed intermittent stream located approximately 500 feet (ft) south of the Site empties into the La Plata River flood plain and has deposited sufficient sand to form a delta-like alluvial sediment deposit over the flood plain. This alluvial sediment extends north to approximately 100 ft of the Site and is visible on aerial photographs (e.g., Figure 3) and is characterized by sparse vegetation, most pronounced in the understory.

The average elevation at the Site is approximately 5,537 ft above mean sea level. Site topography is flat with a slight dip west, toward the La Plata River.

1.3 Site History

On 11/16/18, field personnel were on Site conducting routine well operations at the Kaufman No. 1. The well produced an unexpected and substantial volume of water, resulting in a tank overflow. The resultant release of oil and produced water, approximately 8 barrels (bbl) and 10 bbl, respectfully, was contained by the facility's secondary containment. The well was shut-in and initial cleanup operations commenced. Released fluids were recovered with a vacuum truck.

Enduring Resources was the operator of record at the time of the release; Hilcorp assumed operations of the Site on or about December 1, 2018. After Hilcorp assumed operations, the well was temporarily abandoned. All surface equipment within the tank battery was removed, and impacted soil within the battery was excavated and disposed at a permitted commercial disposal facility. The excavation was primarily along the eastern and southern portion of the former tank battery. The exaction was approximately 50 ft by 60 ft; the vertical extent of the excavation ranged from 1 ft to 5.5 ft deep into the upper saturated zone. A safety fence was constructed along the perimeter of the excavation.

1.4 Soil Investigation

In November 2018 and prior to Hilcorp assuming operations, Timberwolf conducted an initial sampling event to: 1) evaluate the effectiveness of initial response actions, 2) characterize the nature of the release (i.e., identify constituents of concern (COCs)) 3) determine the concentrations of COCs at the horizontal and vertical extents of the excavation, and 4) develop recommendations for further action to address remaining impacts. The initial soil assessment revealed COCs at the Site were petroleum hydrocarbons which were not delineated horizontally or vertically.

In January 2019, Timberwolf returned to the Site to collect additional data in an effort to better characterize the extent of soil and groundwater contamination. Activities included additional soil sampling, installation of groundwater monitoring wells, and groundwater sampling. Based on the site characterization activities, COCs present in Site soil included the following:

- Total BTEX (i.e., benzene, toluene, ethylbenzene, and xylene)
- Total petroleum hydrocarbons (TPH)

Soil assessment activities are documented in the Stage 1 Abatement Plan.

1.5 Groundwater Assessment

The groundwater assessment was conducted in January 2019 in conjunction with the soil investigation. Six monitor wells were installed across the Site. Monitor Well 1 (i.e., MW1) was installed immediately adjacent to the point of release. All other wells (i.e., MW2 through MW6)

were installed near the perimeter of the Site for horizontal delineation of groundwater constituents.

The groundwater assessment revealed the following:

- COCs in Site groundwater included: benzene, total dissolved solids (TDS) and sulfate
- The benzene plume was horizontally delineated
- Groundwater flow across the Site was to the west-southwest, towards the La Plata River
- Additional assessment was required to determine if TDS and sulfate concentrations observed in MW1 were a result of the release or is a native characteristic of Site groundwater.

Groundwater assessment activities are documented in the Stage 1 Abatement Plan.

1.6 Site Geology and Hydrogeology

Site geology consists of 0.5 ft of silt, underlain by approximately 3.5 ft of firm clay. Beneath the clay lies a groundwater sand (i.e., upper saturated zone) which is comprised of medium to very coarse sand; sand becomes coarser with depth with rock inclusions ranging in size from pebbles to cobbles.

During the groundwater assessment and installation of monitor wells, the shallow groundwater aquifer was at full capacity and groundwater was typically encountered at 4.5 ft bgs. However, weathered petroleum hydrocarbon, consistent with a historical release, was observed within the saturated zone at 9.0 ft bgs. This indicates that the aquifer may fluctuate seasonally (e.g., influenced by drought, snowmelt, etc.).

The La Plata River is situated along the western edge of the Site and appears to be in communication with groundwater. The excavation dug during the initial spill response extended into the upper saturated zone and is in direct communication with Site groundwater.

The potentiometric surface elevation (PSE) map created during the groundwater assessment conducted in January 2019 revealed the natural direction of groundwater flow to be west-southwest, towards the La Plata River (Figure 4). Currently, only one well (i.e., MW1), which is located adjacent and hydrologically downgradient from the point of release, has exceeded New Mexico human health criteria for groundwater as a result of the release. The COC is benzene.

1.7 Stage 1 Abatement Plan

On 06/18/19, Timberwolf submitted a Stage 1 Abatement Plan on behalf of Hilcorp to the NMOCD which 1) documented the soil and groundwater investigation, 2) outlined additional site assessment activities, and 3) defined conditions for soil abatement. Action items proposed in the Stage 1 Abatement Plan are summarized below:

- horizontally delineate historical soil impacts observed at approximately 9 ft bgs and located south, southwest, and west of the former tank battery
- assess the vadose zone to determine the leachability of Site soil and abate soil which may pose a threat to underlying groundwater
- conduct an ecological risk assessment to determine if soil within the upper 2 ft pose a risk to area threaten and endangered species and abate soil that may pose any such risk
- conduct additional groundwater sampling and analysis to determine if elevated concentrations of TDS and sulfate observed in MW1, located near the point of release, is a native condition of Site groundwater or is related to the release
- conduct a receptor survey to identify water wells within a 1 -mile radius of the Site and sensitive features within a ¼-mile radius of the Site
- conform with New Mexico Administrative Code (NMAC) 19.15.30 (*Remediation*) and collect sufficient data to present a Stage 2 Abatement Plan
- initiate quarterly groundwater monitoring.

NMOCD, in its letter dated 08/29/19, notified Hilcorp that the Stage 1 Abatement Plan was administratively complete. Upon receiving this notification, Timberwolf 1) provided written notice of the abatement plan to landowners within 1-mile radius of the Site, and 2) submitted public notice as required under NMAC 19.15.30.15. A list of landowners that were provided written notice, a representative copy of the written notice, and affidavits certifying public notices are provided in Appendix B.

1.8 Stage 2 Abatement Plan

A Stage 2 Abatement Plan was prepared to further evaluate benzene concentrations in groundwater and, if necessary, to abate constituents in groundwater which exceed the human health criteria. The Stage 2 Abatement Plan is presented in Section 11 of this report.

2.0 Applicable Remedial Targets

2.1 Introduction

Timberwolf developed site-specific criteria for vadose zone soil which are protective of groundwater as required under NMAC 19.15.30.9. Additionally, ecological criteria which is protective of area threatened and endangered species is presented. Soil and groundwater criteria for COCs are presented below.

2.2 Groundwater Protection Criteria – Soil

In accordance with NMAC 19.15.30.9 (A), samples impacted by petroleum hydrocarbons from the base and sidewalls of the initial excavation were analyzed for synthetic precipitation leaching procedure (SPLP) to develop a site-specific soil-to-groundwater migration criteria which is protective of groundwater which may be used for human consumption. SPLP is an Environmental Protective Agency (EPA) laboratory method (i.e., Solid Waste SW-846; Test Method 1312) designed to determine the leachability and mobility of both organic and inorganic constituents in liquids, soil, and waste.

With regards to soil, the SPLP procedure simulates water percolation, leaching, and natural weathering processes that are experienced within in situ subsurface soil. The purpose of the SPLP procedure is to: 1) establish the leachable fraction of a constituent, and 2) determine if that leachable fraction poses a risk to underlying groundwater.

Soil samples from the vadose zone with benzene concentrations ranging from 0.53 mg/kg to 6.2 mg/kg were selected for SPLP analysis. The SPLP benzene results were compared to the groundwater regulatory criteria presented in Section 2.4 of this report. If the SPLP results of a soil sample was lower than the groundwater regulatory criteria, then the constituent concentration from that sample is protective of groundwater. Analytical results of the SPLP benzene and corresponding BTEX results are presented in Table 1 below.

Table 1. Site-Specific Soil-to-Groundwater Migration Criteria

Sample ID	Date	SPLP Benzene (mg/L)	Volatile Organic Compound (mg/kg)			
			B	T	E	X
EB3	07/11/19	0.12	6.2	17	35	410
ESW3 2.5-3.5'	07/11/19	0.0072	0.67	< 0.24	4.7	27
ESW4 2.5-3.5'	07/11/19	< 0.001	0.53	0.14	2.4	12
Human Health Criteria – Groundwater		0.005	--	--	--	--

BTEX – benzene; toluene; ethylbenzene; xylene

mg/kg – milligrams per kilograms

mg/L – milligrams per liter

The SPLP results reveal that soil concentrations from the vadose zone which have a benzene concentration of 0.53 mg/kg or less do not pose a risk of leaching and percolating into underlying groundwater. Therefore, the site-specific SPLP criteria (i.e., applicable remedial target) for benzene in soil is 0.53 mg/kg.

To evaluate the threat to groundwater posed by total petroleum hydrocarbons (i.e., TPH), soil which had a TPH concentration that exceeded the NMOCD regulatory limit for the Site of 100 mg/kg were analyzed using the Texas Commission on Environmental Quality (TCEQ) Method 1006 (“Method 1006”). Method 1006 is a hydrocarbon fractionation analysis which speciates hydrocarbon chains into aliphatic and aromatic hydrocarbons with much shorter chain intervals than the EPA SW-846 Method 8015 which separates petroleum hydrocarbon chains into the following ranges: gasoline range organics (GRO) C6-C10; diesel range organics (DRO) C10-C28; motor oil range organics (ORO) C29-C35.

The results of Method 1006 analysis are compared to TCEQ Texas Risk Reduction Program (TRRP) soil-to-groundwater migration criteria to determine if soil TPH concentrations poses a risk to underlying groundwater. The TCEQ has established protective concentrations levels (PCL) for aliphatic and aromatic chains which protect underlying groundwater for human consumption. TCEQ soil criteria for the soil-to-groundwater migration pathway is presented in Table 2 below.

Table 2. TCEQ Soil-to-Groundwater Migration PCL for TPH

Constituent	PCL (mg/L)							
	C ₆	C ₆₋₈	C ₇₋₈	C ₈₋₁₀	C ₁₀₋₁₂	C ₁₂₋₁₆	C ₁₆₋₂₁	C ₂₁₋₃₅
Aliphatics	170	420	--	3,600	25,000	1,000,000	1,000,000	--
Aromatics	--	--	20.0	65.0	100	200	470	3,700

TCEQ – Texas Commission on Environmental Quality
 TRRP – Texas Risk Reduction Program
 TPH – total petroleum hydrocarbons
 mg/L – milligrams per liter
 PCL – protective concentration limit
 -- -- no established criteria

2.3 Ecological Protection Criteria – Soil

According to the BLM and the United States Fish and Wildlife Services (USFWS), the area surrounding the Site is critical habitat for the Southwestern willow flycatcher (*Empidonax traillii extimus*). The Southwestern willow flycatcher (“flycatcher”) is listed as a USFWS endangered species.

To ensure preservation of the area ecology, Timberwolf reviewed toxicological databases to determine an applicable PCL for the flycatcher (i.e., ecological PCL). Timberwolf utilized a preliminary ecological risk assessment produced by the Los Alamos National Laboratory (LANL) for applicable PCLs for the flycatcher. This study compared the effects of contaminants on similar species to establish a “no observable adverse effect level” NOAEL for the flycatcher. The NOAEL can be used as a conservative PCL for the flycatcher. A copy of the Los Alamos study is provided in Appendix C; PCLs for the Southwestern willow flycatcher are presented in Table 3.

Table 3. Soil PCLs for the Southwestern Willow Flycatcher

Sample ID	Volatile Organic Compound (mg/kg) ¹			
	B	T	E	X
PCL for the Southwestern willow flycatcher	26.36	25.98	97.1	7.7

PCL – protective concentration limit

BTEX – benzene; toluene; ethylbenzene; xylene

mg/kg – milligrams per kilograms

¹ – Limit established by Los Alamos National Laboratory

Soil in the upper 2 ft with BTEX concentrations that exceed the PCLs presented in Table 3 pose a ecological risk to the Southwestern willow flycatcher and require mitigation.

2.4 Human Health Criteria – Groundwater

Human health criteria for usable groundwater (i.e., total dissolved solids (TDS) less than 10,000 milligrams per kilograms (mg/L)) are established under NMAC 20.6.2§3103. Additionally, this statute provides standards for domestic water supply. These criteria present standards for a variety of constituents, including: metals, anions, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), certain radioactive isotopes, salinity, and pH.

Based on process knowledge, a constituent list prepared for the Site includes:

- VOCs
- SVOCs
- arsenic, barium, cadmium, chromium, mercury, lead, selenium, and silver (i.e., Resource Conservation and Recovery Act (RCRA)-8 metals)
- anions (i.e., chloride and sulfate)
- TDS
- pH.

The regulatory criteria for human health or domestic water supply for these constituents are provided in Table 4.

Table 4. Groundwater Regulatory Criteria

Constituent	Regulatory Criteria (mg/L)
Metals	
Arsenic	0.10 ¹
Barium	1.00 ¹
Cadmium	0.01 ¹
Chromium	0.05 ¹
Lead	0.05 ¹
Mercury	0.0002 ¹
Selenium	0.05 ¹
Silver	0.05 ¹
VOCs	
Benzene	0.01 ¹
Toluene	0.75 ¹
Ethylbenzene	0.75 ¹
Xylenes	0.62 ¹
PAHs (Total Naphthalene)	0.03 ¹
SVOCs	
Phenols	0.005 ²
General Water Chemistry	
Total Dissolved Solids	1,000 ²
Chloride	250 ²
Sulfate	600 ²
pH (units – s.u.)	6 – 9 ²

¹New Mexico human health standard

²New Mexico Standard for domestic water supply wells

mg/L – milligrams per liter

s.u. – standard units

VOCs – volatile organic compounds

SVOCs – semi-volatile organic compounds

3.0 Horizontal Delineation - Soil

3.1 Introduction

In July 2019, Timberwolf conducted a soil delineation at the Site. The purpose of the soil delineation was to delineate TPH-impacted soil observed during the installation of monitor wells MW4, MW5, and MW6.

3.2 Soil Investigation

During installation of monitor wells MW4, MW5, and MW6 in January 2019, TPH-impacted soil was observed within the saturated zone near 9 ft bgs. Concentrations of TPH ranged from 115 mg/kg to 230 mg/kg. On 06/21/19, Timberwolf contracted with Geomat, Inc of Farmington, New Mexico to install five soil borings (i.e., SB1 – SB5) to delineate TPH impacted soil.

The soil borings were installed west and south of MW4, MW5, and MW6 to provide horizontal delineation. Soil borings were installed using a rotary rig equipped with a hollow-stem auger. Soil samples were collected continuously from the surface to the total depth of each borings. Samples were logged for morphological characteristics, and field screened for VOCs using a photoionization detector (PID).

PID readings ranged from 0.15 parts per million (ppm) to 322 ppm; the highest PID reading was observed in SB1 at 9 ft bgs. Samples were collected for laboratory analysis from the interval exhibiting the highest PID reading or the boring terminus if PID readings were negligible.

Soil samples were collected directly into laboratory provided samples containers, stored on ice, and transported to Hall Environmental Analytical Laboratory (HEAL) of Albuquerque, New Mexico for chemical analysis. Laboratory analysis included TPH by EPA SW-846 Method 8015M/D.

3.3 Analytical Results

Laboratory reports documenting methods, analytical results, and chain-of-custody documents are attached in Appendix D. Analytical results for TPH are presented in Table 5 below and in Figure 5.

Table 5. TPH Delineation of Historical Soil Impacts – Saturated Zone

Sample ID	Date	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	Total TPH (mg/kg)
SB1 9-10'	06/21/19	< 5.0	< 9.0	< 45	< 45
SB2 9-10'	06/21/19	< 4.9	< 8.7	< 44	< 44
SB3 9-10'	06/21/19	< 5.0	< 8.9	< 44	< 44
SB4 9-10'	06/21/19	< 4.9	< 9.0	< 45	< 45
SB5 9-10'	06/21/19	< 4.9	< 9.6	< 48	< 48
Groundwater Protection Criteria – Soil¹		20	100	3,700	

¹Soil-to-groundwater migration pathway criteria for protection of human groundwater ingestion

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

GRO – gasoline range organics

DRO – diesel range organics

MRO – motor oil range organics

3.4 Summary

The soil delineation revealed that petroleum hydrocarbon (i.e., TPH) impacted soil observed within the saturated zone of MW4, MW5, and MW6 is localized to those area and is not present to the north, south, west or east.

4.0 Pilot Study of the Upper Saturated Zone

4.1 Introduction

On 11/04/19 and 11/05/19, Timberwolf conducted a pilot study of the upper saturated zone at the Site. The purpose, key elements of the study, and principle findings are presented below.

4.2 Purpose

The pilot study was conducted on 11/05/19 to determine the radius of influence a 2-inch well could produce in the saturated zone. The radius of influence is a critically important datum for in situ remedial system design.

4.3 Elements of Study

Timberwolf installed three (3) temporary gauging points (i.e. GP1, GP2, and GP3) which were located downgradient from MW1 at 25 ft, 40 ft and 50 ft, respectively. The temporary gauging points were constructed of 2-inch PVC well material and completed in the saturated zone. Borings were installed to depths of 7 ft bgs using a power auger. Gauging points were constructed of 5 ft of slotted 2-inch PVC and completed with 5 ft blank PVC risers. A 20/20 silica sand pack was installed across the screened intervals of each gauging point. The location of each gauging point is shown in Figure 6.

A vacuum truck was connected to MW1 using clear PVC pipe equipped with a cam-lock fitting. Prior to pulling vacuum and extracting water from MW1, depth to groundwater was measured in GP1, GP2, GP3, and MW4. Groundwater depth was measured every 15 minutes from the gauging points and two monitoring wells as water was extracted from MW1 via vacuum truck. The study (i.e., test) was conducted for a minimum of 2 hours or until the water depth became static in all wells. The clear PVC pipe between the vacuum hose and MW1 was monitored during the test to ensure that water was being extracted from MW1.

Once the test was completed and vacuum was removed from MW1, groundwater depths in gauging points were monitored to document recharge and confirm that the observed drop in groundwater elevation was a direct influence from the vacuum applied to MW1.

4.4 Pilot Study Results

Data collected during the pilot study is presented in Table 6 below.

Table 6. Pilot Study Results

Time	Depth to Groundwater (ft)			
	GP1	GP2	GP3	MW4
Distance from MW1 (ft)	25	40	50	56
08:30 (Initial)	5.30	6.03	5.41	5.09
Began Pilot Study at 08:50				
09:05	5.30	6.03	5.41	5.09
09:20	5.30	6.03	5.45	5.10
09:35	5.30	6.03	5.45	5.10
09:50	5.30	6.03	5.45	5.10
10:05	5.30	6.03	5.45	5.10
10:20	5.30	6.03	5.45	5.10
10:35	5.30	6.03	5.45	5.10
10:50	5.30	6.03	5.45	5.10
11:05	5.30	6.03	5.45	5.10
End Pilot Study at 11:15				
11:30	5.30	6.03	5.42	5.10
11:50	5.30	6.03	5.41	5.17
12:05	5.30	6.03	5.41	5.18

ft – feet

GP – gauging point

MW – monitor well

A radius of influence of 56 ft was observed in the saturated zone at MW4, located hydrologically side gradient from MW1. The influence at MW4 created a 0.01 ft drop in groundwater elevation after 30 minutes of applied vacuum. The observed influence at GP3, located 50 ft hydrologically downgradient from MW1 created a drop in groundwater elevation of 0.04 ft. Upon termination of the test the vacuum truck was used to remove water from the excavation. Groundwater elevation in GP3 returned to the initial reading after 30 minutes of test termination. However, MW4 continued to drop likely due to its proximity to the excavation and active removal of excavation water.

GP1 and GP2 did not show any groundwater movement. Since the gauging points were not installed using hollow-stem augers, this suggest an ineffective sand pack. The radius of influence observed during the pilot study is depicted in Figure 6.

4.5 Collection and Analysis of Groundwater

A hydrocarbon odor was observed in soil during the installation of GP3. The concentration of hydrocarbon orders appeared to increase at the groundwater interface; therefore, a groundwater samples was collected from GP3. The sample was collected using a dedicated bailer and transferred directly into laboratory containers with appropriate preservative. The groundwater sample was stored on ice, transferred under proper chain-of-custody protocol to HEAL of Albuquerque, New Mexico for chemical analysis.

The groundwater sample was analyzed for BTEX; laboratory reports documenting laboratory methods, analytical results, and chain-of-custody documents are attached in Appendix D. Analytical results are presented in Table 7 below.

Table 7. Groundwater Analytical Results from GP3

Sample ID	Volatile Organic Compound (mg/L)			
	B	T	E	X
GP3	0.055	0.001	0.038	0.21
Human Health Criteria	0.01	0.75	0.75	0.62

BTEX – benzene; toluene; ethylbenzene; xylene

mg/L – milligrams per liter

 Exceeds human health criteria

4.6 Plugging and Abandonment

Upon completion of the pilot study and groundwater collection from GP3, gauging points were removed and plugged to the surface with bentonite.

4.7 Conclusions

The pilot study revealed that the radius of influence in Site groundwater is 56 ft.

Additionally, a groundwater sample collected from GP3, located between MW1 and MW5, exceeded the New Mexico human health criteria for benzene. All other constituents of BTEX were below regulatory criteria.

5.0 Vadose Zone and Ecological Risk Assessments

5.1 Introduction

In July 2019, Timberwolf conducted a vadose zone assessment at the Site. The purpose of the assessment was to 1) determine if soil from the base and sidewalls of the initial excavation exceeded protection criteria for groundwater or ecological PCLs and, 2) if necessary, horizontally delineate soil for elevated constituents.

5.2 Sampling Methodology

Excavation samples for the vadose zone and ecological assessment were collected using a handauger, sharp-shooter shovel, or rotary rig equipped with hollow stem augers. Horizontally delineation samples were collected continuously from the surface to the total depth of each boring using a rotary rig. Samples were logged for morphological characteristics, and field screened for VOCs using a PID. Sample selected for ecological evaluation were from the 0 to 2.0 ft depth interval; samples selected for groundwater protection evaluation were collected from the 2.5 to 5.0 ft depth interval.

Selected soil samples were placed directly into laboratory provided sample containers, labeled, stored on ice, and transported under proper chain-of-custody protocol to certified environmental laboratory for chemical analysis. Laboratory analysis included one or more of the following using the described method:

- BTEX using EPA Method 8260
 - TPH using EPA Method 8015
 - TPH using TCEQ Method 1005
 - TPH using TCEQ Method 1006.
-

5.3 Vadose Zone Assessment

On 7/11/19, Timberwolf collected soil samples from the base and sidewalls of the initial excavation and collected seven samples surrounding the excavation for horizontal delineation. Eight samples were collected from the initial excavation base (i.e., EB1 – EB6, EB8, and EB9). Note: EB7 was inaccessible with hip waders and was not collected). Ten soil samples were collected from the initial excavation sidewalls (i.e., ESW1 – ESW5).

Sidewall samples were collected from the initial excavation from the 2.5-3.5 ft depth interval and based of exaction to determine if constituents in the vadose zone posed a risk to underlying

groundwater. Constituents were delineated with samples collected from seven soil borings (i.e., SB6 through SB12).

Soil samples were placed directly into laboratory provided containers, stored on ice, and transported under proper chain-of-custody to HEAL analysis of BTEX and TPH. Laboratory reports documenting methods, analytical results, and chain-of-custody documents are attached in Appendix D. Analytical results are presented in Table 8 below and in Figure 7.

Table 8. Vadose Zone Assessment


Sample ID	Volatile Organic Compound (mg/kg)				TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	TPH (mg/kg)
	B	T	E	X				
EB1	0.13	< 0.25	0.86	3.2	300	47	< 49	347
EB2	0.28	< 0.24	2.2	12	360	210	< 48	570
EB3	6.2	17	35	410	3,700	2,000	< 480	5,700
EB4	< 0.024	< 0.049	0.081	0.24	51	< 9.8	< 49	51
EB5	0.35	< 0.49	1.6	3	110	53	< 49	163
EB6	1.5	0.86	7.7	68	1,700	210	< 48	1,910
EB7	Sample area inaccessible due to excavation water level							
EB8	< 0.025	< 0.050	< 0.05	< 0.1	50	220	130	400
EB9	1.7	< 0.24	13	120	1,200	410	< 47	1,610
ESW1 0-2'	< 0.024	< 0.049	< 0.049	< 0.098	< 4.9	13	< 49	13
ESW1 2.5-3.5'	< 0.025	< 0.05	< 0.05	< 0.1	< 5.0	< 9.5	< 48	< 48
ESW2 0-2'	< 0.12	< 0.24	< 0.24	< 0.49	180	700	< 47	880
ESW2 2.5-3.5'	< 0.05	< 0.1	0.19	0.63	77	110	< 48	187
ESW3 0-2'	< 0.12	< 0.24	< 0.24	0.8	120	290	< 47	410
ESW3 2.5-3.5'	0.67	< 0.24	4.7	27	530	170	< 49	700
ESW4 0-2'	2.0	2.8	9.8	190	2,200	1,000	< 480	3,200
ESW4 2.5-3.5'	0.53	0.14	2.4	12	150	78	< 48	228
ESW5 0-2'	0.3	0.16	0.41	6	60	< 9.2	< 46	60
ESW5 2.5-3.5'	1.9	0.77	6.2	44	690	380	< 48	1,070
SB6 4-5'	< 0.025	< 0.05	< 0.05	< 0.1	< 5.0	< 9.9	< 49	< 49
SB7 3-4'	< 0.025	< 0.05	< 0.05	< 0.099	< 5.0	< 9.9	< 50	< 50
SB8 3-4'	< 0.025	< 0.049	< 0.049	< 0.099	< 4.9	< 9.7	< 48	< 48
SB9 3-4'	< 0.024	< 0.048	< 0.048	< 0.097	< 4.8	< 9.6	< 48	< 48
SB10 4-5'	0.037	< 0.049	< 0.049	< 0.097	5.1	90	< 47	95.1
SB11 4-5'	< 0.025	< 0.049	< 0.049	< 0.097	150	130	< 48	280
SB12 4-5'	< 0.025	< 0.049	< 0.049	< 0.097	< 4.9	11	< 48	11
Groundwater Protection Criteria	0.53	--	--	--	20	100	3,700	--

BTEX – benzene; toluene; ethylbenzene; xylene

GRO – gasoline range organics

DRO – diesel range organics

MRO – motor oil range organics

 Exceeds groundwater protection criteria

Total BTEX = Benzene + Toluene + Ethylbenzene + Xylene
mg/kg – milligrams per kilograms

-- – no applicable criteria

5.4 Vadose Zone Assessment – Historical Impacts

During the Pilot Study, soil near the groundwater interface was observed to have been impacted by petroleum hydrocarbon at GP3. The soil impacts appeared to be weathered and historical in nature. Additionally, unimpacted soil was observed between the excavation and GP3. This is evidenced by the excavation delineation point SB10 which was installed between the excavation and GP3; concentrations of BTEX and TPH were below groundwater protection criteria for soil as shown in Figure 8. Additionally, soil cuttings from GP1 and GP2 revealed no observable petroleum hydrocarbon present in soil at those points. These lines of evidence support a separate and historical impact, unrelated to the November 2018 release at the tank battery.

Laboratory Analysis

To assess this historical impact, Timberwolf collected soil samples on 11/06/19 from 10 test pits which were installed using a excavator. One sample (TP1) was collected adjacent to the location of GP3. TP2 through TP10 were installed for horizontal delineation. Depths of samples ranged from 3.5 ft to 4.5 ft bgs.

Soil samples were analyzed for BTEX and TPH. Laboratory reports documenting laboratory methods, analytical results, and chain-of-custody documents are attached in Appendix D. Test pit locations are shown in Figure 8; analytical results are presented in Table 9 below.

Table 9. Vadose Zone Assessment – Historical Impacts


Sample ID	Volatile Organic Compound (mg/kg)				TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	TPH (mg/kg)
	B	T	E	X				
TP1 4.5'	< 0.12	< 0.24	< 0.24	< 0.48	630	300	< 47	930
TP2 4.5'	< 0.24	< 0.047	< 0.47	< 0.095	< 4.7	< 8.9	< 44	< 44
TP3 4.5'	< 0.25	< 0.049	< 0.49	< 0.099	< 4.9	< 9.1	< 46	< 46
TP4 4'	< 0.12	< 0.23	2.3	22	310	95	< 41	405
TP5 4.5'	< 0.24	< 0.47	< 0.47	< 0.095	4.7	17	< 45	22
TP6 4.5'	< 0.24	< 0.49	< 0.49	< 0.098	< 4.9	< 9.2	< 46	< 46
TP7 4'	< 0.12	0.36	0.99	8.1	830	100	< 42	930
TP8 3.5'	< 0.24	< 0.49	< 0.49	< 0.098	< 4.9	< 9.3	< 47	< 47
TP9 4.5'	< 0.24	< 0.48	< 0.48	< 0.097	< 4.8	< 9.0	< 45	< 45
TP10 4.5'	< 0.24	< 0.49	< 0.49	< 0.098	< 4.9	65	< 50	65
Groundwater Protection Criteria	0.53	--	--	--	20	100	3,700	--

BTEX – benzene; toluene; ethylbenzene; xylene

GRO – gasoline range organics

DRO – diesel range organics

MRO – motor oil range organics

 Exceeds groundwater protection criteria

Total BTEX = Benzene + Toluene + Ethylbenzene + Xylene
mg/kg – milligrams per kilograms

-- – no applicable criteria

Hydrocarbon Fractionation

TPH concentrations exceeded the groundwater protection criteria in three groundwater samples (i.e., TP1 4.5', TP4 4', and TP7 4'). The sample from TP4 was analyzed hydrocarbon fractionation (i.e., aromatic and aliphatic hydrocarbons) utilizing TPH TCEQ Method 1006.

A common source is presumed for this area so relative percentages of each hydrocarbon fraction from TP4 were applied to the TPH concentrations of TP1 and TP7 to extrapolate each hydrocarbon fraction. TCEQ 1006 results, hydrocarbon fractionation extrapolation, and applicable corresponding groundwater protection criteria are presented in Table 10.

Table 10. Hydrocarbon Fractionation (TCEQ Method 1006)

Hydrocarbon Fraction ¹	TP1 4.5' ¹	TP4 4'	TP7 4' ¹	Groundwater Protection Criteria ²
TPH (TCEQ 1005)	169	248	74.6	--
Aliphatics (mg/kg)				
C ₆	< 9.4	< 20.0	< 4.2	170
C ₆₋₈	< 9.4	< 20.0	< 4.2	420
C ₈₋₁₀	27.1	39.7	11.9	3,600
C ₁₀₋₁₂	23.8	34.9	10.5	2,500
C ₁₂₋₁₆	24.2	35.5	10.7	1,000,000
C ₁₆₋₂₁	< 9.4	< 20.0	< 4.2	1,000,000
C ₂₁₋₃₅	< 9.4	< 20.0	< 4.2	1,000,000
Aromatics (mg/kg)				
C ₇₋₈	< 9.4	< 20.0	< 4.2	20
C ₈₋₁₀	< 9.4	< 20.0	< 4.2	65
C ₁₀₋₁₂	< 9.4	< 20.0	< 4.2	100
C ₁₂₋₁₆	< 9.4	< 20.0	< 4.2	200
C ₁₆₋₂₁	< 9.4	< 20.0	< 4.2	470
C ₂₁₋₃₅	< 9.4	< 20.0	< 4.2	3,700

¹ – Aliphatic and aromatic chains extrapolated from TCEQ-1006 analysis of TP4 sample

² – TCEQ TRRP Tier 1 Residential Groundwater PCL for groundwater

mg/L – milligrams per liter

-- – no applicable criteria

5.5 Ecological Risk Assessment

Soil in the upper 2 ft horizon were evaluated to determine if constituents exceeded the critical PCLs for the Southwestern willow flycatcher. The upper 2 ft is the horizon which provide ecological exposure, either by: dermal contact, inhalation, or ingestion.

Sidewall samples from the initial excavation were collected from the 0 to 2.0 ft depth interval to evaluate the ecological risk to the flycatcher. Soil samples were placed directly into laboratory provided containers, stored on ice, and transported under proper chain-of-custody to HEAL for chemical analysis.

Samples were analyzed for BTEX; laboratory reports documenting methods, analytical results, and chain-of-custody documents are attached in Appendix D. Analytical results are presented in Table 11 below and in Figure 7.

Table. 11. Ecological Risk Assessment

Sample ID	Volatile Organic Compound (mg/kg)			
	B	T	E	X
ESW1 0-2'	< 0.024	< 0.049	< 0.049	< 0.098
ESW2 0-2'	< 0.12	< 0.24	< 0.24	< 0.49
ESW3 0-2'	< 0.12	< 0.24	< 0.24	0.8
ESW4 0-2'	2.0	2.8	9.8	190
ESW5 0-2'	0.3	0.16	0.41	6
PCL for Southwestern willow flycatcher¹	26.36	25.98	97.1	7.7

PCL – protective concentration limit

BTEX – benzene; toluene; ethylbenzene; xylene

mg/kg – milligrams per kilograms

¹ – Limit established by Los Alamos National Laboratory

 Exceeds ecological PCL

5.6 Summary

The vadose zone assessment and ecological assessment revealed that the following areas require mitigation to eliminate a potentially risk to either groundwater or area ecology:

- Excavation base and sidewalls along the western and southern sides of the initial excavation require additional excavation or other remedies to mitigate soil for the protection of groundwater and/or ecological PCLs
- Three samples (i.e., TP1 4.5', TP4 4', and TP7 4') exceeded the groundwater protection criteria. However, hydrocarbon fraction of these samples revealed that most of the petroleum hydrocarbon is in the aliphatic chains and concentrations of all aromatic and aliphatic chains are below groundwater protection criteria. Therefore, the historical soil impacts located west of the excavation do not pose a threat to underlying groundwater and no further action is required.

Areas requiring soil mitigation are depicted with crosshatch in Figure 7.

6.0 Soil Abatement

6.1 Introduction

Soil within the vadose zone which exceeded the groundwater protection criteria or the ecological protection criteria was abated in accordance with 19.30.15 NMAC.

6.2 Soil Abatement

On 11/06/19, Sierra Oilfield Services of Farmington, New Mexico was contracted to excavate impacted soil in and around the initial excavation (i.e., former tank battery). Soil in the Vadose zone that exceeded the soil-to-groundwater migration criteria was excavated and stockpiled on-Site. This included the entire soil horizon of the vadose zone (i.e., soil was excavated to the top of the groundwater sand), which was approximately 4.5 ft deep. The overall excavation length and width was 105 ft by 65 ft, respectively; excavation depth averaged 4.5 ft bgs.

Soil exceeding the ecological PCLs in the upper 2 ft horizon was also excavated and stockpiled. Excavaion All excavation activities were completed on 11/08/19. The excavation comprised an area of approximately 0.11 acres; the horizontal extent of the excavation is shown in Figure 9.

6.3 Collection and Analysis of Confirmation Samples

Confirmation samples were collected from the excavation side walls (i.e. ESW6-ESW14) to determine if soil within the vadose zone was below soil-to-groundwater migration criteria and ecological PCLs.

On 11/6/19, 18 discrete grab soil samples were collected from the South and West sidewalls to determine if impacted soil had been sufficiently abated by excavation activities. Samples collected for ecological risk assessment were collected from the 0 – 2 ft depth interval; samples collected for vadose zone assessment were collected at 3 ft bgs. Prior assessment revealed that samples collected from the north and east sidewalls were below SPLP and ecological limits for the site.

Confirmation samples were collected directly into laboratory provided sample containers, stored on ice, and transported under proper chain-of-custody protocol to HEAL in Albuquerque, New Mexico. All samples were analyzed for BTEX.

Laboratory reports documenting methods, analytical results, and chain-of-custody documents are attached in Appendix D. Laboratory results revealed that, except for ESW6, all samples were below remedial targets. ESW6 exceeded the established ecological limit for xylene. Therefore, the upper 2 ft of soil surrounding ESW6 was excavated to mitigate ecological risk. On 11/08/19, two additional samples (i.e., ESW6A and ESW6B) were collected to determine if all soil exceeding the established ecological PCL had been removed from the Site.

Confirmation sample locations are shown in Figure 9; laboratory results of are presented in Table 12 below.

Table 12. Excavation Confirmation Sampling

Sample ID	Sample Date	Volatile Organic Compound (mg/kg)			
		B	T	E	X
ESW6 0-2'	11/06/19	< 0.41	2.6	0.69	130
ESW6 3'	11/06/19	0.12	0.14	2.0	14
ESW6A 0-2'	11/08/19	< 0.025	< 0.05	< 0.05	< 0.1
ESW6B 0-2'	11/08/19	< 0.025	< 0.05	< 0.05	< 0.1
ESW7 0-2'	11/06/19	< 0.12	< 0.23	< 0.23	1.9
ESW7 3'	11/06/19	< 0.088	< 0.18	0.23	4.1
ESW8 0-2'	11/06/19	< 0.022	< 0.044	< 0.044	0.2
ESW8 3'	11/06/19	< 0.022	< 0.043	< 0.043	< 0.087
ESW9 0-2'	11/06/19	< 0.019	< 0.037	< 0.037	< 0.074
ESW9 3'	11/06/19	< 0.017	< 0.034	< 0.034	< 0.068
ESW10 0-2'	11/06/19	< 0.020	< 0.039	< 0.039	0.082
ESW10 3'	11/06/19	< 0.018	< 0.035	< 0.035	< 0.071
ESW11 0-2'	11/06/19	< 0.021	< 0.041	< 0.041	0.14
ESW11 3'	11/06/19	0.024	< 0.034	< 0.034	< 0.068
ESW12 0-2'	11/06/19	< 0.032	< 0.064	< 0.064	< 0.13
ESW12 3'	11/06/19	< 0.022	< 0.044	< 0.044	< 0.087
ESW13 0-2'	11/06/19	< 0.075	< 0.15	< 0.15	< 0.30
ESW13 3'	11/06/19	< 0.020	< 0.039	< 0.039	< 0.079
ESW14 0-2'	11/06/19	< 0.023	< 0.046	< 0.046	< 0.092
ESW14 3'	11/06/19	< 0.019	< 0.037	< 0.037	< 0.075
Groundwater Protection Criteria		0.53	--	--	--
PCL for Southwestern willow flycatcher		26.36	25.98	97.1	7.7


B – benzene

E – ethylbenzene

T – toluene

X – xylene

Total BTEX = Benzene + Toluene + Ethylbenzene + Xylene

 Exceeds groundwater protection criteria or ecological PCL

mg/kg – milligrams per kilograms

PCL – protective concentration level

6.4 Soil Disposal

All excavated soil was transported to Industrial Ecosystems, Inc. (IEI) of Aztec, New Mexico for commercial disposal. IEI is a permitted surface waste management facility operating OCD Permit No.: NM01-0010B.

Approximately 784 cubic yards of soil was excavated and disposed; copies of IEI incoming waste logs are provided in Appendix E.

6.5 Excavation Backfill

Once laboratory results confirmed that all sidewall samples were below the established soil-to-groundwater migration criteria and ecological PCLs, the excavation was backfilled using clean fill material. The backfill was accomplished in lifts of 6 to 8 inches. Each lift was compacted using a loader with weighed bucket.

After the backfill was completed, the Site was graded in preparation for returning the Kaufman No. 1 into service.

6.6 Conclusions

Approximately 784 cubic yards of soil was abated for groundwater protection and/or ecological protection. Following excavation activities soil confirmation samples were collected from the excavation sidewalls to ensure that all soil which posed a threat to either groundwater or the ecology had been mitigated. Confirmation samples were collected at intervals less than one per 200 square feet.

Only one sample, ESW6 0-2', exceeded the abatement criteria. The area of ESW6 was subsequently excavated and two additional sidewall samples (i.e., ESW6A and ESW6B) were collected from the subsequent excavation sidewalls. Confirmation samples from the excavation sidewalls revealed that all soil samples were below remedial targets for groundwater protection and ecological PCLs.

The laboratory results of confirmation samples indicate that remaining soil in the vadose zone poses no threat to groundwater, surface water resources, or threatened and endangered species in the area.

7.0 Additional Groundwater Assessment

7.1 Introduction

The groundwater assessment revealed that TDS and sulfate concentrations in the groundwater sample collected from MW1 exceeded the established human health standard. Additional groundwater assessment was conducted to determine if the elevated TDS and sulfate concentrations were a result of the release or if it is a native condition of Site groundwater.

7.2 Groundwater Gauging

Prior to groundwater collection and groundwater gauging, well caps were removed so that water levels could equilibrate. Each well was gauged to determine the depth to water using an oil-water interface probe capable of measuring to the nearest one-hundredth foot. Phase separated hydrocarbons (PSH) was not encountered.

Timberwolf previously surveyed tops of casings for each monitor well using a laser level and survey rod during the groundwater assessment conducted in January 2019. The depths to water measurements from each monitor well was subtracted from the corresponding well's elevation to determine the depth of groundwater in each well.

A PSE map was prepared from the survey and gauging data. The PSE map reveals that groundwater flow across the Site was towards the open excavation, as shown in Figure 10.

7.3 Groundwater Sample Collection

On 06/20/19, a hydrologically upgradient monitor well (i.e., MW3) was sampled using EPA low-flow technique. Water was pumped through a flow-through cell equipped with a YSI probe. Field water quality parameters were analyzed and recorded which included: dissolved oxygen, conductivity, pH, temperature, and ORP. After water quality parameters stabilized, the YSI flow-through cell was bypassed and samples were collected directly into laboratory-provided sample containers.

Sample containers were stored on ice and transported under proper chain-of-custody protocol to Hall Environmental Analytical Laboratories, Inc. in Albuquerque, New Mexico for chemical analysis.

7.4 Groundwater Analytical Results

The sample collected from MW3 was analyzed for chloride, sulfate, and TDS. Laboratory results were compared to analytical results from a groundwater sample collected from MW1 during the

groundwater assessment as documented in the Stage 1 Abatement Plan. Analytical results are summarized in Table 13 below.

Table 13. Additional Groundwater Assessment

Constituent	MW1	MW3
Chloride, mg/L	130	120
Sulfate, mg/L	1,700	1,600
TDS, mg/L	3,130	2,750

mg/L – milligrams per liter
TDS – total dissolved solids

7.5 Conclusion

Analytical results of the groundwater sample collected from MW3, which is hydrologically upgradient from MW1, revealed elevated salinity in Site groundwater similar to that observed in MW1.

Total concentrations and relative percentages of chloride, sulfate, and TDS reveal a strong correlation in groundwater chemistry between the sample collected adjacent from the point of release (i.e., MW1) and the hydrologically upgradient sample collected from MW3. This suggests that the elevated salinity (i.e., sulfate and TDS) is a native feature of the Site's groundwater.

8.0 Receptor Survey

8.1 Introduction

Timberwolf conducted a receptor survey to identify all water wells, surface water, and sensitive features near the Site. Methodology and findings are presented below.

8.2 Public Records Search

Timberwolf contracted with Banks Environmental Data (“Banks”) to conduct a public records water well search within a one-mile radius from the Site. A copy of the Banks report is attached in Appendix F. Twenty-two (22) wells were identified in the public records search; results are summarized in Table 14 (below) and mapped in Figure 11.

Table 14. Findings of Public Records Search – One-Mile Radius

Well Name	Map ID	GPS Coordinate*	Well Type	Status	Depth (ft)
Unnamed	1	36.862876° N / 108.204621° W	Domestic/Household	U	--
Unnamed	2	36.864803° N / 108.202336° W	Domestic/Household	U	50
Unnamed	3	36.856833° N / 108.210502° W	Domestic/Household	U	--
Unnamed	4	36.865625° N / 108.198916° W	Domestic/Household	U	80
Unnamed	5	36.866542° N / 108.204651° W	Domestic/Household	U	50
Unnamed	6	36.857691° N / 108.211435° W	Domestic/Household	U	--
Unnamed	7	36.85857° N / 108.212582° W	Domestic/Household	U	42
Unnamed	7	36.85857° N / 108.212582° W	Domestic/Household	U	--
Unnamed	8	36.855771° N / 108.211456° W	Domestic/Household	U	25
Unnamed	9	36.866591° N / 108.209206° W	Domestic/Household	U	--
Unnamed	9	36.866591° N / 108.209206° W	Domestic/Household	U	190
Unnamed	10	36.868412° N / 108.204505° W	Domestic/Household	U	40
Unnamed	10	36.868412° N / 108.204505° W	Domestic/Household	U	42
Unnamed	11	36.868536° N / 108.201145° W	Domestic/Household	U	--
Unnamed	12	36.85571° N / 108.213696° W	Domestic/Household	U	500
Unnamed	12	36.85571° N / 108.213696° W	Domestic/Household	U	--
Unnamed	13	36.86055° N / 108.215009° W	Domestic/Household	U	--
Unnamed	14	36.850269° N / 108.200136° W	Domestic/Household	U	205
Unnamed	15	36.85391° N / 108.21362° W	Domestic/Household	U	18
Unnamed	16	36.85954° N / 108.21853° W	Domestic/Household	U	160
Unnamed	17	36.855812° N / 108.218275° W	Domestic/Household	U	70
Unnamed	18	36.862876° N / 108.204621° W	Domestic/Household	U	100

*Coordinates in North America Datum (NAD) 83

U – unknown

ft - feet

-- -- not applicable

The public records search revealed 22 water wells. Of the 22 water wells, four appear to be duplicates (i.e., 7, 9, 10, and 12). The nearest downgradient water well (i.e., 3), is located approximately 0.45 miles southwest of the Site. The nearest well overall is identified as 1 which is located approximately 0.22 miles north-northwest of the Site.

8.3 Ground Reconnaissance

On 6/20/19, Timberwolf conducted a ground reconnaissance of accessible areas within a one-quarter mile radius of the Site. The reconnaissance was conducted to identify any additional water wells not included in public records and to document topographically sensitive areas, such as: wetlands, intermittent creeks, etc.

The one-quarter mile ground reconnaissance identified the following:

- One 2-inch monitor well approximately 90 ft southeast of the Site
- Four sensitive topographic features were located within the one-quarter mile radius from the Site:
 - The La Plata River located approximately 40 ft west of the Site
 - Two riparian wetland features, one approximately 30 ft to the north and one immediately adjacent to the south and east of the Site
 - An intermittent stream located approximately 500 ft south of the Site.

The monitor well and sensitive topographical features are shown in Figure 12.

9.0 Fourth Quarter Groundwater Monitoring Event

9.1 Introduction

On 10/08/19, Timberwolf initiated the groundwater monitoring program. Details related to the 2019 fourth quarter (4Q19) groundwater monitoring event are presented below.

9.2 Elevation Survey and Gauging

Prior to groundwater collection and groundwater gauging, well caps were removed so that water levels could equilibrate. Each well was gauged to determine the depth to water using an oil-water interface probe capable of measuring to the nearest one-hundredth foot. Phase separated hydrocarbons (PSH) was not encountered.

On 11/19/20, Timberwolf contracted with NCE Surveys, Inc. of Farmington, New Mexico to survey the tops of casings of each monitor well relative to mean sea level. A copy of the survey is available upon request. The depths to water measurements from each monitor well was subtracted from the corresponding well's elevation to determine the depth of groundwater in each well.

A PSE map was prepared from the survey and gauging data. The PSE map reveals that groundwater flow across the Site was towards the open excavation, as shown in Figure 13.

9.3 Well Purging and Groundwater Collection

The six sampling stations (i.e., MW1 through MW6) were sampled using EPA low-flow technique. A submersible pump was placed within the screened interval of each well. Water was extracted from each well and pumped through a flow-through cell equipped with a YSI probe. Field water quality parameters were analyzed and recorded which included: dissolved oxygen, conductivity, pH, temperature, and ORP. Groundwater stabilization parameters are documented in Appendix G on Table H-1. After water quality parameters stabilized, the YSI flow-through cell was bypassed and samples were collected directly into laboratory-provided sample containers.

Sample were stored on ice and transported under proper chain-of-custody protocol to Hall Environmental Analytical Laboratories, Inc. in Albuquerque, New Mexico for chemical analysis.

9.4 Analytical Results

Groundwater samples were analyzed for the BTEX. Analytical methods are documented in the laboratory report attached in Appendix D. Analytical results from the 4Q19 groundwater monitoring event are summarized in Table 13 below and shown in Figure 14. Also shown in Table 15 are the analytical results from the initial groundwater assessment conducted in January 2019.

Table 15. Groundwater Analytical Results – 4Q19

Sample ID	Sample Date	Volatile Organic Compound (mg/L)			
		B	T	E	X
MW1	01/18/19	0.074	0.35	0.027	0.033
MW1	10/09/19	< 0.001	< 0.001	< 0.001	< 0.002
MW2	01/18/19	< 0.001	< 0.001	< 0.001	< 0.0015
MW2	10/09/19	< 0.001	< 0.001	< 0.001	< 0.002
MW3	01/18/19	< 0.001	< 0.001	< 0.001	< 0.0015
MW3	10/09/19	< 0.001	< 0.001	< 0.001	< 0.002
MW4	01/18/19	< 0.001	< 0.001	< 0.001	< 0.0015
MW4	10/09/19	< 0.001	< 0.001	< 0.001	< 0.002
MW5	01/18/19	< 0.001	< 0.001	< 0.001	< 0.0015
MW5	10/09/19	0.0041	< 0.001	< 0.001	< 0.002
MW6	01/18/19	< 0.001	< 0.001	< 0.001	< 0.0015
MW6	10/09/19	< 0.001	< 0.001	< 0.001	< 0.002
Regulatory Criteria¹		0.01	0.75	0.75	0.62

B – benzene

E – ethylbenzene

T – toluene

X – xylene



Exceeds regulatory criteria

mg/L – milligrams per liter

¹New Mexico human health standard

9.5 Quality Assurance Program

To establish quality assurance in laboratory data, Timberwolf collected a field duplicate sample and utilized a Trip Blank. A field duplicated (“Dup”) was collected from MW6 to evaluate laboratory reproducibility. The field duplicate was collected immediately after the MW6 sample to ensure homogeneity between the sample and the field duplicate. The Trip Blank was maintained with the sampling kit at all times to evaluate the potential for in-field contaminations or contaminants encountered traveling to and from the laboratory.

Both the field duplicate and trip blank were analyzed for BTEX. Analytical results are documented in the attached laboratory report provided in Appendix D and summarized in Table 16.

Table 16. Groundwater Quality Assurance Results – 4Q19

Sample ID	Sample Date	Volatile Organic Compound (mg/L)			
		B	T	E	X
MW6	10/08/19	< 0.001	< 0.001	< 0.001	< 0.002
Dup	10/08/19	< 0.001	< 0.001	< 0.001	< 0.002
Trip Blank	10/08/19	< 0.001	< 0.001	< 0.001	< 0.002

mg/L – milligrams per liter

B – benzene

E – ethylbenzene

T – toluene

X – xylene

The analytical results of the field duplicate reveal consistent laboratory results between the sample (i.e., MW6) and the field duplication (i.e., Dup) with all constituents of BTEX. Laboratory analysis of the Trip Blank revealed all analyzed constituents were below laboratory detection limits, indicating no observable levels of sample contamination.

9.6 Findings

The initial groundwater assessment revealed a uniformed flow of groundwater across the Site from east to west-southwest as shown in Figure 4. Subsequent groundwater gauging data collected in June and October 2019 (Figures 10 and 13, respectively) show a radical divergence in groundwater flow on either side of the open excavation.

Because the initial excavation extended into the groundwater sand (i.e., total depth of 5.5 ft) excavation water was in direct communication with groundwater. The change in direction of groundwater flow between the excavation and the river indicates that evaporation rates of water in the excavation created a depression in groundwater elevation near the excavation. This depression was great enough to change the direction of groundwater flow between the excavation and the river.

Comparing the groundwater analytical results from January 2019 and the 4Q19 monitoring event reveals a substantial decrease in benzene concentrations in MW1 which is located immediately adjacent to the point of release. Benzene concentrations decreased from 0.074 mg/L in January 2019 to < 0.001 mg/L during the 4Q19 monitoring event conducted in October.

This dramatic decrease in dissolved benzene concentrations in such a short period of time is consistent with the PSE maps for the Site. The groundwater depression created by evaporation of water in the open excavation caused groundwater in the area to flow towards the excavation. Benzene, a mobile and hydrophilic compound, flowed with groundwater to the excavation and was subjected to evaporation and ultraviolet degradation.

One notable increase in constituent concentration was observed in MW5. Benzene concentrations in MW5 increased from < 0.001 mg/L in January 2019 to 0.0041 mg/L during the 4Q19 monitoring event in October. The benzene concentration in MW5 remained below the New Mexico human health criteria. No other increase in constituent concentration was observed in groundwater samples.

10.0 Hydrological Assessment of Groundwater and the La Plata River

10.1 Introduction

In December 2019, Timberwolf began collecting surface elevations of the La Plata River to correlate to groundwater elevations. The purpose of the measurements is to understand the relationship between Site groundwater and the La Plata River.

10.2 Installation and Survey of Steel Rods

On 11/05/19 Timberwolf installed two steel rods along the west bank of the La Plata River. Each steel rod is 6 ft long with a diameter of 5/8 inches. The stakes were driven into the ground until approximately 13 inches of the steel rod remained exposed.

On 11/19/19, NCE Surveys, Inc. of Farmington, New Mexico surveyed the tops of each steel rod relative to mean sea level

10.3 River and Well Gauging

River elevations are measured relative to the tops of each steel rod by use of a 6-ft bubble level and water interface probe capable of measuring to the nearest one-one hundredth of foot. Depths to water in monitor wells are measured using the same interface probe; monitor wells tops of casing were surveyed as documented in Section 9 of this report.

The depths to water measurements from each monitor well was subtracted from the corresponding well's elevation to determine the depth of groundwater in each well. Likewise, river elevations were calculated by subtracting the measure depth to water from the top of each steel rod.

A potentiometric surface elevation (PSE) map was prepared from the survey and gauging data. The PSE map reveals that groundwater flow across the Site was west-southwest across the Site but turned southwest as groundwater approached the River. The PSE map is provided in Figure 15.

10.4 Findings

Both the Site groundwater and the La Plata River appear to be affected by seasonal rainfall, snowmelt, and/or drought. More data is needed to fully understand the relationship between the La Plata River and Site groundwater.

11.0 Stage 2 Abatement Plan

11.1 Introduction

The following actions are proposed to further assess and remediate, if needed, groundwater at the Site. The preferred remediation option is presented below.

11.2 Installation of an Additional Monitor Well

Timberwolf will install an additional monitor well between MW1 and MW5 in the vicinity of the former GP3 (the temporary gauging point installed during the pilot study). The proposed well (i.e., MW7) will be installed by a licensed water well driller and constructed of 2-inch PVC. The well will be permitted as required by the New Mexico Office of State Engineer. The proposed location of MW7 is shown in Figure 16.

MW7 will be added as a sampling station as identified in the Stage 1 Abatement Plan and incorporated into quarterly monitoring events.

11.3 Groundwater Abatement

If laboratory analysis of samples collected from MW7 reveal that any constituent of BTEX exceeds the New Mexico human health criteria for groundwater, the constituents in groundwater will be abated.

Groundwater abatement will consist of installing up to three trenches upgradient and downgradient of the proposed MW7. Each trench will be at least 6 ft wide, 35 ft long, and approximately 5.5 ft deep and completed into the upper saturated zone. Spacing between trenches will be approximately 20 ft apart. The estimated radius of influence for these trenches is 28 ft based on the pilot study and area evaporation rates discussed in Section 11.4. Proposed trench locations and corresponding radius of influence are shown in Figure 17.

Excavated soil will be used to construct secondary containment berms around trenches. Berms will have a minimum height of 2 ft above ground surface. Each trench will be fitted with bird netting and surrounded with safety fencing. Fencing, bird netting, and berm integrity, will be inspected quarterly. A detail sheet for berm constructed is provided in Figure 18.

11.4 Scientific Basis of Abatement Technology

Groundwater will enter the trench as each trench is to be completed into the upper saturated zone. Water evaporation off trenches will create a potentiometric low or depression in groundwater elevation. This depression will divert groundwater flow towards the trenches.

Since constituents of BTEX are mobile and hydrophilic; the compounds will, with relative efficiency, be transport to the trenches and be subjected to volatilization and ultimately ultraviolet degradation.

This remedial technique is feasible due to 1) high evaporation rates (averaging 9 inches per month in the warm season and approximately 78 inches annually) and 2) relatively flat groundwater gradient (i.e., 0.5 percent). In addition, this technique was successful in abating groundwater at the point of release as evidenced by reduced BTEX concentrations in MW1 over a 9-month treatment period.

11.5 Trench Closure

Trenches will be maintained until BTEX concentrations at all sampling stations (i.e. MW1 through MW7) are below human health criteria for a minimum of two consecutive quarters. Trench closure will include removing protective netting, fencing and backfill with native soil material utilized as berm material.

11.6 Schedule of Abatement Activities

The proposed timeline for completion of the proposed activities are presented in Table 17 below.

Table 17. Schedule of Abatement Activities

Activity ¹	April	May	June	July	Aug	Sept	Oct	Nov
Deliver Written Notice to Landowners	■							
Submit Public Notice	■							
Quarterly Monitoring Event ²		■		■			■	
Obtain Permit from Office of State Engineer	■							
Install MW7	■							
Install Abatement Trenches ²			■					
Submit Quarterly Reports				■			■	
Trench Closure ³								

¹Contingent upon OCD approval of the Stage 2 Abatement Plan within 90 days of submission

²To include inspection and maintenance on trench berms, fencing and bird netting

³Contingent upon flood stage of the La Plata River

⁴Treches will be closed after two consecutive quarters of all sampling stations' compliance within human health criteria

11.7 Site Closure

Quarterly monitoring and reporting will continue until groundwater monitoring demonstrate that each sampling station has met the human health criteria for eight consecutive quarters. Once closure criteria has been met, a Site closure plan will be submitted to the OCD.

Figures

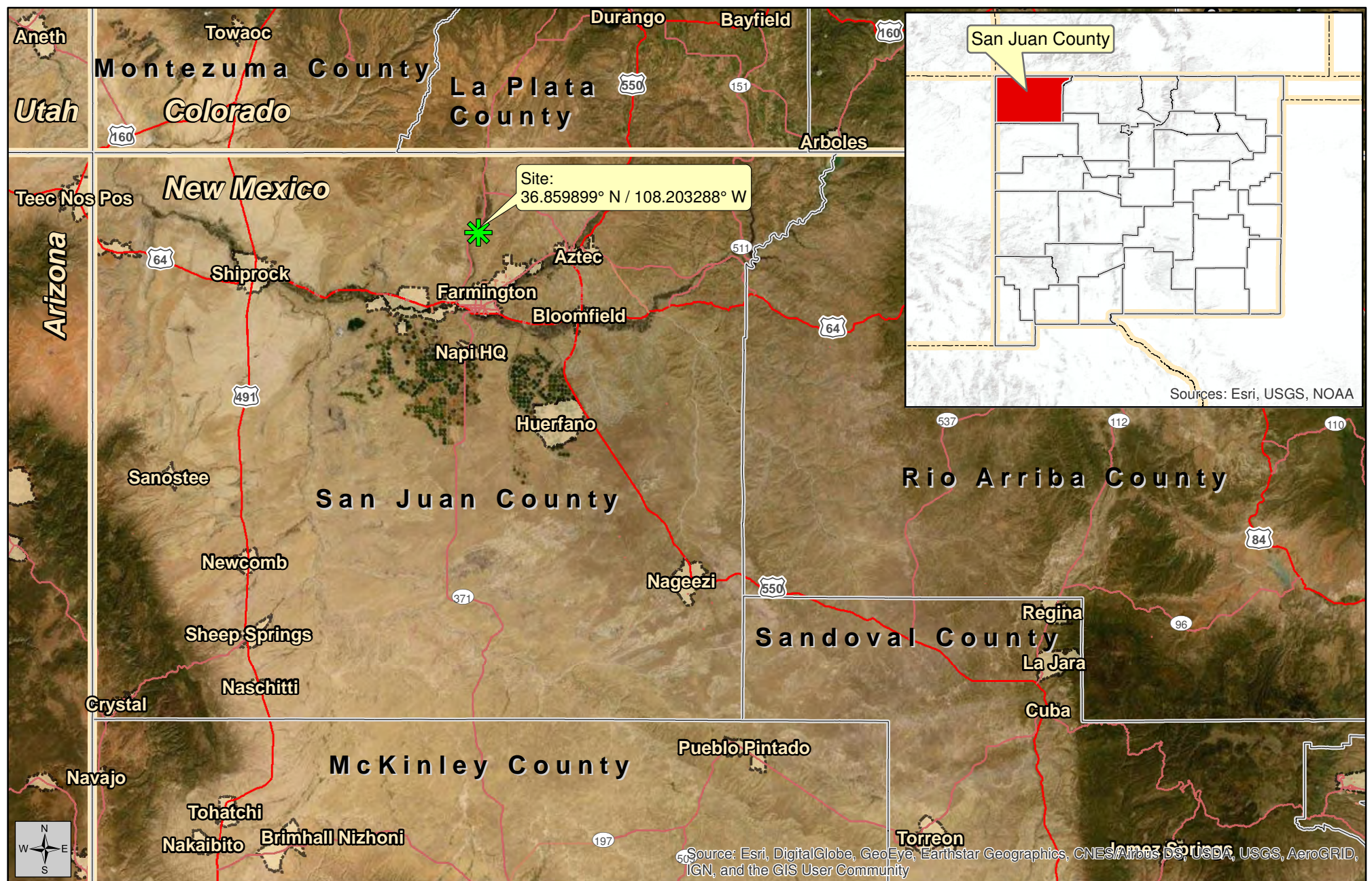


Figure 1
Site Location Map

Stage 2 Abatement Plan (AP-0138)

December 30, 2019



Created By:
Russell Greer
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

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

 Site

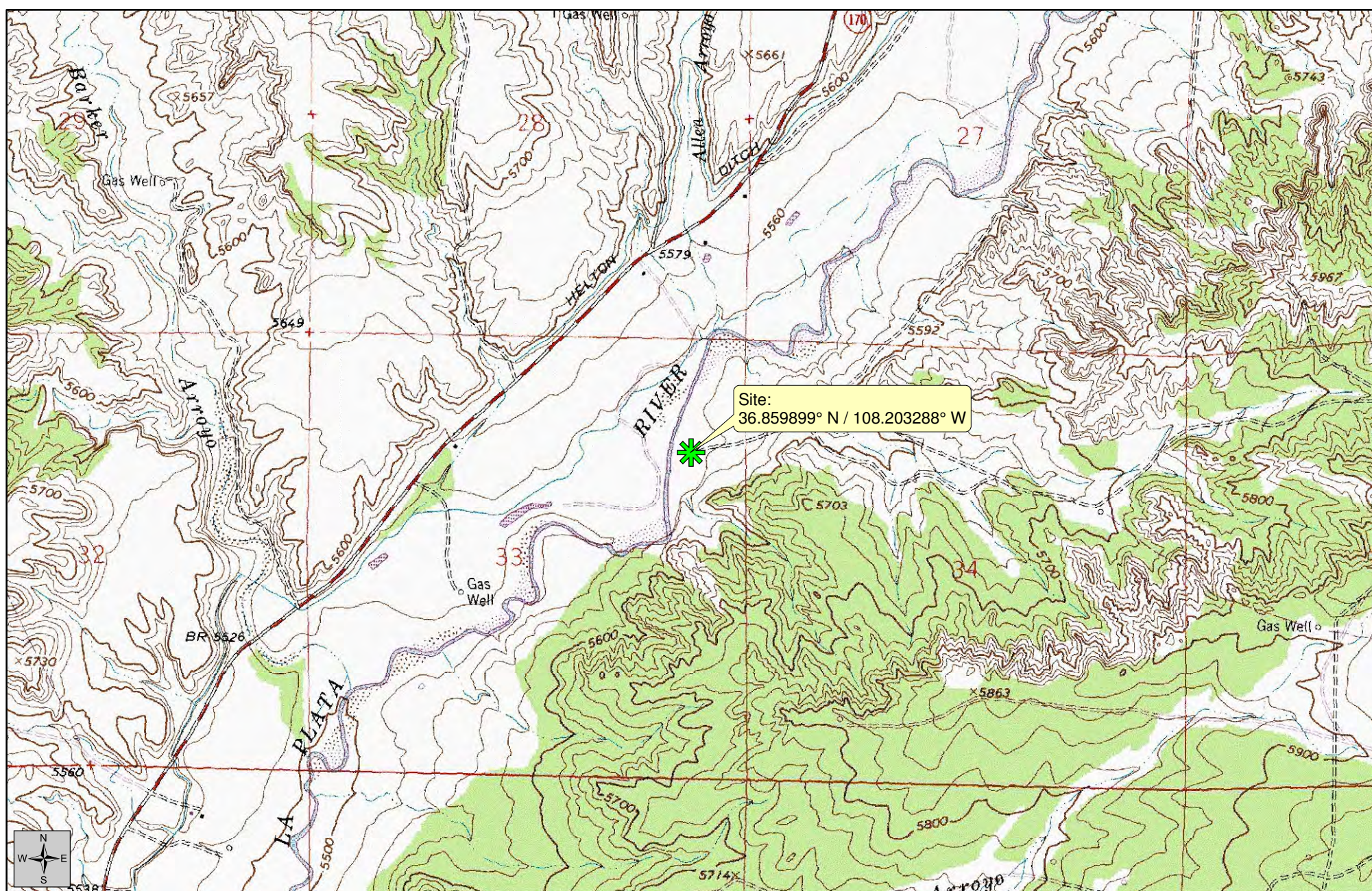


Figure 2
Topographic Map

Stage 2 Abatement Plan (AP-0138)


December 30, 2019



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TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: USGS
Quad: Farmington North
Vector Source: TE

 Site

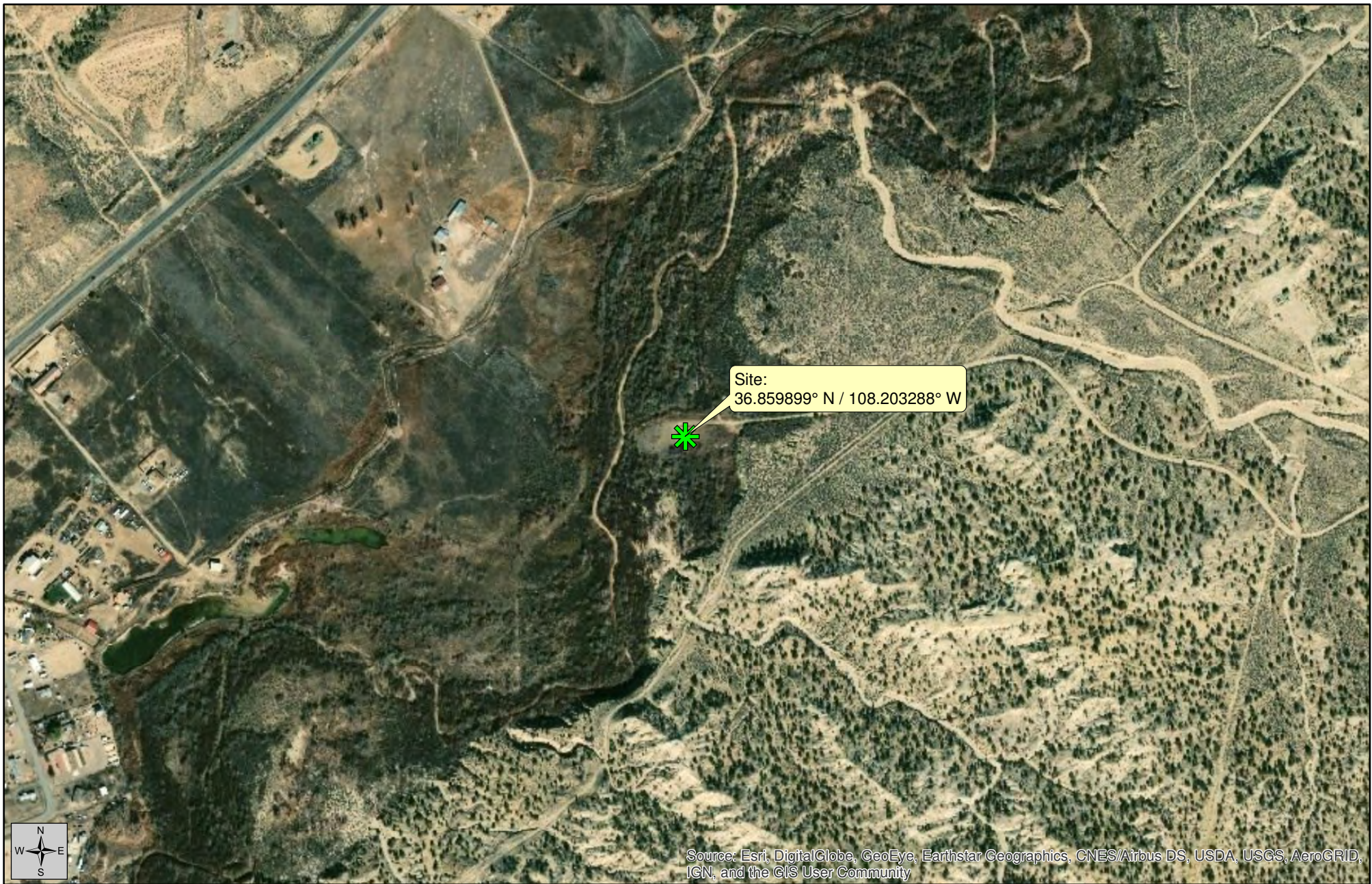


Figure 3
Aerial Map

Stage 2 Abatement Plan (AP-0138)

December 30, 2019



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1:8,000
0 1,000 2,000 3,000 4,000 Feet
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Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

 **Site**



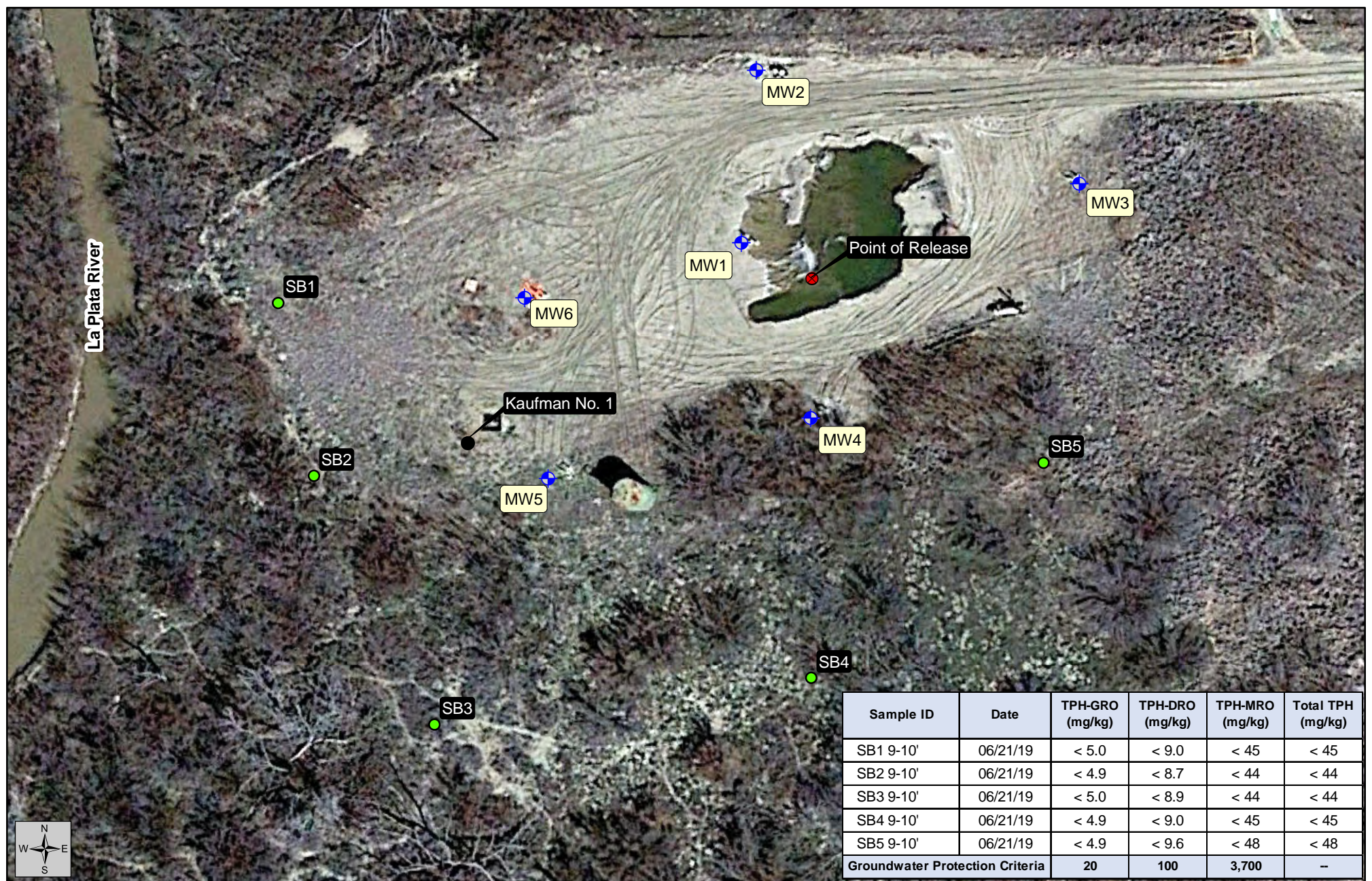


Figure 5
TPH Delineation of Historical
Soil Impacts - Saturated Zone

Stage 2 Abatement Plan (AP-0138)

Sample Date:
June 21, 2019



Created By:
Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Point of Release
- ◆ Monitor Well
- Sample Location (clean)
- Kaufman No. 1 Well Head

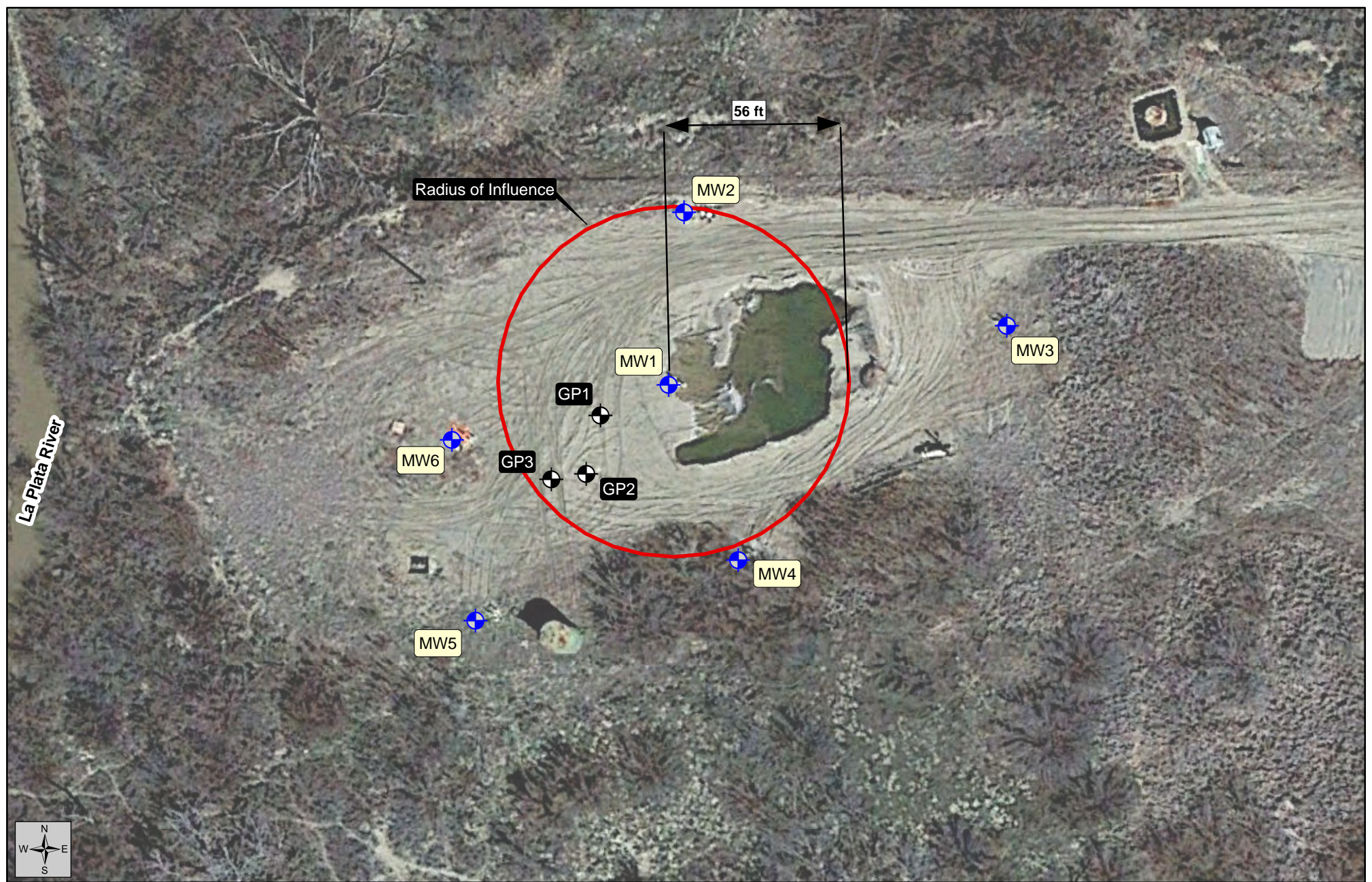


Figure 6
Pilot Study -
Upper Saturated Zone

Stage 2 Abatement Plan (AP-0138)




December 30, 2019



Created By:
Russell Greer
TE Project No.: HEC-180061

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Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

-  Monitor Well
-  Gauging Point
-  Radius of Influence

Sample ID	Date	Volatile Organic Compound (mg/kg)				Total BTEX (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	Total TPH (mg/kg)
		B	T	E	X					
EB1	07/11/19	0.13	< 0.25	0.86	3.2	4.19	300	47	< 49	347
EB2	07/11/19	0.28	< 0.24	2.2	12	14.48	360	210	< 48	570
EB3	07/11/19	6.2	17	35	410	468.2	3,700	2,000	< 480	5,700
EB4	07/11/19	< 0.024	< 0.049	0.081	0.24	0.321	51	< 9.8	< 49	51
EB5	07/11/19	0.35	< 0.49	1.6	3	4.95	110	53	< 49	163
EB6	07/11/19	1.5	0.86	7.7	68	78.06	1,700	210	< 48	1,910
EB7	07/11/19	Sample area inaccessible and not collected due to excavation water level								
EB8	07/11/19	< 0.025	< 0.050	< 0.05	< 0.1	< 0.05	50	220	130	400
EB9	07/11/19	1.7	< 0.24	13	120	134.7	1,200	410	< 47	1,610
ESW1 0-2'	07/11/19	< 0.024	< 0.049	< 0.049	< 0.098	< 0.098	< 4.9	13	< 49	13
ESW1 2.5-3.5'	07/11/19	< 0.025	< 0.05	< 0.05	< 0.1	< 0.1	< 5.0	< 9.5	< 48	< 48
ESW2 0-2'	07/11/19	< 0.12	< 0.24	< 0.24	< 0.49	< 0.49	180	700	< 47	880
ESW2 2.5-3.5'	07/11/19	< 0.05	< 0.1	0.19	0.63	0.82	77	110	< 48	187
ESW3 0-2'	07/11/19	< 0.12	< 0.24	< 0.24	0.8	0.8	120	290	< 47	410
ESW3 2.5-3.5'	07/11/19	0.67	< 0.24	4.7	27	32.37	530	170	< 49	700
ESW4 0-2'	07/11/19	2.0	2.8	9.8	190	204.6	2,200	1,000	< 480	3,200
ESW4 2.5-3.5'	07/11/19	0.53	0.14	2.4	12	15.07	150	78	< 48	228
ESW5 0-2'	07/11/19	0.3	0.16	0.41	6	6.87	60	< 9.2	< 46	60
ESW5 2.5-3.5'	07/11/19	1.9	0.77	6.2	44	52.87	690	380	< 48	1,070
SB6 4-5'	06/21/19	< 0.025	< 0.05	< 0.05	< 0.1	< 0.1	< 5.0	< 9.9	< 49	< 49
SB7 3-4'	06/21/19	< 0.025	< 0.05	< 0.05	< 0.099	< 0.099	< 5.0	< 9.9	< 50	< 50
SB8 3-4'	06/21/19	< 0.025	< 0.049	< 0.049	< 0.099	< 0.099	< 4.9	< 9.7	< 48	< 48
SB9 3-4'	06/21/19	< 0.024	< 0.048	< 0.048	< 0.097	< 0.097	< 4.8	< 9.6	< 48	< 48
SB10 4-5'	06/21/19	0.037	< 0.049	< 0.049	< 0.097	< 0.097	5.1	90	< 47	95.1
SB11 4-5'	06/21/19	< 0.025	0.072	< 0.049	< 0.099	< 0.099	150	130	< 48	280
SB12 4-5'	06/21/19	< 0.025	< 0.049	< 0.049	< 0.099	< 0.099	< 4.9	11	< 48	11
Groundwater Protection Criteria		0.67	--	--	--	--	20	100	3,700	--
PCL for Southwestern willow flycatcher		26.36	25.98	97.1	7.7	--	--	--	--	--

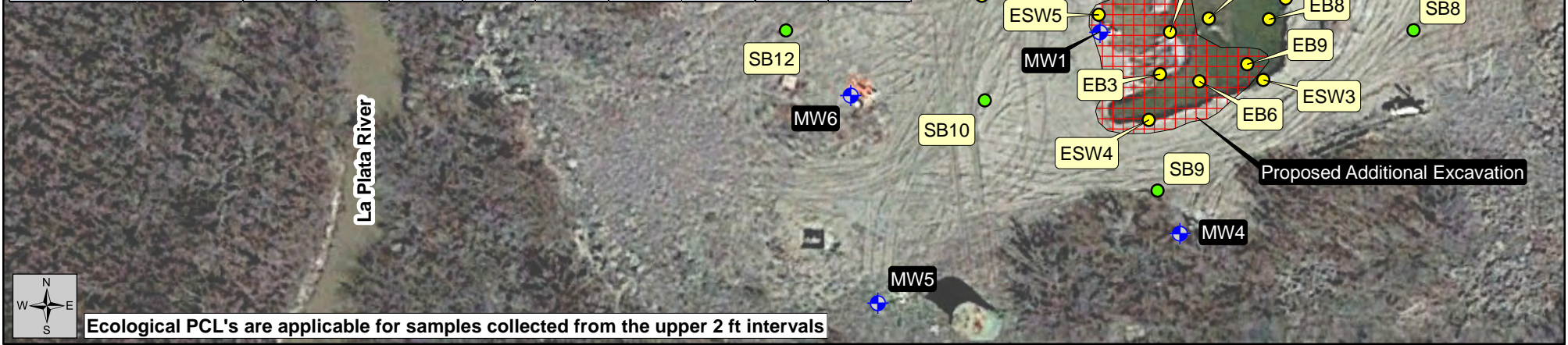


Figure 7
Vadose Zone Assessment

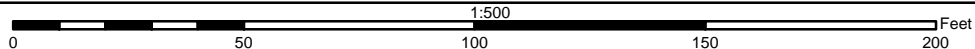
Stage 2 Abatement Plan (AP-0138)

Sample Dates:
07/11/19 and 06/21/19



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Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico



Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Sample Location (clean)
- Sample Location (elevated)
- + Monitor Well
- Proposed Additional Excavation

Sample ID	Date	Volatile Organic Compounds (mg/kg)				Total BTEX (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-MRO (mg/kg)	Total TPH (mg/kg)
		Benzene	Toluene	Ethylbenzene	Xylenes					
TP1 4.5'	11/06/19	< 0.120	< 0.24	< 0.24	< 0.48	< 0.48	630	300	< 47	930
TP2 4.5'	11/06/19	< 0.024	< 0.047	< 0.047	< 0.095	< 0.095	< 4.7	< 8.9	< 44	< 44
TP3 4.5'	11/06/19	< 0.025	< 0.049	< 0.049	< 0.099	< 0.099	< 4.9	< 9.1	< 46	< 46
TP4 4'	11/06/19	< 0.120	< 0.23	2.3	22	24.3	310	95	< 41	405
TP5 4.5'	11/06/19	< 0.024	< 0.047	< 0.047	< 0.095	< 0.095	4.7	17	< 45	22
TP6 4.5'	11/06/19	< 0.024	< 0.049	< 0.049	< 0.098	< 0.098	< 4.9	< 9.2	< 46	< 46
TP7 4'	11/06/19	< 0.12	0.36	0.99	8.1	9.45	830	100	< 42	930
TP8 3.5'	11/06/19	< 0.024	< 0.049	< 0.049	< 0.098	< 0.098	< 4.9	< 9.3	< 47	< 47
TP9 4.5'	11/06/19	< 0.024	< 0.048	< 0.048	< 0.097	< 0.097	< 4.8	< 9.0	< 45	< 45
TP10 4.5'	11/06/19	< 0.024	< 0.049	< 0.049	< 0.098	< 0.098	< 4.9	65	< 50	65
Groundwater Protection Criteria		0.67	--	--	--	--	20	100	3,700	--



Figure 8
Vadose Zone Assessment -
Historical Impacts

Stage 2 Abatement Plan (AP-0138)

Sample Date:
November 6, 2019



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Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Sample Location (clean)
- Sample Location (elevated)
- + Monitor Well

Sample ID	Date	Volatile Organic Compound (mg/kg)				Total BTEX (mg/kg)
		B	T	E	X	
ESW6 0-2'	11/06/19	< 0.41	2.6	0.69	130	133.29
ESW6 3'	11/06/19	0.12	0.14	2.0	14	16.26
ESW6A 0-2'	11/08/19	< 0.025	< 0.05	< 0.05	< 0.1	< 0.1
ESW6B 0-2'	11/08/19	< 0.025	< 0.05	< 0.05	< 0.1	< 0.1
ESW7 0-2'	11/06/19	< 0.12	< 0.23	< 0.23	1.9	1.9
ESW7 3'	11/06/19	< 0.088	< 0.18	0.23	4.1	4.33
ESW8 0-2'	11/06/19	< 0.022	< 0.044	< 0.044	0.2	0.2
ESW8 3'	11/06/19	< 0.022	< 0.043	< 0.043	< 0.087	< 0.087
ESW9 0-2'	11/06/19	< 0.019	< 0.037	< 0.037	< 0.074	< 0.074
ESW9 3'	11/06/19	< 0.017	< 0.034	< 0.034	< 0.068	< 0.068
ESW10 0-2'	11/06/19	< 0.020	< 0.039	< 0.039	0.082	0.082
ESW10 3'	11/06/19	< 0.018	< 0.035	< 0.035	< 0.071	< 0.071
ESW11 0-2'	11/06/19	< 0.021	< 0.041	< 0.041	0.14	0.14
ESW11 3'	11/06/19	0.024	< 0.034	< 0.034	< 0.068	0.024
ESW12 0-2'	11/06/19	< 0.032	< 0.064	< 0.064	< 0.13	< 0.13
ESW12 3'	11/06/19	< 0.022	< 0.044	< 0.044	< 0.087	< 0.087
ESW13 0-2'	11/06/19	< 0.075	< 0.15	< 0.15	< 0.30	< 0.30
ESW13 3'	11/06/19	< 0.020	< 0.039	< 0.039	< 0.079	< 0.079
ESW14 0-2'	11/06/19	< 0.023	< 0.046	< 0.046	< 0.092	< 0.092
ESW14 3'	11/06/19	< 0.019	< 0.037	< 0.037	< 0.075	< 0.075
Site-Specific SPLP Limit		0.67	--	--	--	--
PCL for Southwestern willow flycatcher		26.36	25.98	97.1	7.7	--

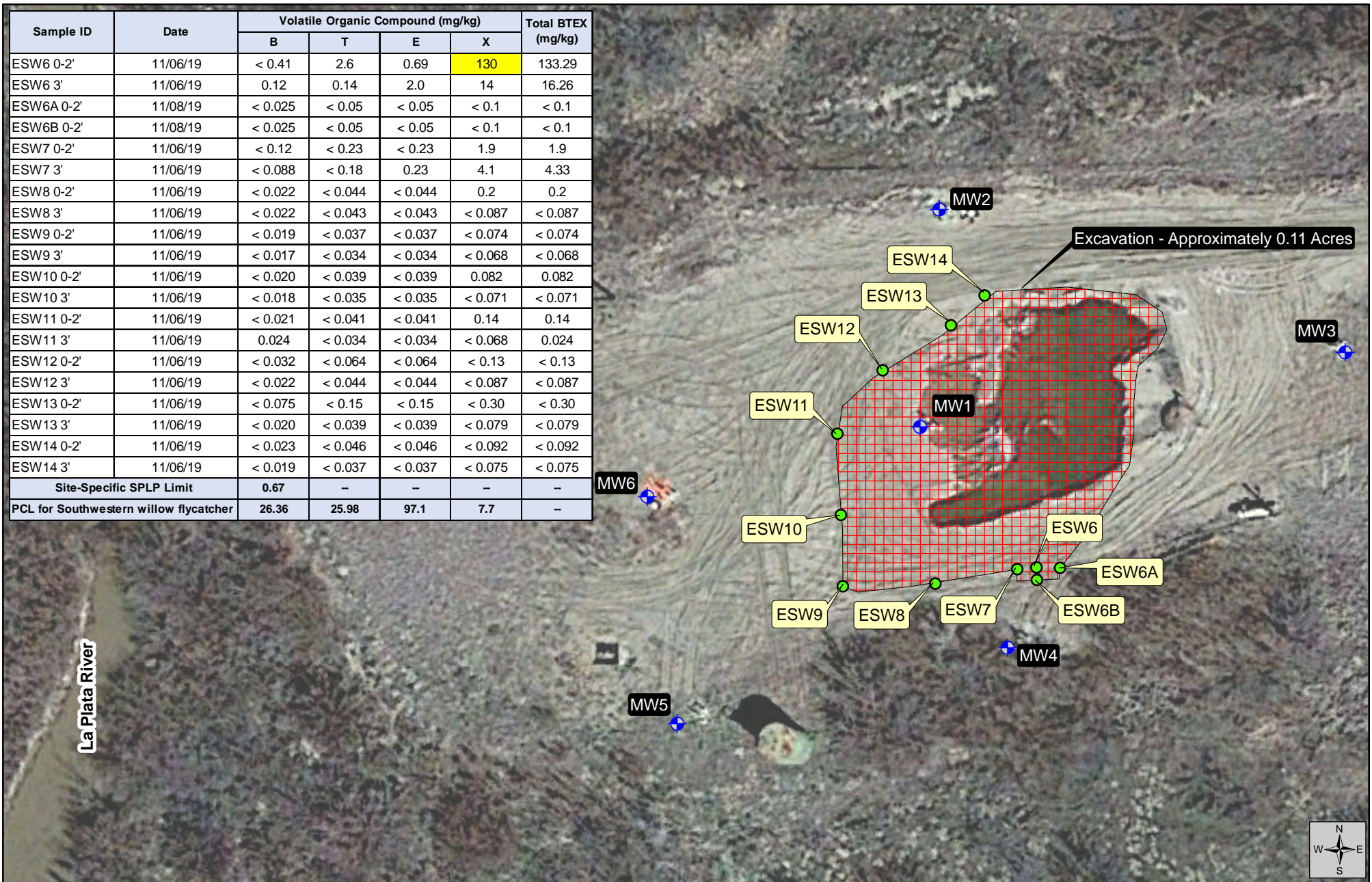


Figure 9
Soil Abatement and
Confirmation Samples

Stage 2 Abatement Plan (AP-0138)

Sample Dates
11/06/19 and 11/08/19



Created By:
Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Sample Location
- + Monitor Well
- Soil Abatement Area
- Exceeds PCL for Southwestern willow flycatcher



Figure 10
Potentiometric Surface
Map - June 2019

Stage 2 Abatement Plan (AP-0138)

Gauging Date:
June 20, 2019



Created By:
Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Monitor Well
- Groundwater Gradient
- Groundwater Flow

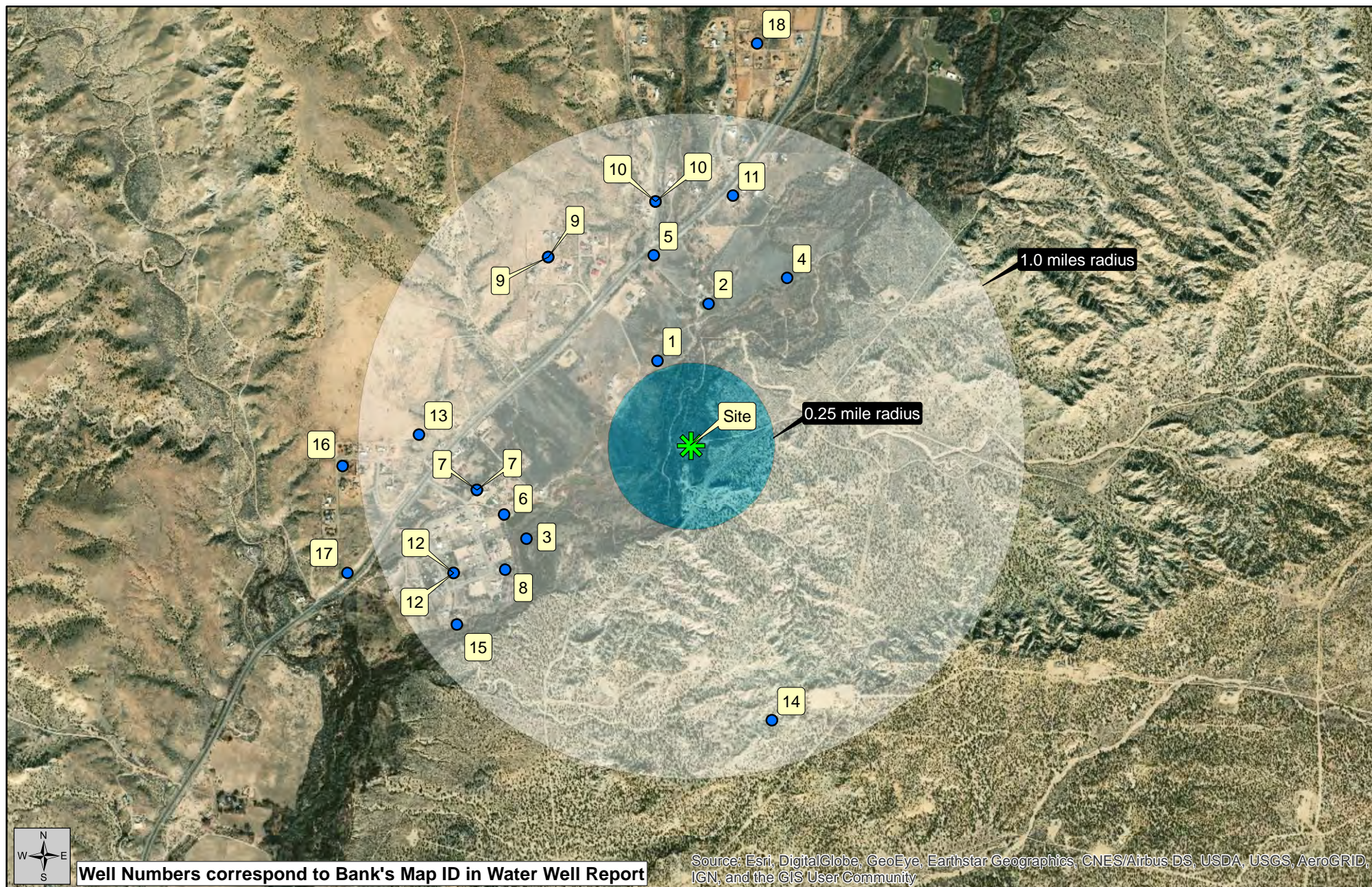


Figure 11
Receptor Survey -
Water Well Location Map

Stage 2 Abatement Plan (AP-0138)

December 30, 2019



Created By:
Russell Greer
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

- Site
- Water Well
- 0.25 mile radius
- 1.0 mile radius

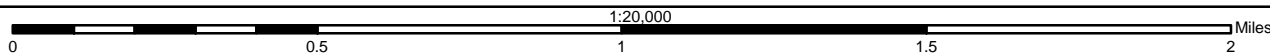




Figure 12
Receptor Survey -
Sensitive Features Map

Stage 2 Abatement Plan (AP-0138)

December 30, 2019



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Russell Greer
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

- Monitor Well
- Identified Wetland
- Berm



Figure 13
Potentiometric Surface
Map - October 2019

Stage 2 Abatement Plan (AP-0138)

Gauging Date:
October 8, 2019

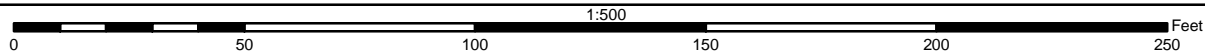


Created By:
Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Monitor Well
- Groundwater Gradient
- Groundwater Flow



Sample ID	Date	Volatile Organic Compounds (mg/L)			
		B	T	E	X
MW1	10/09/19	< 0.001	< 0.001	< 0.001	< 0.001
MW2	10/09/19	< 0.001	< 0.001	< 0.001	< 0.001
MW3	10/09/19	< 0.001	< 0.001	< 0.001	< 0.001
MW4	10/09/19	< 0.001	< 0.001	< 0.001	< 0.001
MW5	10/09/19	0.0041	< 0.001	< 0.001	< 0.001
MW6	10/09/19	< 0.001	< 0.001	< 0.001	< 0.001
Regulatory Criteria		0.01	0.75	0.75	0.62



Figure 14
Groundwater Analytical
Results - 4Q19

Stage 2 Abatement Plan (AP-0138)

Sample Date:
October 9, 2019



Created By:
Russell Greer
December 30, 2019
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

 Monitor Well

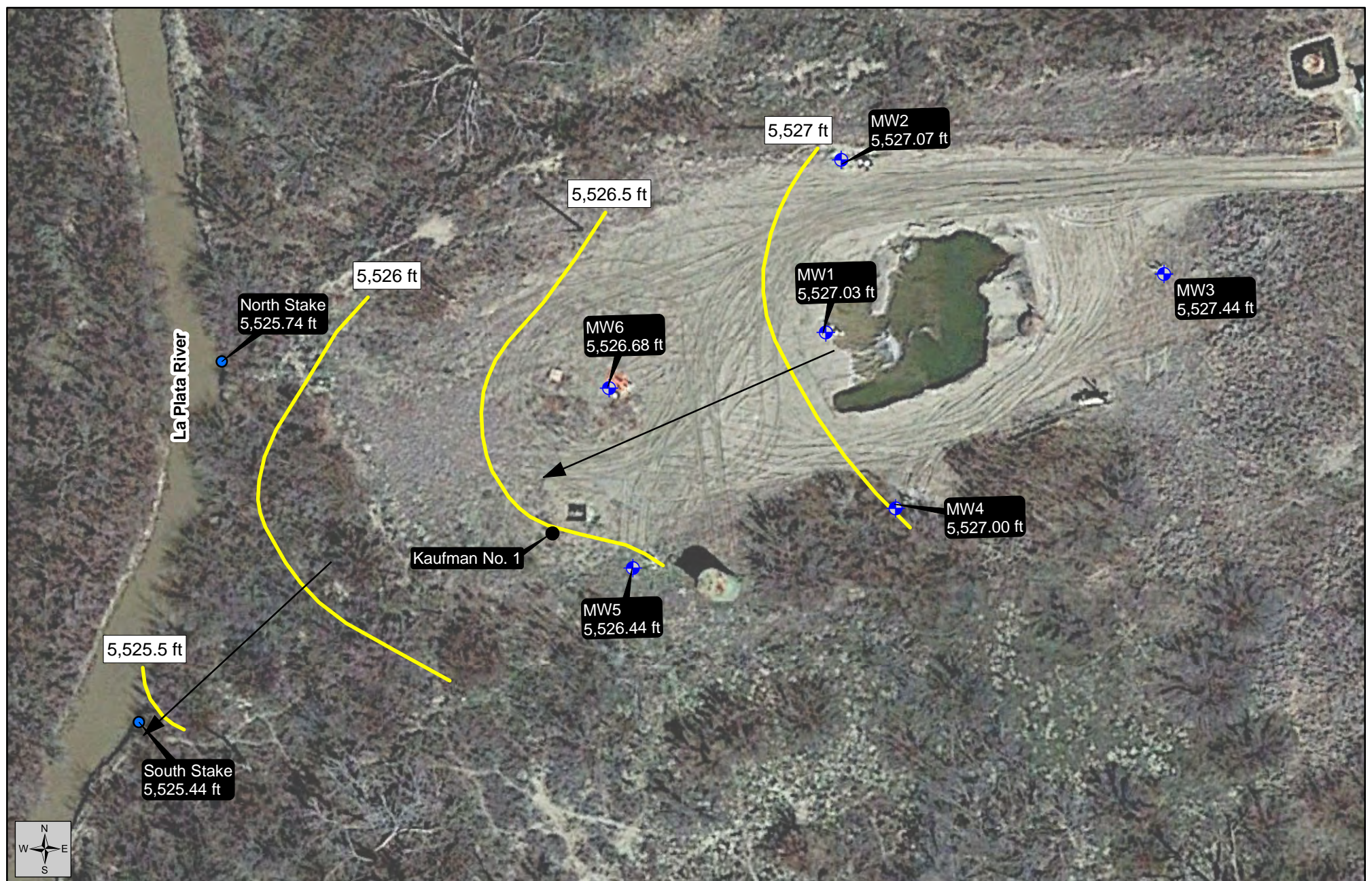


Figure 15
Potentiometric Surface
Map - December 2019

Stage 2 Abatement Plan (AP-0138)

Gauging Date:
December 10, 2019



Created By:
 Russell Greer
 December 30, 2019
 TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
 Imagery Source: Google Earth
 Vector Source: TE

- Monitor Well
- Surveyed Stake
- Kaufman No. 1 Well Head
- Groundwater Gradient
- Direction of Flow



Figure 16
Proposed Monitor
Well Location Map

Stage 2 Abatement Plan (AP-0138)



December 30, 2019

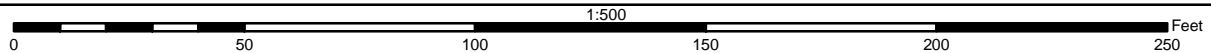


Created By:
Russell Greer
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

-  Monitor Well
-  Proposed Monitor Well



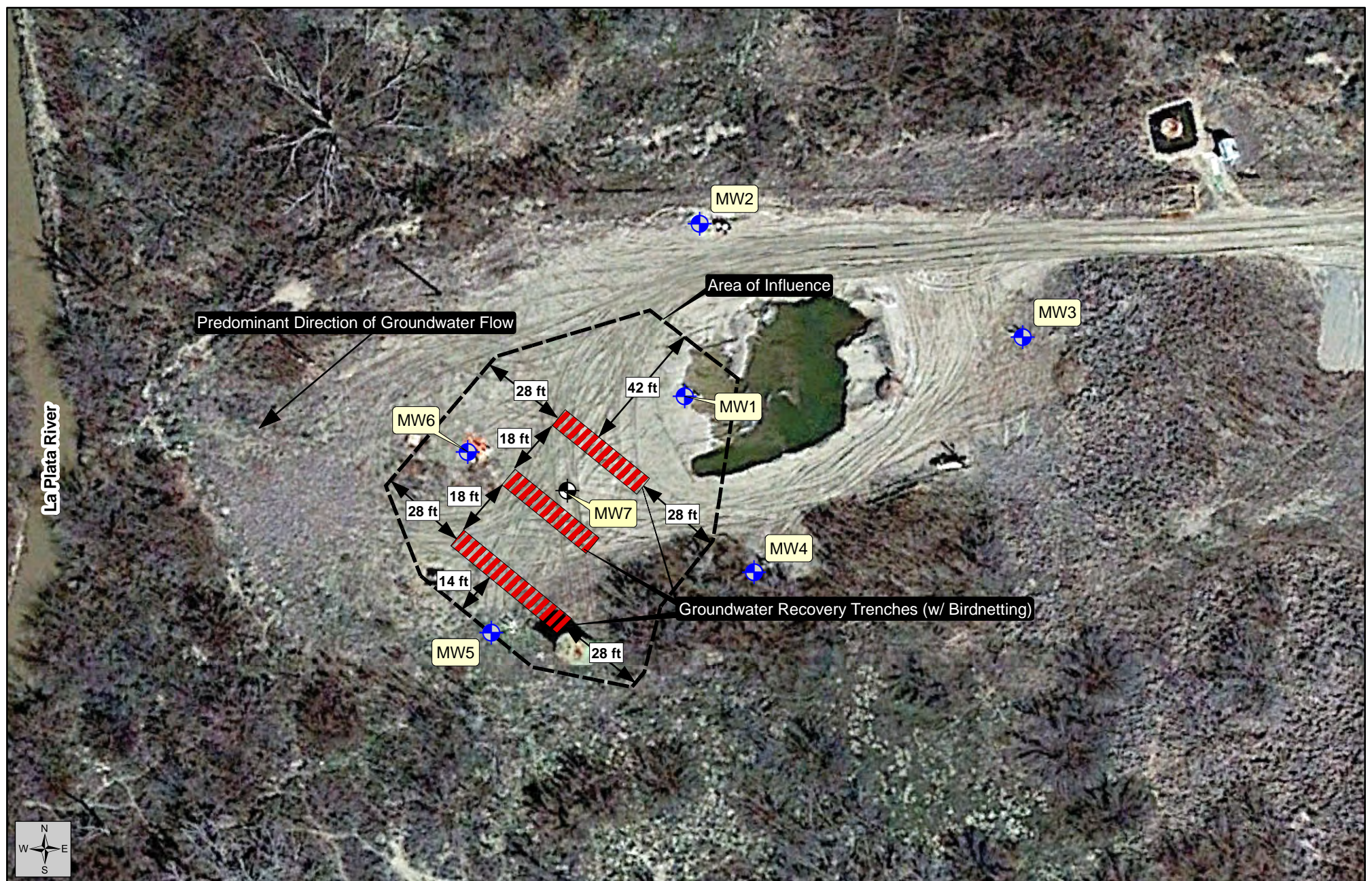


Figure 17
Groundwater Abatement -
Preferred Remedial Technique

Stage 2 Abatement Plan (AP-0138)

December 30, 2019



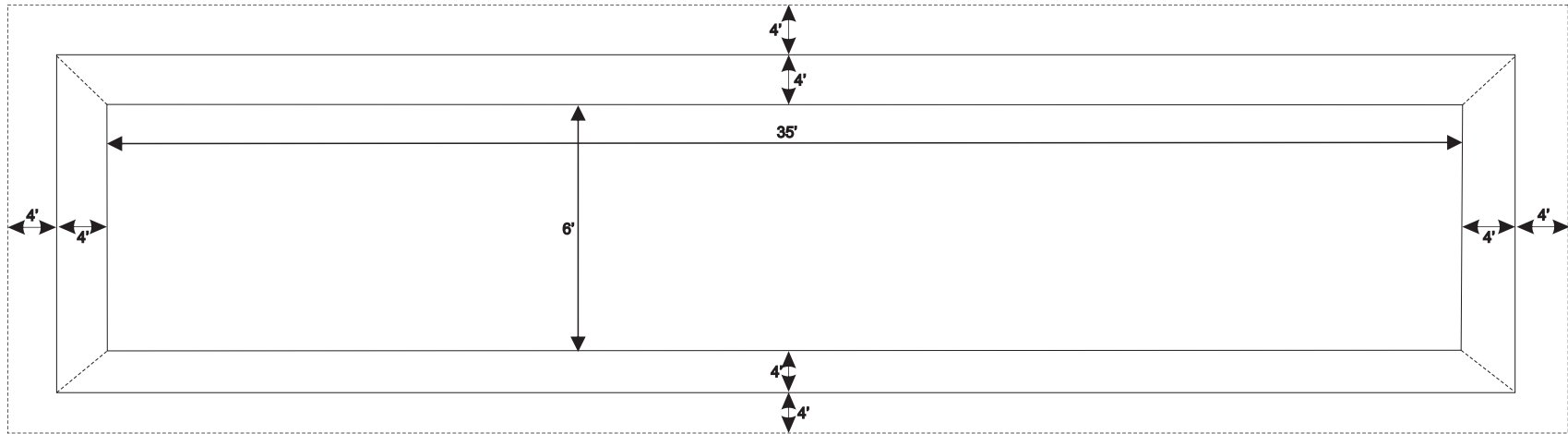
Created By:
Russell Greer
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33, T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Datum: NAD83
Imagery Source: Google Earth
Vector Source: TE

- Monitor Well
- Proposed Monitor Well
- Recovery Trenches
- Area of Influence
- Direction of Groundwater Flow

Top View



Cross-Section View



Figure 18
Detail Sheet For
Berm Construction

Stage 2 Abatement Plan (AP-0138)

Date: December 30, 2019



Created By:
Chris Perez
TE Project No.: HEC-180061

Kaufman No. 1 Release (SE1/4 NE1/4, Sec. 33 T31N, R13W)
Hilcorp Energy Company
San Juan County, New Mexico

Not to Scale

Appendix A

OCD Approval of 60-Day Extension Request

Jim Foster

From: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Sent: Tuesday, November 12, 2019 2:33 PM
To: Jim Foster <jim@teamtimberwolf.com>
Cc: Jennifer Deal <jdeal@hilcorp.com>; Ryan Mersmann <ryan@teamtimberwolf.com>; Michael Morse <michael@teamtimberwolf.com>
Subject: RE: Hilcorp's Kaufman No. 1 (AP-138) - Stage 2 Abatement Extension Request

Jim,

Sorry I didn't get this out before I left,

OCD approves HEC request for an additional 60 days. Please include this approval in your Stage 2 plan.

Thank you,

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources

From: Jim Foster <jim@teamtimberwolf.com>
Sent: Monday, October 28, 2019 11:33 AM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Cc: Jennifer Deal <jdeal@hilcorp.com>; Ryan Mersmann <ryan@teamtimberwolf.com>; Michael Morse <michael@teamtimberwolf.com>
Subject: [EXT] Hilcorp's Kaufman No. 1 (AP-138) - Stage 2 Abatement Extension Request

Cory,

On behalf of Hilcorp Energy, this email is submitted to provide a status update for Stage 1 activities and to request a 60 day extension for submitting the Stage 2 Abatement Plan for the Site.

Elements of the Stage 1 Abatement Plan and the current status are presented in the following table:

Section	Description	Status
6.2	Horizontal Delineation of Historical Impacts	Completed
6.3	Vadose Zone Assessment / Abatement	Completed / Pending
6.4	Ecological Risk Assessment / Abatement	Completed / Pending
6.5	Additional Groundwater Assessment	Completed
6.6	Receptor Survey	Completed
6.7	Hydrological Assessment of Groundwater and River	Pending
6.9	Initiate Monitoring Program	Completed

Items which are currently pending are scheduled to be completed next week. Also, following additional excavation for Vadose Zone abatement (6.3) and Ecological Risk abatement (6.4), we plan to collect confirmation samples the afternoon of Nov 6th.

Thank you,

Jim Foster



1920 W. Villa Maria, Suite 205
Bryan, Texas 77807
979-324-2139
teamtimberwolf.com

Appendix B

Written and Public Notice



691 CR 233, Ste. B-4
Durango, Colorado 81301
970.516.8419
www.teamtimberwolf.com

August 30, 2019

First Name Last Name

Owner Address

City , State Zip

Re: Written Notice of Stage 1 Abatement Plan (AP-138)
Kaufman No. 1 Release
Hilcorp Energy Company
San Juan County, New Mexico

Dear First Name Last Name,

On behalf of Hilcorp Energy Company (Hilcorp), Timberwolf Environmental, LLC (Timberwolf) prepared this written notice of a Stage 1 Abatement Plan at the Kaufman No. 1 (i.e. "Site"). The Site is an oil and gas well and production facility located approximately 9.1 miles north of Farmington, San Juan County, New Mexico. Details concerning the Stage 1 Abatement Plan are presented below.

Operator: Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico 87410

Site name and location: Kaufman No. 1 (AP-138)
API: 30-045-10174
Legal Description: SE¼, NE¼, Sec. 33, T31N, R13W
Latitude: 36.8598137 Longitude: -108.2037506
The Kaufman No. 1 ("Site") is situated on federal land that is managed by the Bureau of Land Management. The Site is located east of the La Plata River, approximately 9.1 miles north of Farmington in San Juan County, New Mexico.

Source, impacted media, and Stage 1 Abatement Plan

On or about 11/16/18, a release of approximately 8 barrels of oil and 10 barrels of produced water occurred due to a tank overflow. The release impacted the soil vadose zone and underlying groundwater; no surface water was impacted. Production equipment was removed to facilitate excavation and disposal of affected soil.

The Stage 1 Abatement Plan is proposed to: 1) investigate the vadose zone to ensure that any remaining affected soil does not pose a threat to either the underlying groundwater or any threatened and endangered species, 2) determine the location of area water wells, 3) conduct additional groundwater analysis to determine native salinity levels of groundwater at the Site, 4) conduct a hydrogeologic assessment to study the relationship between the Site's groundwater and the La Plata River, 5) establish a quality assurance plan, and 6) establish a monitoring program for Site groundwater.

Director's procedure for making final determination

The New Mexico Oil and Gas Conservation Division will accept written comments and requests for consideration on the stage 1 abatement plan if received within 30 days of this public notice. The Director will approve or deny the stage 1 abatement plan following the 30 day public notice and within 60 days from receipt of the abatement plan.

Public Availability

A copy of the Stage 1 Abatement Plan can be viewed at the Division's Santa Fe Office located at 1220 South St. Francis Dr., Santa Fe, NM 87505 or the Division's District 3 Office located at 1000 Rio Brazos Road, Aztec, NM 87410. The abatement plan is also viewable online via the NMOCD's website:
www.emnrd.state.nm.us/ocd

Public Comments

The division will accept written public comments and requests for consideration if received within 30 days from the date of this publication. Please address any comments or requests to:

Cory Smith, Environmental Specialist
New Mexico Oil Conservation Division – District 3
1000 Rio Brazos Road
Aztec, NM 87410

For additional information, please contact: Jennifer Deal, Environmental Specialist
Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico 87410
(505) 599-3400

Sincerely,
Timberwolf Environmental, LLC

Jim Foster
President

cc: Jenifer Deal, Hilcorp Energy Company



SANTA FE NEW MEXICAN

Founded 1849

TIMBERWOLF ENVIRONMENTAL.
1920 W. VILLA MARIA
STE 205
BRYAN, TX 77807

ACCOUNT: 32286
AD NUMBER: 0000264308
LEGAL NO 86265 P.O. #:
1 TIME(S) 161.70
AFFIDAVIT 20.00
TAX 14.49
TOTAL 186.19

AFFIDAVIT OF PUBLICATION

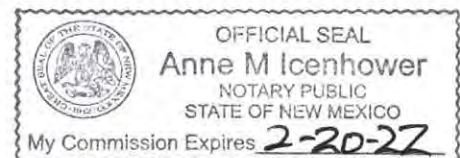
STATE OF NEW MEXICO
COUNTY OF SANTA FE

I, L. Harding, being first duly sworn declare and say that I am Legal Advertising Representative of THE SANTA FE NEW MEXICAN, a daily newspaper published in the English language, and having a general circulation in the Counties of Santa Fe, Rio Arriba, San Miguel, and Los Alamos, State of New Mexico and being a newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 on Session Laws of 1937; that the Legal No 86265 a copy of which is hereto attached was published in said newspaper 1 day(s) between 09/12/2019 and 09/12/2019 and that the notice was published in the newspaper proper and not in any supplement; the first date of publication being on the 12th day of September, 2019 and that the undersigned has personal knowledge of the matter and things set forth in this affidavit.

ISI L. Harding
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 12th day of September, 2019

Notary Anne M Icenhower
Commission Expires: 2-20-22



LEGAL # 86265

**PUBLIC NOTICE OF
STAGE 1
ABATEMENT PLAN
(AP-138)**

Operator: Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico
87410

Site name and location: Kaufman No. 1 (AP-138)

API: 30-045-10174

Legal Description: SE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 33, T31N, R13W

Latitude: 36.8598137

Longitude: 108.2037506

The Kaufman No. 1 ("Site") is situated on federal land that is managed by the Bureau of Land Management. The Site is located east of the La Plata River, approximately 9.1 miles north of Farmington in San Juan County, New Mexico.

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Cory Smith, Environmental Specialist

New Mexico Oil Conservation Division - District 3
1000 Rio Brazos Road
Aztec, NM 87410

For additional information, please contact: Jennifer Deal, Environmental Specialist
Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico
87410
(505) 599-3400

Pub.: Sep. 12, 2019

AFFIDAVIT OF PUBLICATION

Ad No.
0001296239

TIMBERWOLF ENVIRONMENTAL
1920 W. VILLA MARIA, SUITE 205

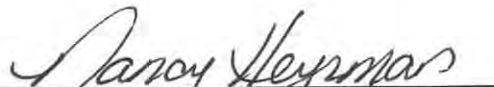
BRYAN TX 77807

I, being duly sworn say: THE DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice was published in a regular and entire issue of the said DAILY TIMES, a daily newspaper duly qualified for the purpose within the State of New Mexico for publication and appeared in the internet at The Daily Times web site on the following days(s):

09/12/19


Legal Clerk

Subscribed and sworn before me this
12th of September 2019.


State of WI, County of Brown
NOTARY PUBLIC

5.15.23

My Commission Expires

Ad#:0001296239
P O : Kaufman No. 1 (AP-38)
of Affidavits :0.00

NANCY HEYRMAN
Notary Public
State of Wisconsin

PUBLIC NOTICE OF STAGE 1 ABATEMENT PLAN (AP-138)

Operator: Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico 87410

Site name and location: Kaufman No. 1
(AP-138)

API: 30-045-10174

Legal Description: SE¼, NE¼, Sec. 33, T31N, R13W

Latitude: 36.8598137 Longitude: -108.2037506

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Source, impacted media, and Stage 1 Abatement Plan

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Public Comments

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requests to:
Cory Smith, Environmental Specialist
New Mexico Oil Conservation Division - District
3
1000 Rio Brazos Road
Aztec, NM 87410

For additional information, please contact:
Jennifer Deal, Environmental Specialist
Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico 87410
(505) 599-3400

Legal No. 1296239 published in The Daily Times
on September 12, 2019.

Appendix C

LANL Preliminary Ecological Risk Assessment

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*Preliminary Risk Assessment
of the Southwestern Willow Flycatcher
(Empidonax traillii extimus)
at the Los Alamos National Laboratory*

Los Alamos
NATIONAL LABORATORY

*Los Alamos National Laboratory is operated by the University of California
for the United States Department of Energy under contract W-7405-ENG-36.*

*Edited by Hector Hinojosa, Group CIC-1
Photocomposition by Teresa Hiteman, Group ESH-20*

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*Preliminary Risk Assessment
of the Southwestern Willow Flycatcher
(Empidonax traillii extimus)
at the Los Alamos National Laboratory*

Gilbert J. Gonzales
Anthony F. Gallegos
Mary A. Mullen
Kathryn D. Bennett
Teralene S. Foxx

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**Preliminary Risk Assessment of the Southwestern Willow Flycatcher
(*Empidonax traillii extimus*) at the Los Alamos National Laboratory**

Gilbert J. Gonzales, Anthony F. Gallegos, Mary A. Mullen, Kathryn D. Bennett, and Teralene S. Foxx

Abstract

The southwestern willow flycatcher (*Empidonax traillii extimus*) is the fourth threatened or endangered species to undergo a preliminary assessment for estimating potential risk from environmental contaminants at the Los Alamos National Laboratory. The assessments are being conducted as part of a three-year project to develop a habitat management plan for threatened and endangered species and species of concern at the Laboratory. For the preliminary assessment, estimated doses were compared against toxicity reference values to generate hazard indices (HIs). This assessment included a measure of cumulative effects from multiple contaminants (radionuclides, metals, and organic chemicals) to 100 simulated nest sites located within flycatcher potential habitat. Sources of contaminant values were 10,000-ft² grid cells within an Ecological Exposure Unit (EEU). This EEU was estimated around the potential habitat and was based on the maximum home range for the flycatcher identified in the scientific literature. The tools used included a custom FORTRAN program, ECORSK5, and a geographic information system. Food consumption and soil ingestion contaminant pathways were addressed in the assessment. Using a four-category risk evaluation, HI results indicate no appreciable impact is expected to the southwestern willow flycatcher. Information on risk by specific geographical location was generated, which can be used to manage contaminated areas, flycatcher habitat, facility siting, and/or facility operations in order to maintain low levels of risk from contaminants.

1.0 Introduction and Background

The Los Alamos National Laboratory (LANL) is located in north-central New Mexico (Figure 1). The southwestern willow flycatcher (*Empidonax traillii extimus*) (referred to as “flycatcher” in this report) is the fourth federally protected species to undergo a preliminary assessment of potential risk from environmental contaminants at LANL. The assessments are being conducted as part of a three-year project to develop a habitat management plan for threatened and endangered (T&E) species and other species of concern at the Laboratory (Foxx et al. 1998). The purpose of the habitat management plan is to provide

for the proactive management of T&E species and other species of concern that permanently reside on or utilize LANL property in compliance with the federal Endangered Species Act, the National Environmental Policy Act, and other laws and regulations.

The flycatcher is a federally endangered species and is also listed by the State of New Mexico as endangered. It was listed in New Mexico in 1988 and placed on the federal list in 1995 (Skaggs 1996). The flycatcher requires patches of cottonwood or willow for nesting and foraging. This species has experienced extensive loss and modification of its habitat nationally and is also

endangered by nest parasitism by the brown-headed cowbird (*Molothrus ater*). The breeding range includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, and northern Mexico. It winters in Mexico, Central America, and northern South America.

Flycatchers inhabit riparian areas, marsh, wetlands, and other areas near water (Gonzales et al. 1996). Areas in lower Pajarito Canyon near the Pajarito wetlands have been qualitatively judged to contain "suitable habitat." The Pajarito wetlands is located in lower Pajarito Canyon and is parallel and immediately adjacent to State Route 502 beginning at the southeast boundary of Technical Area (TA) 18 and extending approximately two miles to the Laboratory's southeast boundary. The canyon serves as one of several drainages for the flanks of the Jemez Mountains. Spring and summer thunderstorms recharge a thin perched aquifer through the canyon which terminates in the wetlands (Purtymun et al. 1990). The wetlands was originally delineated by the U.S. Fish and Wildlife Service as part of the National Wetlands Inventory (Cowardin et al. 1979). Palustrine wetlands dominate the Pajarito wetlands, which are fed by springs, seeps, and runoff from precipitation. Historical data, aerial photographs, and field observations indicate a wetland hydrology that is interrupted. Since the wetlands are transitional between aquatic and terrestrial systems where the water table is usually at or slightly above the surface, aquatic flora and fauna dominate, but terrestrial flora and fauna add to the high biological diversity. Hydric soils in the wetlands support vegetation dominated by hydrophytic plants including Mexican rush (*Juncus mexicanus*), cattails (*Typha* spp.), coyote willow (*Salix* spp.), salt cedar (*Tamarix galliea*), and narrowleaf cottonwood (*Populus angustifolia*) (Banar 1996).

Fauna include many species of insects and birds, at least 23 species of mammals, and at least 15 species of reptiles and amphibians. A detailed listing of species that occur at the wetlands can be found in Banar (1996). LANL's Ecology Group conducts annual surveys for federally listed T&E species and for several State-protected species. During one of three surveys in 1997 for the flycatcher, a migrant flycatcher was sighted in the Pajarito wetlands and at the Rio Grande (Keller 1997). No nesting birds were identified. Subsequent surveys in the same year revealed no additional sightings nor did surveys in 1995, 1996, or 1998.

The flycatcher has never been known to nest on LANL or within Los Alamos County, however, Klingel (1997) has confirmed flycatchers in the Jemez Mountains. Breeding habitat is believed to exist on LANL and Bandelier National Monument, which is adjacent to LANL.

Habitat rarity and small, isolated populations make the remaining flycatchers increasingly susceptible to local extirpation through stochastic events such as fire, brood parasitism, predation, depredation, and land development. Pesticides and herbicides in particular have been identified as agents potentially affecting the flycatcher, either through direct toxicity or through effects on their food base (Sogge et al. 1997).

With little southwestern willow flycatcher habitat remaining, widespread events could destroy virtually all remaining habitat throughout all or a significant portion of the subspecies' range. Wildlife specialists believe that it is crucial that the maximum possible number of flycatcher breeding areas be identified and monitored (Sogge et al. 1997), therefore, it is important that any potential risk from contaminants to flycatchers that may inhabit the Pajarito habitat in the future be estimated and monitored over time.

The southwestern willow flycatcher is primarily an insectivore, with both larval and adult stages of insects serving as important foods (Klingel 1997). It forages within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (Bent 1942, Marshall 1996). Because insects have a high lipid content, if exposed to contaminants, they typically store relatively high levels of the fat-soluble contaminants. Therefore, lipophilic contaminants such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs) should receive particular attention in the ensuing assessment.

The complexity of assessment applied was commensurate with a “Stage 1, Tier 2,” or preliminary, assessment as defined in the Methods section. Having previously successfully demonstrated the integration of the custom FORTRAN program ECORSK5, LANL Environmental Restoration’s (ER) contaminant database (Facility for Information, Management and Display – FIMAD), and a geographic information system (GIS), the primary objectives of the preliminary risk assessment were to

- semi-quantitatively appraise the potential for contaminants (organic, inorganic, and radionuclide) to impact flycatchers hypothetically nesting in or around LANL;
- evaluate the impact of improvements in model realism on risk, where improvements include (1) inclining the home range (HR) to angles that are similar to flycatcher potential habitat, (2) weighting the foraging process such that foraging, or occupancy, is inversely related to distance from a given nest site, and (3) scaling HR dimensions to flycatcher potential habitat so that HR shapes are proportional to the nesting habitat; and

- identify where further assessment, if any, is required; this includes identifying known and unknown facets of potential effects to assist in the development of a natural resources management plan that includes management of T&E species habitat.

2.0 Methods

Only a summary of the methods is made here as a detailed description of methods has been previously reported in Gonzales et al. 1998; Gallegos et al. 1997a and 1997b; and Gonzales et al. 1997.

The level of risk assessment that we targeted for this study in order to meet the objectives was “Stage 1, Tier 2,” which we define as a preliminary risk assessment in which several elements of risk assessment are addressed:

- qualitatively evaluate contaminant release, fate, and transport,
- identify contaminants of potential ecological concern (COPECs),
- identify potential exposure pathways,
- identify known effects through literature review,
- develop a conceptual model,
- characterize the general biology and ecology of the flycatcher relative to potential contaminant exposure, and
- make a preliminary estimate of risk.

For our intents and purposes, the next stage of assessment (“Stage 2, Tier 2” or “effects assessment”) for any species and COPECs that require further study would, in addition to the stage 1 elements, add the elements of conducting field studies and performing toxicity tests. A “Tier 3” level of assessment would primarily add a “risk characterization” component in which a final risk determination is made, an uncertainty analysis is conducted, and the significance of risks is established.

The process for conducting the assessment consisted of the following elements.

2.1 Review Literature

A broad range of literature was reviewed on subjects including but not limited to the biology of the species, HR tendencies, related food webs and diet, population histories, historical relationships with contaminants, and species-specific toxicology.

2.2 Compiling Toxicity Reference Values

As described in more detail later, the basis of the method used in this assessment to convey potential impact is to compare contaminant exposure estimates to toxicity reference values (TRVs) using the general formula

$$HQ = \text{Exposure/TRV}, \quad (1)$$

where

HQ = hazard quotient, and
TRV = toxicity reference value.

A TRV is a level, or threshold value, of contaminant below which it is expected that no impact to a species will occur. The TRV method adopts “no observable adverse effects levels” (NOAELs) as the threshold for determining risk. NOAELs are experimentally derived toxicity values based on toxicological studies using a variety of animals. Much variation exists in species used as well as in experimental conditions, and no NOAEL information exists on the flycatcher or other T&E species. Because of these variations and uncertainties, conservative TRVs that would have the tendency to overestimate risk were used. The NOAELs and related information used are listed in Tables A-1a and A-1b in the appendix.

Nonradionuclide TRVs. TRVs chosen for use in quantifying risk from organic and metal COPECs were the chronic NOAELs in units of mg COPEC per kg body wt of the flycatcher per day. In order of descending use, the manner in which NOAELs were compiled was

- 1) obtained directly from the scientific literature or from published data bases,
- 2) computed from chronic intake doses, and
- 3) computed from LD_{50s}—a dose which is lethal to 50% of a test population.

Table A-1a identifies (1) the nonradionuclide NOAELs used in this assessment, (2) references from which the NOAELs were taken or derived, (3) test species on which they are based, (4) the chemical form on which the NOAEL is based, (5) the toxicological test endpoint, and (6) comparison or alternative NOAELs or TRVs which could have been used. The NOAELs for the metal COPECs are based on avian test species. The NOAELs for the organic COPECs are based on laboratory rats. NOAELs can have a substantial impact on risk estimates, therefore it is important to use NOAELs that are based on toxicity testing of species that are as close phylogenetically to the assessed species as possible. Environmental Protection Agency (EPA) data bases largely contain NOAELs that are based on testing laboratory rats. Examples of the impact that NOAELs can have on risk estimates have been previously demonstrated (Gallegos et al. 1997a). The replacement of rat-based NOAELs with NOAELs based on birds is a continuous process in this study, and this report is updated periodically as additional NOAELs and other information become available.

In human risk assessments, reference doses (RfDs) are typically adjusted (lowered) by a factor of 10 to account for the

uncertainty of extrapolating RfDs within and between species. Attempts to calculate extrapolations of TRVs have been made by some researchers, however, the methods for doing so vary from one researcher to another. For example, Sample et al. (1995) assumed that “smaller animals have higher metabolic rates and are usually more resistant to toxic chemicals because of more rapid rates of detoxification and that metabolism is proportional to body weight.” Conversely, in a study of risk to vertebrates from pesticides, Tiebout and Brugger (1995) predicted that small-bodied insectivores faced the highest risk.

Other possible sources of uncertainty that are not necessarily exclusive of each other include

1. extrapolation of acute dose derived NOAELs to chronic responses,
2. lowest observed adverse effect level (LOAEL) to NOAEL conversions,
3. extrapolation of sensitive-test-species data to nonsensitive or “normal” life stages,
4. extrapolation of less-than-life-span toxicological data to life span,
5. time to achievement of contaminant steady-state in laboratory tests on which NOAELs are based, and laboratory to field extrapolation (Calabrese and Baldwin 1993).

Some of the above-listed factors have the potential to increase or decrease (under- or overestimate) toxicological values. Also, several instances of interdependence of uncertainty factors exist, therefore the assumption that these factors are independent in their application would likely lead to over-conservatism (Calabrese and Baldwin 1993). For these reasons, the authors believe that the collective amount of uncertainty originating from different

sources is great enough and/or variable enough such that adjustment for such uncertainty would make the results unusable because of large total margins of introduced error. This uncertainty is more appropriately eliminated or reduced in the next level of risk assessment should the results of this assessment indicate the need.

Radionuclide TRVs. TRVs have been largely unavailable for nonhumans. Radionuclide TRVs are ecological screening action levels (ESALs) in units of picocuries of radionuclide per gram of soil, i.e., pCi/g. For 11 radionuclides, TRVs were back-calculated from an International Atomic Energy Agency (IAEA) dose guideline of $0.1 \text{ rad} \cdot \text{d}^{-1}$ (IAEA 1992) (Table A-1b). They were derived by SNL (1998) using the dose conversion factors published by Amiro (1997). The IAEA reviewed all available literature on the effects of radiation on non-human biota and proposed a limit of $1.0 \text{ rad} \cdot \text{d}^{-1}$ as protective of all non-human biota with certain exceptions such as for T&E in which case they recommended $0.1 \text{ rad} \cdot \text{d}^{-1}$ as the protective level. For an additional 17 radionuclides, human-protective screening action levels, in units of pCi/g, were used (Table A-1b). Although the application of human TRVs to nonhuman biota can result in a large overestimate of risk (Gallegos et al. 1997a), the 17 radionuclides for which this was done contribute very little or no risk at LANL.

2.3 Delineating Ecological Exposure Units (EEUs), where EEU = Potential Nesting Habitat + HR (foraging area)

We define an EEU as an area defined by the biology of a species for which an ecological risk assessment is conducted. The EEU for the flycatcher is shown in Figure 2.

Peters (1993) developed allometric equations for estimating the HR for a number of classes of biota and functional

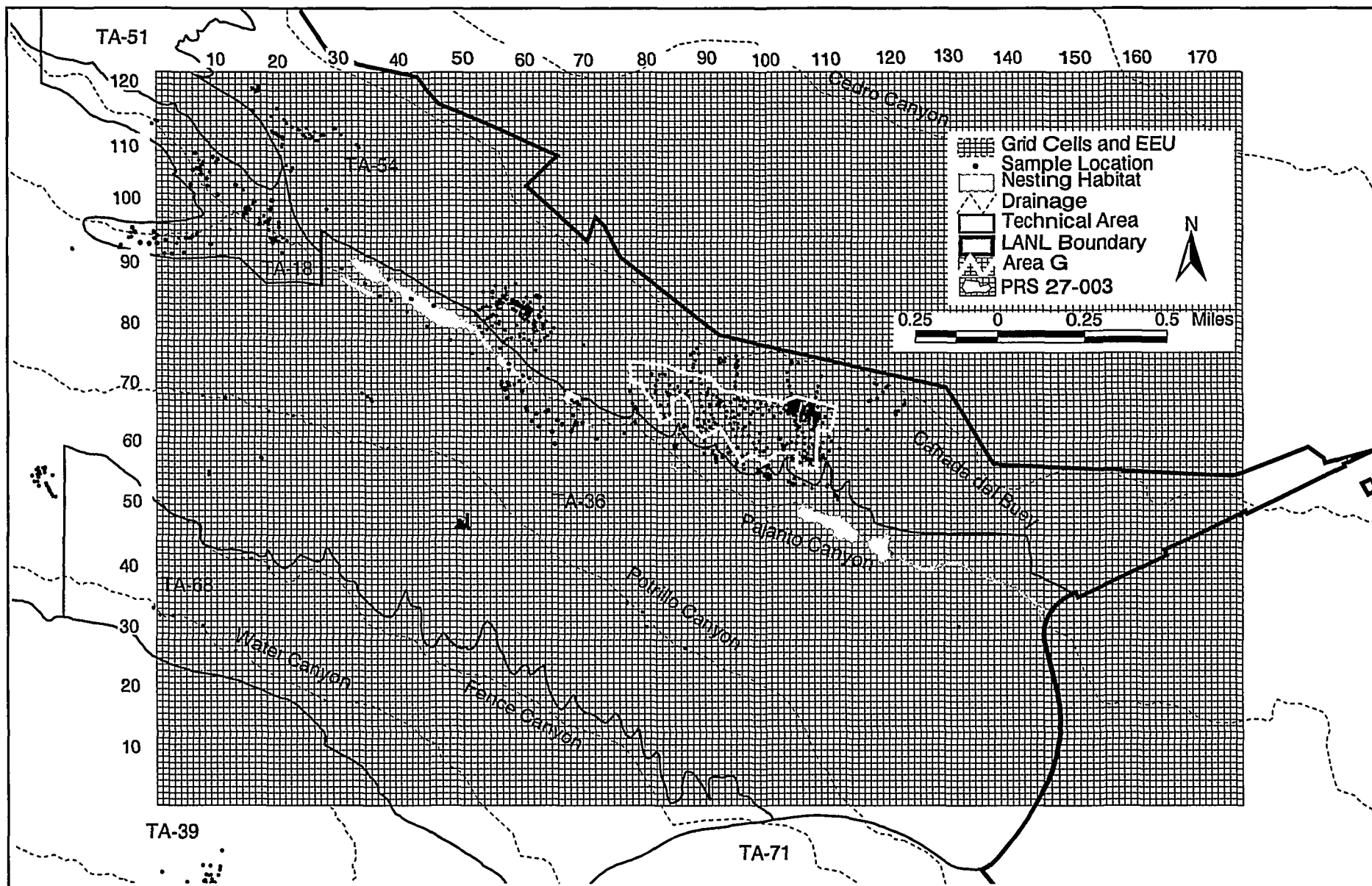


Figure 2. EEU-74 at LANL, the site of the preliminary risk assessment of the southwestern willow flycatcher.

foraging groups as based on body weight. The allometric equation predicts a HR for the flycatcher of only approximately $3.0\text{E-}02 \text{ km}^2$, which is in agreement with the literature for the non-breeding season. During the breeding season, however, territorial males can move several hundred meters between singing locations (Sogge et al. 1995, Peterson and Sogge 1996, Marshall 1996, Klingel 1997, Skaggs 1995). Therefore the extreme boundaries of the flycatcher EEU were established by mapping an area that accommodated both the breeding season and non-breeding season HR. The EEU was mapped as approximately 900 m from the extreme-most north, south, west, and east boundary of the nesting habitat. As described later, most foraging scenarios were based on the non-breeding HR of $3.0\text{E-}02 \text{ km}^2$, but one of the scenarios simulated an HR of 1.0 km^2 as based on a distance from nest site of approximately 600 m. Since the EEU is oversized, the size of the HR, not of the EEU, dictates which grid cells, and therefore which contaminant values on a spatial basis, enter into calculation of the HI for any given execution of ECORSK. Foraging was weighted in some scenarios such that foraging is inversely related to distance from a given nest site. This simulates the realistic behavior in which the majority of foraging occurs within the nesting habitat (Pajarito wetlands). The quantitative mechanics of this is also described later.

The resultant EEU is shown in Figure 2. The EEU encompasses all or portions of LANL TAs 18, 36, 54, and 68. Each EEU was mapped using a GIS and the GIS software ARC/INFO. ARC/INFO is a GIS software developed by Environmental Systems Research Institute, Inc. (ESRI) (ESRI 1989).

The GIS was used to create spatial data sets, combine information from different

spatial data sets, generate a spatial grid, and produce maps. The spatial extent of flycatcher nesting habitat was digitized into ARC/INFO to create a coverage (theme or layer). [Note: Including the EEU, roughly 75% of the 43 mi^2 that make up the Laboratory has been digitized into a personal computer.] This habitat was assigned an attribute coverage factor (map code value). The modeling also required additional coverages to be developed, a grid set, and a forage habitat coverage.

More specifically, a grid was developed that would encompass the spatial extent needed for the modeling activity. In ARC/INFO, a grid was created using the command GENERATE with the fishnet option. Adequate potential release site areal definition was not available for use in the risk estimation method to be described, therefore, an alternative subunit area definition was sought. The requirements for grid size were that sufficient grid cell density was achieved to allow accurate development of spatial risk estimates within the limits of available personal computer capabilities and that presentation of spatial risk data did not appear to achieve greater resolution than is supported by the limitations of the GIS. Based on these criteria the chosen grid cell size was 100 ft by 100 ft. This assignment was assumed to be a conservative measure in most cases. However, provision is made for modification of the animal occupancy estimates if deemed necessary.

The ecological risk model required that each row and column of the grid be designated by a label. In addition, the coordinates of the center of each grid cell were needed. To accomplish this, a program in *Basic*, documented in a previous report (Gallegos et al. 1997b), was developed. These attributes were then added to the grid spatial data set.

The next coverage developed in ARC/INFO was the forage coverage. The forage coverage (EEU) was created by assigning the foraging area—all space between the edge of the nesting area and the edge of the EEU—an attribute factor.

After these three coverages were made, additional information was needed that required combining coverages. When all coverages had been developed, maps were generated either in ARC/PLOT or ARC/INFO or ArcView. ArcView is a desktop GIS for map display, production, and query. It was also developed by ESRI (1989).

2.4 Choosing Parameters and Assumptions Considering Purpose of Study, Quotient Method Limitations, and other Constraints or Considerations

All risk assessment models are an oversimplification of reality, but this must be understood within the context of the stated purpose of any one risk assessment. As stated later in the Discussion section, the primary purpose of this level of assessment is to indicate potential for impact to the flycatcher. A second purpose is to focus additional assessment needs on the most problematic contaminants, the most problematic source areas, and areas related to the receptor(s) of interest or to the COPECs. Considerations of additional assessment are not restricted to the collection of additional empirical data but may involve collection of real data. Hence, the degree to which uncertainties are resolved for any particular assessment versus those which are addressed by making assumptions is also dependent on the purpose of any single assessment. As degree of complexity of a risk assessment lessens, the number of assumptions made and, thus, uncertainties in the study results increase. However, some uncertainties are inherent in any empirical study. For

example, a lack of toxicological information such as chronic NOAELs in the scientific community generally results in gross estimation of TRVs or no computation of risk indices for many COPECs.

Table 1 summarizes the assumptions made in this study, categorized according to whether we consider them “conservative,” “realistic,” or “nonconservative.”

Conservative assumptions could err to the side of overstating risk or protecting a species or ecological value.

Nonconservative assumptions could err to the side of understating risk or possibly not protecting a species to all degrees.

2.5 Compiling Data

This included querying and downloading contaminant data from FIMAD, performing additional queries in data base programs for the inclusion of additional input fields such as background concentrations and TRVs, and structuring this information into ECORSK input files. Data used for this risk assessment were collected by ER at LANL by sampling and analyzing soils for inorganic, organic, and radioactive contaminants. Analytical results from this sampling are maintained in an Oracle data base by FIMAD. FIMAD data can be accessed through the command line Structured Query Language or through the graphical interface Databrowser. The data for the risk assessment component of the T&E species project was accessed primarily with the former. Soil sampling data are stored in several tables, depending on the attribute of the data, when the data were collected, and the field unit from which the data were collected.

The data for the T&E species project were compiled from the FIMAD data base for each HR according to the following procedure:

Table 1. The Assumptions, Conditions, and Factors used in Calculating Risk from Contaminants

Conservative (overestimates risk)	Realistic	Nonconservative (underestimates risk)
All COPECs are assumed to have the same type of biological effect.		Risk was not estimated for contaminants for which TRVs were not available.
Radioactive decay of radionuclides was not calculated.	TRVs/NOAELs for metals were based on avian test species and are chronic.	Environmental restoration activities, such as clean-up that makes some COPEC values that are in FIMAD, was not accounted in the assessment.
Antagonism was not assessed.	The mean natural background COPEC values, not UTLs, were used for the inorganics.	The quotient method is not considered probabilistic, therefore the likelihood of any impact predicted is unknown.
The FIMAD data base was assumed to be current and accurate.	The FIMAD data base was assumed to be current and accurate.	The FIMAD data base was assumed to be current and accurate.
TRVs for 11 radionuclides were based on IAEA-suggested protective standard of 0.1 rad·d ⁻¹ (IAEA 1992). TRVs for 17 radionuclides were based on human screening action levels. Uncertainty factor is not applied to primary values (NOAELs) for extrapolation from toxicology test species to flycatcher.	The average, not maximum, COPEC concentrations were used.	Synergism between two or more COPECs assessed was not factored.
Soil contamination levels measured for one or more sampling points within a 10,000 ft ² area were assumed for the entire area.	The percent of dietary food intake as soil = 5.	
Sampling by ER Program is biased to locations where higher levels or larger spread of contamination were expected.		
Assumed bioavailability of COPECs = 100%.		
The foraging time, if any, spent foraging outside LANL resulting from migration, can be assumed to occur in areas with less contamination than at LANL.		
Biomagnification factors used were comparatively high.		

1. FIMAD-identified sampling locations within each HR were selected from the sampling locations stored in FIMAD in order to determine which samples were relevant to the T&E species study.
2. Sampling locations were then linked to sample identification numbers and field units to determine where the analytical results would be stored.
3. FIMAD tables were queried for the analytical results. Most FIMAD table data are quality assured prior to loading into FIMAD. Using input from FIMAD (Manzel 1997), we have previously estimated the accuracy of the data used for assessments of T&E species (Gallegos et al. 1997). Based on those estimates, the accuracy is typically expected to be between 95 and 98%.

4. As part of the query language, analytical results were screened to contain only samples with a beginning depth equal to zero. Although higher quantities of contaminants have been found at intermediate soil depths than at shallow depths elsewhere at LANL (Gonzales and Newell 1996), their bioavailability to aboveground biota is unknown. The data were then exported to a personal computer and modified further using Microsoft Access® software.
5. All records were screened by "sample units," and those records not given in grams or kilograms were discarded. All remaining records were converted to mg/kg for organics and heavy metals or to pCi/g for radionuclides, leaving only the surface soil sample data relevant to the T&E species study.
6. For the organics and inorganics, measured soil concentrations reported as below the detection limits of the instrumentation used in the analysis were assigned one-half the detection limit per Gilbert (1987).
7. For radionuclides, "less-than-detectable" values were included without change per DOE (1991).
8. Every sample record was assigned the appropriate cell (100 ft by 100 ft) of the grid covering the feeding area. The grid cells are labeled with the row and column in which they are found. Averages were calculated for each analyte within every grid cell containing at least one record of data. The "grid" was superimposed onto a map of sampling locations that were concentrated around pre-identified "potential release sites." Sample locations were not scattered evenly throughout cells of the grid because generally more samples were taken

where higher levels, greater variation, or larger spread of contamination were expected. Consequently, some cell averages include the data from several samples, others include the data from only one sample, while still others have no analytical data. In total, 11,098 records were compiled for the flycatcher in the main input file "eeuinp.dat."

2.6 Ecological Risk Estimation

Ecological risk was estimated using a modified EPA Quotient Method to calculate a relative risk index for inorganic, organic, and radionuclide contaminants from the soil ingestion and food consumption contaminant pathway. For each contaminant in each grid cell, a hazard quotient (HQ) is computed as $HQ = \text{Exposure}/TRV$. These are partial HQs (pHQ). Different levels of pHQs exist and are rolled up into higher level pHQs. For example, a pHQ for one COPEC in one grid cell may be added to pHQs for other COPECs and/or grid cells. When pHQs for all COPECs in all grid cells of a given HR are summed, this constitutes a cumulative HQ or hazard index (HI). The HI can be said to measure cumulative effects, in an additive fashion, of multiple contaminants if the pHQs for all COPECs are added.

The standard error of the mean was also computed, but this variation is primarily caused by the inclusion of different source-contaminant grid cells from one HR to another. Therefore, the origin of the variation represented by the standard error of the mean is heterogeneity of spatial contaminant distribution.

Nonradionuclides. For the nonradionuclide metals and organics, the following simple model was used:

$$HI = Food \times F_s / Bodwt \times \sum_{j=1}^{ncs} Occup_j \sum_{l=1}^{ncoc} BMF_l Dc_{j,l} / (TRV \times Dar_l), \quad (2)$$

where,

HI = hazard index (also equal to cumulative HQ for all COPECs and all grid cells within a given HR),

Food = amount of food consumed by a given animal, kg/day (calculated from $582 \times \text{body weight}^{0.651}$ per EPA 1993),

F_s = fraction of diet as incidental soil (0.05 assumed for flycatcher),

BMF = biomagnification factor (estimated for 15 COPECs)

$Occup_j$ = occupancy factor on the j th contamination site,

$Dc_{j,l}$ = concentration of COPEC in soil (mg COPEC/kg soil) for the j th contamination site of the l th COPEC (Note: Background concentrations of COPECs in soil were not subtracted.)

TRV (toxicity reference value) = consumed dose above which observable adverse effects may occur, mg-COPEC/kg-body weight-day of the l th COPEC,

Dar_l = adjustment factor for D_{rl} above for the l th COPEC,

Bodwt = body weight, kgfw, of the receptor species,

ncs = number of contamination sites, and

ncoc = number of contaminants in the j th contamination site.

Radionuclides. For radionuclides the following simple model was used:

$$HI = \sum_{j=1}^{ncs} Occup_j \sum_{l=1}^{ncoc} SC_{j,l} / (SAL_{j,l} \times SALa_{j,l}), \quad (3)$$

where,

$SC_{j,l}$ = soil concentration of COPEC, mg-COPEC/kg-soil for the l th COPEC of the j th contamination site,

$SAL_{j,l}$ = soil action level, mg-COPEC/kg-soil for the l th COPEC of the j th contamination site,

$SALa_{j,l}$ = adjustment factor for $SAL_{j,l}$ above,

ncs = number of contamination sites, and

ncoc = number of contaminants in the j th contamination site.

2.7 Risk Sources

Two types (sources) of risk were estimated – these were Unadjusted (Total) Risk and Background Risk. Unadjusted risk is the quantified HI associated with sampling within LANL boundaries. Unadjusted Risk includes risk associated with measured contaminant levels, both background and elevated levels. No adjustment (subtraction) is made for background soil concentrations. Background Risk is the quantified HI associated with the arithmetic mean “natural” (nonradionuclides) and “regional” (radionuclides) concentrations of COPECs in soil. Clifford et al. (1995) have shown that assignment of background levels in Quotient Method risk estimation can be inconsequential in terms of final results.

2.8 Data Collection Design

Upon randomly selecting a potential nest site within the defined nesting habitat of the

EEU, the ECORSK5 model develops an HR (foraging area) by adding grid cells in a concentric fashion around the nest and calculates an HQ for each COPEC within each 100- by 100-ft grid cell of the HR. The model repeats this process the number of times specified, which in this case, was for a total of 100 simulations. Contaminated grid cells “selected” during one simulation are “replaced” for possible selection during a subsequent simulation, therefore some grid cells are common between any two simulations, but they also have some differences. Thus, the soil contaminant population is not independent from one simulation to another.

Three factors, programmed in ECORSK5 as options, were varied as a means of performing a sensitivity analysis that measures the effect of increasing model realism on HI values: (1) HR slope was varied between horizontal (or a slope of 0°) and 33° in a SE to NW direction. These two slope values were combined with two values each for the factors described below—forage weighting and HR scale; (2) weighting of foraging so that occupancy of the flycatcher on any given grid cell during simulated foraging decreases with its distance from a nesting site; thus when foraging is weighted, a species feeds more on grid cells that are close to its nest than on grids further from its nest. Two values of this factor – no weighting and $e^{-r/34}$ – were used; $e^{-r/x}$ estimates the relative probability of foraging as a function of radial distance, r , in meters from the center of a foraging area, i.e., nest location. Integration of the equation gives the cumulative probability of foraging at any point r . For the flycatcher, the weighting factor $x = 34$ m was estimated by scaling from the ratio of HR radius: x for the Mexican spotted owl given in a previous report (Gallegos et al. 1997a). Given $x = 34$, a flycatcher is expected to do approximately 63% of its foraging within a 36-m radius of

its nest site; (3) the ability to scale the width-to-height dimensions of the foraging area, or HR; this feature enables the creation of foraging area shapes around a nesting site that are rectangular rather than square. Rectangular HRs may be dictated by factors such as hunting patterns that are determined by factors such as distribution of prey. The shape and dimensions of an HR may be proportional to the shape of a nesting habitat. As shown in Figure 2, the width of the flycatcher nesting habitat is about four times its height. Two values of this factor, a 1:1 width:height (a square) and a 4:1 w:h rectangle, were combined with two values each of the variables forage weighting and HR slope.

2.9 Bioaccumulation and Biomagnification

Several cases in history have implied that the higher the trophic level of an organism on a food chain, the greater its susceptibility to biomagnification (Leidy 1980). The flycatcher may be subject to relatively high levels of biomagnification because they feed heavily on insects which, with their high lipid contents, theoretically would readily store lipophilic contaminants such as pesticides. Biomagnification is more apparent in aquatic systems than terrestrial, and recent studies question the validity of biomagnification in terrestrial systems (Laskowski 1991). While biomagnification of the chlorinated hydrocarbons (organochlorines) is fairly well proven (Walker 1990), the concentration of heavy metals in animals is not necessarily a property of food chains (Laskowski 1991). Heavy metal biomagnification has been implicated mostly in mammals (Shore and Douben 1994, Hegstrom and West 1989, Ma 1987). Conclusions to the contrary are that

- heavy metal biomagnification is not a rule in terrestrial food chains (Laskowski 1991, Beyer et al. 1985, Grodzinska et

al. 1987, Willamo and Nuorteva 1987, Nuorteva 1988),

- “biomagnification alone cannot lead to very high concentrations of most heavy metals in top carnivores” (Laskowski 1991), and
- “biomagnification cannot be responsible for toxic effects of heavy metals in terrestrial carnivores” (Laskowski 1991).

Nevertheless,

- biomagnification of heavy metals to toxic levels can occur from relatively low concentrations in soil (Ma 1987);
- even if a chemical or its metabolites have high NOAELs in long-term ecotoxicity or toxicity tests, incomplete metabolic elimination of contaminants, also known as bound residues, can result in unacceptable risk from bioaccumulation or biomagnification (Franke et al. 1994).

All foraging scenarios assessed in this study included bioaccumulation factors (BAFs) and biomagnification factors (BMFs) for some COPECs. BAFs for aldrin, dieldrin, endrin, DDT and dichlorodiphenylethylene (DDE) were 5.35, 5.35, 7.9, 2.62, and 2.62, respectively, taken from Calabrese and Baldwin (1993) for the American kestrel (*Falco sparverius*) in a terrestrial food web. For the same respective COPECs and species in a terrestrial food web, BMFs were 43.0, 43.0, 42.0, 253.0, and 80.4. On average, these terrestrial-based BMFs were 0.301% of the BMFs for aquatic systems published as human health value criteria under the Clean Water Act (EPA 1993). This fraction was used to adjust mean aquatic BMFs for 10 additional COPECs for use in this study. The source of the aquatic BMFs for the 10 additional COPECs was Smith et al. (1988). The adjusted BMFs by

COPEC used in this study were anthracene, 2.75; all aroclors, 93.91; benzo(a)pyrene, 4.55; chlordane, 42.44; 1,4-dichlorobenzene, 0.17; lindane, 0.82; mercury, 16.56; phenanthrene, 0.013; pyrene, 58.68; and thallium, 0.36.

2.10 Formulating Risk Conclusion

The risk evaluation criteria used for interpreting hazard index results are shown in Table 2.

2.11 Delineating Further Study Needs

At the level of assessment conducted in this study, any risk conclusion that indicates that some impact is possible (HIs >1.0) results primarily in the recommendation that further study is needed.

Table 2. Risk Evaluation Criteria used to Interpret Results of Applying the EPA HQ Method (EPA 1986)

Hazard Index Range	Conclusion
<1.0	No appreciable impact
1.0 – 10.0	Small potential for impacts
10 – 100	Substantial potential for impacts
>100	Ecological impacts very probable

3.0 Results

3.1 Mean Total Risk within Total Nesting Habitat

Non-breeding Season. Table 3 shows the arithmetic mean of 100 randomly selected nest sites for each of the HR Scaling × Forage Weighting × HR Angle scenarios. None of the mean HIs exceeded 1.0 using a non-breeding season HR of $\sim 3.0\text{E-}02 \text{ km}^2$. HIs <1.0 are interpreted as indicative that “no appreciable impact” from all contaminants considered collectively is

Table 3. Mean Hazard Indices, taken as “Total Risk,” for the Southwestern Willow Flycatcher for Various Combinations of HR Shape, Forage Weighting, HR Slope, and HR Size (Breeding, Nonbreeding)

Factor	Home Range Unscaled				Home Range Scaled*			
	Foraging Unweighted†		Foraging Weighted‡		Foraging Unweighted		Foraging Weighted	
	HR Unsloped [¥]	HR Sloped 33°§	HR Unsloped	HR Sloped 33°	HR Unsloped	HR Sloped 33°	HR Unsloped	**HR Sloped 33°
Scenario No.	Scenario #1	Scenario #2	Scenario #3	Scenario #4	Scenario #5	Scenario #6	Scenario #7	Scenario #8
Mean HI, (Nonbreeding [¶])	0.26 (±0.018)	0.26 (±0.021)	0.26 (±0.20)	0.26 (±0.22)	0.50 (±0.41)	0.24 (±0.06)	0.47 (±0.53)	0.26 (±0.35)
Maximum HI	2.3	2.5	2.4	2.7	5.0	3.6	4.4	3.9
% His >1.0	5	5	5	5	16	7	15	7
Background HI					0.16			
Mean HI, (Breeding ^{##})	NC	NC	NC	NC	0.17 (±0.48)	NC	NC	NC

Note: Mean HI values are the average of 100 randomly selected nest sites; values in parentheses are the mean standard error. All values include bioaccumulation for the soil ingestion pathway and biomagnification for the food consumption pathway for 15 COPECs.

NC = Not calculated.

* Width to height is 4:1.

** Most realistic scenario: (Rectangular HR [4:1 w:h] that is inclined 33° in which simulated foraging is inversely related to distance from nest site).

† Foraging occupancy on each grid cell is equal throughout HR.

‡ Foraging inversely related to distance from nest site at the rate $e^{-r/x}$, where $x = 34$ m.

¥ In the case of the square, top and bottom sides of the square face north and south, respectively. In the case of the rectangle, the long axis of the HR is horizontal.

§ The long axis of the HR is angled 33° from the horizontal position. A 33° angle is the approximate angle of the nesting habitat.

During non-breeding season, $HR \approx 3.0E-02 \text{ km}^2$.

Territorial males during breeding season, $HR \approx 1.0 \text{ km}^2$

expected (Tables 2 and 3). Background risk contributed a range of 32% to 67% of Total Risk.

Breeding Season. Although the flycatcher usually has a small HR, they can move several hundred meters between singing locations in cases of territorial males (Marshall 1997, Peterson and Sogge 1996, Sogge et al. 1995). Therefore, to account for breeding season HRs, ECORSK5 was executed with specified HRs of 0.5 km² (400-m radius) and 1.0 km² (~600-m radius) in addition to the typical HR of 0.03 km². This was done for the most conservative (highest mean HI) Foraging Scenario, i.e., for Foraging Scenario #5. This resulted in mean HIs of 0.16 (±0.48) and 0.17 (±0.48) for the 0.5 and 1.0 km² HRs, respectively. Therefore, movement of territorial males during the breeding season presents no added risk above that during the non-breeding season.

3.2 Risk by Nest Site

Several scenarios had individual nest sites with HIs between 1.0 and 10.0. HI values within this range indicate a “small potential for impacts” (Table 2). The maximum individual nest site HI for all scenarios considered was 5.0, which was at nest site No. 48 in the scenario of a 4:1 width:height HR (rectangle), unweighted foraging, and a horizontal (not angled) HR (Table 3). Background Risk contributed only about 3% (0.16 ± 0.48) of the maximum HI. Scenario #5 is somewhat unrealistic and was applied mainly for the purpose of gaining insight into the effect of improving model realism, i.e., sensitivity analysis. Although “unweighted foraging” and an unscaled (horizontal) HR make the scenario somewhat unrealistic, the influence is marginal because of such a small HR – 3.0E-02 km².

For the scenario that generated the highest mean HI (Scenario #5), the proportion of 100 nest site HIs that were greater than 1.0 was 16%. This value compares to 7% for the most realistic scenario (Scenario #8) (Table 4) and 5% for four other scenarios.

Table 4. Hazard Indices of Selected Nest Sites for Foraging Scenario #8

Nest Location			
Column	Row	HI	Nest Site No.
69	62	3.9	40
69	60	3.9	23
69	61	3.4	19
70	59	3.4	28
70	62	3.2	62
71	60	2.9	9
71	57	1.6	88
73	57	0.8	95
74	57	0.8	93
63	69	0.7	48
56	85	0.4	49
76	55	0.3	37
76	55	0.3	99
62	70	0.2	65

3.3 Risk by Location

“Risk Sink.” ECORSK5 partitions risk by grid cell location and this is one type of partial HQ calculated. This enables us to identify locations of hypothetical nest sites (grid cells) that have the highest risk (“risk sink”) contributed to them from the surrounding contaminant sources (“risk sources”). This is important because there were nest sites with HIs greater than 1.0. For Scenario #8, seven nest sites had HIs >1.0; these were nest site #'s 40, 23, 19, 28, 62, 9, and 88 (Table 4). These nest sites are in the general area of grid cells IDs ranging from Columns 69 – 71 and Rows 59 – 62.

“Risk Sources.” Only a few contaminant sources (grid cells) contributed a majority of the risk to the nest sites with the highest HIs. For the seven hypothetical nest sites listed above for Scenario #8, between 81 and 99% of the risk contribution came from five grid cells out of a total of 143 grid cells (Table A-2). The grid cell IDs of these five sources are column/row 69/63, 68/62, 70/63, 68/61, and 68/63 (Table A-2 and Fig. 2). This area is a floodplain with cattails, rushes, and cottonwood.

3.4 Risk by Contaminant

Because ECORSK5 partitions risk by COPEC, contributions of individual contaminants to elevated cumulative risk indices can be examined. For the scenario generating the highest HI (Scenario #5), pentachlorophenol contributed 72% of the risk overall, followed by aluminum at 8%, radium-226 at 6%, thorium-228 at 2%, and DDE, thorium-230 and zinc at 1% each (Table 5). There were 43 grid cells with pentachlorophenol detections. The pentachlorophenol concentrations in soil ranged from 0.4 to 21.8 mg/kg and averaged 1.5 mg/kg, but all except the value of 21.8 mg/kg were within 3.1 mg/kg.

For the most realistic scenario (Scenario #8), risk was dominated by aluminum (28%), radium-226 (22%), calcium (19%), thorium-228 (8%), thorium-230 (4%), and DDE (4%). Aluminum, radium, and calcium are naturally occurring. Calcium is a macronutrient. The Al concentrations in soil ranged from 541 to 11,685, which are all below the background level of 26,600, indicating that the TRV used for A1 was probably overly conservative.

4.0 Discussion

Although some of the assumptions made for the analysis (Table 1) would tend to underestimate risk and others could cause an overestimate of risk, the results are

considered realistically conservative because the number of and magnitude by which the conservative assumptions are likely to have skewed the results toward overestimating risk is greater than the nonconservative assumptions. The most conservative assumptions were that (1) COPECs were assumed to be 100% available for entrance into biological systems, (2) contamination levels measured at one or more sampling points were assumed for an entire 10,000 ft², and (3) the biomagnification levels used, which can substantially impact HI results (Gallegos et al. 1997b), were comparatively (Ryti 1998) high (conservative). Unlike previous assessments of T&E species at LANL (Gonzales et al. 1998), many radionuclide TRVs used in this study were not based on human standards, but rather were based on a suggested guideline for non-human biota (IAEA 1992). Therefore, the degree of conservatism of the radionuclide TRVs has been lowered from previous studies on other T&E species (Gonzales et al. 1997b), but the TRVs are still considered conservative (IAEA 1992).

The results on which the risk conclusion was focused include contributions from background and LANL-related sources considered collectively. This distinction is not necessarily relevant from a science perspective. It would become important to dwell on the distinction between these two sources of risk if and when remedial action was to be considered. Considering the level of assessment employed in this study (Phase 1 of Tier 2, or preliminary), if a potential for adverse impact to a species is identified, then the primary focus should be to identify where further assessment is needed. Nevertheless, there is valuable and important use for partitioning the portion of Total Risk contributed by background. If Total Risk of an appreciable magnitude is estimated for any species and background risk dominates the contribution to that risk,

Table 5. Ranked Hazard Quotients by COPEC for Scenario #5

COPEC	pHQ	Std Err	No. Obs.	Rank	% of Total pHQ
Pentachlorophenol	1.03	4.19E-02	20	1	72.20%
Aluminum	0.11	1.44E-04	71	2	7.58%
Radium-226	9.01E-02	0.00E+00	1	3	6.33%
Calcium	7.47E-02	9.60E-05	71	4	5.25%
Thorium-228	2.77E-02	4.83E-03	59	5	1.95%
DDE	1.78E-02	0.00E+00	1	6	1.25%
Thorium-230	1.51E-02	1.04E-02	59	7	1.06%
Zinc	1.38E-02	1.35E-02	79	8	0.97%
DDT [p,p]	6.03E-03	0.00E+00	1	9	0.42%
Barium	5.63E-03	0.00E+00	79	10	0.40%
Cesium-137	4.21E-03	1.03E-03	13	11	0.30%
Aldrin	4.15E-03	0.00E+00	1	12	0.29%
Dieldrin	4.02E-03	0.00E+00	1	13	0.28%
Lead	3.32E-03	2.62E-04	79	14	0.23%
Chromium	2.27E-03	6.39E-05	79	15	0.16%
Sodium	2.16E-03	1.74E-06	71	16	0.15%
Vanadium	1.90E-03	0.00E+00	71	17	0.13%
Magnesium	1.54E-03	0.00E+00	71	18	0.11%
Antimony	1.54E-03	6.63E-04	71	19	0.11%
Silver	1.19E-03	2.77E-03	79	20	0.08%
Beryllium	1.16E-03	0.00E+00	79	21	0.08%
Hexachlorobenzene	1.13E-03	4.06E-05	20	22	0.08%
Selenium	8.43E-04	1.70E-04	71	23	0.06%
Di-n-butyl phthalate	7.18E-04	2.58E-05	20	24	0.05%
Arsenic	6.05E-04	2.90E-07	71	25	0.04%
Manganese	4.55E-04	3.38E-07	71	26	0.03%
Cadmium	4.32E-04	1.31E-05	79	27	0.03%
Endrin Ketone	3.95E-04	0.00E+00	1	28	0.03%
Endrin	3.95E-04	0.00E+00	1	29	0.03%
Endrin Aldehyde	3.95E-04	0.00E+00	1	30	0.03%
Mercury	3.37E-04	4.91E-04	79	31	0.02%
RDX	3.27E-04	8.25E-05	70	32	0.02%
Copper	2.91E-04	1.84E-07	71	33	0.02%
Strontium-90	2.90E-04	0.00E+00	1	34	0.02%
Dichlorophenol [2,4-]	2.63E-04	9.47E-06	20	35	0.02%
Uranium-234	2.56E-04	1.01E-07	12	36	0.02%
Thorium-232	2.55E-04	0.00E+00	59	37	0.02%
Uranium-238	2.50E-04	7.21E-08	12	38	0.02%
Cobalt-60	2.14E-04	5.52E-04	13	39	0.02%
Dinitrophenol [2,4-]	1.95E-04	7.96E-06	20	40	0.01%
Benzoic Acid	1.76E-04	1.28E-05	20	41	0.01%
Dinitrotoluene [2,4-]	1.70E-04	9.69E-05	78	42	0.01%
Thallium	1.67E-04	3.71E-05	71	43	0.01%
Benzidine	1.49E-04	5.76E-06	8	44	0.01%
Bis(2-ethylhexyl) phtalate	9.76E-05	6.79E-05	20	45	0.01%
Hexachloroethane	7.89E-05	2.84E-06	20	46	0.01%
Nickel	7.01E-05	9.57E-08	79	47	0.00%

Note: Scenario #5 had a foraging scheme that is considered conservative, i.e., would tend to overestimate risk.

this may be an indication that the risk model may be overly conservative. The proportion of Total or Unadjusted Risk contributed by background ranged from 32% to 67% for Mean HIs and 3% for the Maximum HI considering all nest sites and all scenarios.

5.0 Conclusions

On average, i.e., based on Mean HIs, no appreciable impacts from contaminants at LANL are expected to the southwestern willow flycatcher. There are isolated nest site HIs (>1.0) that require uncertainty analysis to the extent that the conservatism of the foraging scenarios warrant. These conclusions are based on assumptions that, all considered, are believed to be reasonably conservative, i.e., led to an overestimate of risk. Information on risk by specific geographical location was provided, which can be used to maintain risk to the flycatcher from contaminants at acceptably low levels by managing contaminated areas, flycatcher habitat, facility siting, and facility operations.

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Table A-1a. Toxicity Reference Values (TRVs) used in the Preliminary Risk Assessment of the Southwestern Willow Flycatcher at the Los Alamos National Laboratory

ANALYTE	NOAEL mg/kg/d	Reference (see Gallegos 1997b)	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
Inorganics							
Aluminum	109.700	Carriere et al., 1986	ringed dove	Al (SO ₄)	reproduction		
Antimony	0.035	LANL, 1994				0.035 = rat LOAEL, whole body & blood	LANL, 1994 and EPA, 1996
Arsenic	1.160	Whitworth et al., 1991 <u>In</u> : Weston, 1995.	1-d mallard		Chronic NOAEL, behavioral effects	1. 0.001; 2. 0.009 mg/L = human oral NOAEL	1. LANL, 1994; 2. EPA, 1996
Barium	20.800	Johnson et al., 1960	1-day chicks	hydroxide	mortality	0.21 = oral human NOAEL for BaCn, cardiovasc. target	LANL, 1994
Boron	28.800	Smith and Anders, 1989	mallard ducks	boric acid	reproduction	28.8	
Beryllium	0.540	EPA, 1993b	rat		Oral rat NOAEL (EPA, 1996)	= oral rat NOAEL (EPA, 1996)	
Cadmium	1.450	White et al., 1978	mallard ducks	chloride	reproduction	1. 0.005; 2. 19.1 = oral NOAEL in rat	1. EES-15 Append; 2. EPA, 1996
Calcium	24.000	Shane and Young, 1968 <u>In</u> : Weston, 1995	White leghorn chick		Chronic death from renal failure	None	
Chromium III	3.810	Hill and Matrone, 1970 <u>In</u> : Weston, 1995	3-wk chick		Chronic weight loss and mortality	1. 1468; 2. 5% = oral NOAEL, rat	1. LANL, 1994; 2. EPA, 1996
Chromium VI	3.800	Hill and Matrone, 1970 <u>In</u> : Weston, 1995	3-wk chick		Chronic NOAEL, body weight	2.4 = oral NOAEL, rat	LANL, 1994 and EPA, 1996
Cobalt							
Copper	46.970	Mehring et al., 1960	1 day chicks	oxide	growth, mortality	5.3 mg = single dose NOAEL, human	
Cyanide	10.800	EPA, 1993b	rat		oral NOAEL		
Fluorides	4.500	LANL, 1994				0.06 = oral NOAEL, human	
Hydrogen Fluoride							
Iron							

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
Lead	1.130	Edens et al., 1976	Japanese quail	acetate	reproduction	0.9	LANL, 1994
Lithium	480.000	Opresko et al., 1994	red-winged blackbird	LiCl ₂	NOAEL = 15,000 ppm (feeding dose) x bw/bw; no endpoint stated		
Magnesium	32.000	Opresko et al., 1994	Japanese quail		NOAEL = [1,000 ppm (feeding dose) x bw]/bw; endpoint = physiology	no EPA, 1996 value	
Manganese	9.140	Vohra and Kratzer, 1968 <u>In</u> : Weston, 1995	turkey poults		Acute NOAEL	1. 0.14 = oral human NOAEL; 2. 0.005	1. EPA, 1996; 2. LANL, 1994
Mercury	0.064	Opresko et al., 1994	Japanese quail	HgCl	NOAEL = [2 ppm (feeding dose) x bw]/bw; endpoint = physiology	1. 0.32; 2. 0.0064	1. LANL, 1994; 2. ORNL, CH ₃ Hg NOAEL for mallard
Molybdenum	0.280	Lepore and Miller, 1964 <u>In</u> : Weston, 1995	7-mo hen		50% embryo mortality [LD ₅₀] x 0.01		
Nickel	0.676	Weber and Reid, 1968 <u>In</u> : Weston, 1995	1-d chick		wt. gain	1. 5.0; 2.100 ppm = rat diet NOAEL	1. LANL, 1994; 2. EPA, 1996
Nitrate	1.600	LANL, 1994					
Nitrite	1.000	LANL, 1994				10 ppm = oral human NOAEL, methemoglobinemia	EPA 1993b
Potassium		LANL, 1994					
Selenium	0.400	Heinz et al., 1989	mallard duck		reproduction	1. 0.015; 2. 0.853 mg/d = human NOAEL, whole body	1. LANL, 1994; 2. EPA, 1996
Silver	0.344	____ and Jensen, 1975 <u>In</u> : Weston, 1995	1-d chick		Chronic growth and mortality	0.0014	LANL, 1994
Sodium	124.000	Scott et al., 1960 <u>In</u> : Weston, 1995	1-d quail		Chronic NOAEL, "no effects"	20.4 = oral NOAEL in rat, CNS	EPA, 1996

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
Thallium	1.200	Opresko et al., 1994	golden eagle	TISO ₄	LD ₅₀ x 0.01	1. 0.22 = oral NOAEL, rat (ThO ₂); 2. 0.192 = LC ₅₀ pheasant.	1. Hudson et al., 1984 In: Weston, 1995.
Vanadium	0.320	Opresko et al., 1994	mallard duck	VaSO ₄	NOAEL = [10 ppm (feeding dose) x bw]/bw; endpoint=blood chemistry	5 ppm=rat oral diet NOAEL	EPA, 1996
Zinc	1.935	Stahl et al., 1990	white leghorn hens		reproduction	1. 10.1 = chronic "no effects" NOAEL in 1- d chicks; 2. 0.2231 = "acute dose" x 0.01 in great horned owl; 3. 0.1	1. Oh et al., 1979 In: Weston, 1995; 2. Opresko et al., 1994 ; 3. LANL, 1994
Volatile Organic Compounds							
1,1,1,2-Tetrachloroethane						89.300	LANL, 1994
1,1,1-Trichloroethane	1000.0	Lane et al., 1982 In: Opreska, 1994	mouse		reproduction, chronic NOAEL		
1,1,2,2-Tetrachloroethane							
1,1,2-trichloro-1,2,2- trifluoroethane						273.000	LANL, 1994
1,1,2-Trichloroethane						3.900	LANL, 1994
1,1-Dichloroethane							
1,1-Dichloroethene						9.000	LANL, 1994
1,2,3-Trimethyl benzene(d)							
1,2,4-Trimethylbenzene							
1,2-di bromo-3- Chloropropane							
1,2-Dichloroethane	17.2	Alumot et al., 1976b In: Opreska, 1994	chicken		reproduction, chronic NOAEL		
1,2-Dichloropropane							
1,3,5-Trimethylbenzene							
1,3- Dichloropropene	3.0	LANL, 1994					
2-Butanone (Methyl ethyl ketone)	1771.0	LANL, 1994					
2-Hexanone(g)							
3-carene(d)							

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
4-hydroxy-4-methyl-2-pentanone(d)							
4-isopropyltoluene							
4-Methyl-2-pentanone (MIK)							
Acetone	565.0	Hill and Camardese, 1986	Japanese quail		acute toxicity		
Benzene	26.36	Nawrot and Staples, 1979 <u>In</u> : Opreska, 1994	mouse		reproduction		
Benzoic acid	4.46	LANL, 1994					
Bromobenzene(d)							
Bromochloromethane(d)							
Bromodichloromethane	17.9	EPA, 1993b	mouse		kidney		
Bromoform	17.9	EPA, 1993b	rat		liver, NOEL (no observable effects level)		
Bromomethane	1.4	LANL, 1994					
Carbon disulfide	11.0	EPA, 1993b	rabbit		fetus, NOAEL		
Carbon tetrachloride	16	Alumot et al., 1979b <u>In</u> : Opreska, 1994	rat		reproduction, chronic NOAEL	0.71	LANL, 1994
Chlorobenzene	19.0	LANL, 1994					
Chloroethane							
Chloroethane							
Chloroform	15.0	Palmer et al., 1979 <u>In</u> : Opreska, 1994	rat		liver, kidney, gonad condition, chronic NOAEL	12.9	LANL, 1994
Chloromethane							
cis-1,2-Dichloroethene							
cis-1,3-Dichloropropene							
Dibromochloromethane	21.4	EPA, 1993b	rat		liver		
Dibromoethane							
dibromomethane(d)							
Dichlorodifluoromethane (1,2)-(1,3)-(2,2)	15.0	LANL, 1994					
Dichloropropane (1,2)							
Ethyl benzene	97.1	LANL, 1994					

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
hexanone (methyl butyl ketone)(d)							
Isopropyl benzene							
Limonene(d)							
Methanol	50.0	EPA 1986e In: Opreska, 1994	rat		mortality, blood chemisrty, NOEL	500.0	LANL, 1994
Methyl Iodide(d)							
Methylene Chloride	5.85	NCA 1986e In: Opreska, 1994	rat		liver histology, chronic NOAEL	5.85	LANL, 1994
n-butylbenzene(d)							
n-Hexane							
Nitrotoluenes							
o-Chlorotoluene	20.0	EPA, 1993b			whole body		
p-Chlorotoluene(d)							
propyl benzene(d)							
Styrene	200.0	LANL, 1994					
Tetrachloroethylene	14.0	EPA, 1993b	mouse		liver, hepatotoxicity		
Toluene	25.98	Nawrot and Staples 1979 In: Opreska, 1994	mouse		reproduction	223.0	LANL, 1994
trans-1,2-Dichloroethene	17.0	LANL, 1994					
Vinyl Chloride	0.17	Feron et al. 1981 In: Opreska, 1994	rat		longevity, mortality		
Xylene (Total)	7.77	Hill and Camardese, 1986 In: Weston, 1995	Japanese quail		acute NOAEL	179.0	LANL, 1994
Trichloropropane (1,2,3)	8	EPA, 1993b	rat		whole body	5.71	LANL, 1994
(2,4-Dichlorophenoxy) propionic acid (dichloroprop)(d)							
1,2,4-Trichlorobenzene	100.0	EPA, 1993b	rat		adrenal	14.8	LANL, 1994
1,2-Dichlorobenzene	85.7	LANL, 1994					
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,4-methan Azulene, decahydro-4,4,8(d)							
2,2-Oxybis(1- chloropropane) (bis[2- chloroisopropyl]ether)							

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
2,4,5 - Trichlorophenoxyacetic acid	10.0	EPA, 1993b	rat		kidney, liver NOEL	3.0	LANL, 1994
2,4,5-Trichlorophenoxy Propionic Acid	0.75	EPA, 1993b	dog		liver, NOEL		
2,4,5-Trichlorophenol	100.0	EPA, 1993b	rat		liver, kidney NOEL		
2,4,6-Trichlorophenol							
2,4- D	0.8	Hudson et al., 1984	chuckar		mortality		
2,4-DB	8.0	LANL, 1994					
2,4-Dichlorophenol	0.3	EPA, 1993b	rat		immune system, NOEL		
2,4-Dimethylphenol	50.0	EPA, 1993b	mouse		nervous system, blood		
2,4-Dinitrophenol	2.0	EPA, 1993b	human		eye, LOAEL		
2- Nitrophenol(d)							
2-Chloronaphthalene							
2-Chlorophenol	5.0	EPA, 1993b	rat		reproduction		
2-Methyl-4,6- dinitrophenol(d)							
2-Methylnaphthalene(d)							
trans-1,3-Dichloropropene							
Trichloroethene							
Trichlorofluoromethane	1000	EPA, 1993b	rat		whole body LOAEL	349.0	LANL, 1994
2-Methylnaphthalene(g)							
2-Methylphenol (o-cresol)	50.0	EPA, 1993b	rat		whole body		
2-Nitroaniline, (o- Nitroaniline)							
2-Nitroaniline							
2-Nitrophenol(g)							
2-Nitrophenol)(g)							
2H-1-benzo-pyran-2-one(d)							
3,3'-Dichlorobenzidine							
3-Nitroaniline(m- nitroaniline)(g)							
3-Nitroaniline							
4 -Chloro-3-methylphenol (p-chloro-m-cresol)							

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
4,6-Dinitro-2-methylphenol(g) (4,6-dinitro-o-creso)							
4- Nitrophenol							
4-Bromophenyl phenyl ether(d)							
4-Bromophenyl-phenylether(g)							
4-Chloro o-tolxyacetic acid(d)							
p-Chloroaniline	12.5	EPA, 1993b	rat		spleen, LOAEL		
4-Chlorophenyl phenyl ether(d)							
4-Chlorophenyl phenylether(g)							
4-Methylphenol (p-cresol)	5.0	EPA, 1993b	rabbit		whole body, NOEL		
4-Nitroaniline(p-nitroaniline)(g)							
4-Nitroaniline							
Acenaphthene	175.0	LANL, 1994					
Acenaphthylene(d)							
Acenaphthylene(g)							
Adipic ester(d)							
Aldrin	0.0200	Tucker and Crabtree, 1970 <u>In</u> : Weston, 1995	mallard duck		mortality, chronic NOAEL	1) .02 rat; reproduction, chronic NOAEL 2) 0.025	1) Treon and Cleveland 1995 <u>In</u> : Opreska, 1994 2) LANL, 1994
Alpha-BHC							
Aniline							
Anthracene	1000.0	EPA, 1993b	rat		NOEL		
Arochlors (mixed)	0.4759					0.007	LANL, 1994
Aroclor-1248	0.00272	Cecil et al., 1974	chicken		chronic reproductive		
Aroclor-1254	0.0052	Lillie, 1974 <u>In</u> : Weston, 1995	leghorn (pullets)		reproduction, noteratogenesis	0.18, ring-necked pheasant, reproduction	Dahlgren et al., 1972 <u>In</u> : Opreska, 1994

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
Aroclor-1260	0.468	Heath et al., 1972 In: Weston, 1995	bobwhite (chick)		mortality		
Azobenzene							
Benzene acetic acid(d)							
Benzidine							
Benzo[a]anthracene							
Benzo[a]pyrene							
Benzo[b]fluoranthene							
Benzo[ghi]perylene							
Benzo[k]fluoranthene							
Benzyl alcohol(d)							
Benzyl alcohol							
Beta-BHC							
Bis(2-ethylhexyl)phthalate	1.11	Peakall, 1974 In: Opreska, 1994	ringed dove		reproduction	22.6, white leghorn, chronic effect dose	Wood and Bitman, 1980 In: Weston, 1994
Bis(2chloroethoxy) methane(g)							
Bis-(2-chloroethyl)ether							
Butyl benzyl phthalate	159.0	LANL, 1994					
Carbazole							
Cetyl alcohol(d)							
Chlordane	2.14	Stickel et al., 1983 In: Opreska, 1994	red-winged blackbird		mortality	0.055	LANL, 1994
Chlorophenoxy acetic acid (2-methy-4)							
Chrysene							
Dalapon	8.45	LANL, 1994					
DDD	0.236	Hill et al., 1975	ring-necked pheasant		mortality	165.0	LANL, 1994
DDE	0.00224	Longcore et al., 1971	black duck		eggshell thinning	42.0	LANL, 1994
DDT	0.00028	Anderson et al., 1975 In: Opreska, 1994	brown pelican		reproduction	1) 0.00660, mallard, reproduction 2) 0.05	1) Davison and Sell, 1974 In: Weston, 1995 2) LANL, 1994

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
delta-BHC(d)							
Di-n-butylphthalate	0.111	Peakall, 1974 In: Opreska, 1994	ringed dove		reproduction		
Di-n-octyl phthalate	175.0	LANL, 1994					
Dibenzo[a,h]anthracene							
Dibenzofuran(d)							
Dicamba	3.0	LANL, 1994					
Dieldrin	0.024	Heath et al., 1972 In: Weston, 1995	bobwhite		mortality, acute LC ₅₀	1. 0.077, barn owl, reproduction 2. 0.005	1. Mendenhall et al., 1983 In: Weston, 1995 2. LANL, 1994
Diethylphthalate	4583.0	Lamb et al., In: Opreska, 1994	mouse		reproduction		
Dimethyl phthalate	1000.0	EPA, 1993b	rat		kidney, NOEL		
Dimethylformamide							
Dinoseb	1.0	EPA, 1993b	rat		fetus, LOAEL		
Endosulfan I & II	0.15	EPA, 1993b	rat		kidney, LOAEL		
Endosulfan sulfate(d)							
Endosulfan	10	Abiola, 1992	gray partridge		reproduction		
Endrin	0.3	Spann et al., 1986 In: Opreska, 1994	rat		reproduction	0.025	LANL, 1994
Ethyl acetate	900.0	EPA, 1993b	rat		whole body, NOEL		
Ethylene glycol	200.0	EPA, 1993b	rat		fetus, NOEL		
Fluoranthene	125.0	EPA, 1993b	mouse		kidney, liver, blood		
Fluorine	125.0	LANL, 1994					
Heptachlor Epoxide	0.013	EPA, 1993b	dog		liver, LOAEL		
Heptachlor	0.0880	Hill and Camardese 1986 In: Weston, 1995	Japanese quail		mortality, acute LC ₅₀	0.150	LANL, 1994
Hexachlorobenzene	0.080	LANL, 1994					
Hexachlorobutadiene							
Hexachlorocyclopentadiene	7.0	EPA, 1993b	rat		forestomach		
Hexachloroethane	1.0	EPA, 1993	rat		kidney		
Hexadecanoic acid(d)							
Indeno[1,2,3-cd]pyrene							
Isophorone	150.0	EPA, 1993b	dog		kidney, NOEL		

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
Lindane (gamma BHC)	0.244	Hill and Camardese, 1986 In: Weston, 1995	Japanese quail		mortality	1. 2.0, mallard duck, reproduction 2. 0.33	1. Chakravarty et al., 1986 In: Opreska, 1994 2. LANL, 1994
Mecoprop (MCP)	3.0	LANL, 1994					
Mecoprop(d)							
Methoxychlor	3.16	Hill and Camardese, 1986 In: Weston, 1995	Japanese quail		mortality, acute LC ₅₀	1. 4.0, rat, reproduction 2. 5.01	1. Gray et al., 1988, In: Opreska, 1994 2. LANL, 1994
N-Nitrosodi-N-propylamine							
N-Nitrosodimethylamine							
N-Nitrosodiphenylamine							
Naphthalene	1.39	Wildlife Intn'l Ltd. 1985 In: Weston, 1995	bobwhite quail		acute NOAEL		
Nitrobenzene	4.6	LANL, 1994					
Octacosane(d)							
Octadecanoic acid(d)							
Octamethyleyclotetrasiloxa ne(d)							
PCB (aroclor)	0.007	LANL, 1994					
Pentachlorophenol	3.8E-4	Stedman et al., 1980 In: Weston, 1995	broiler chick		chronic effect dose	3.0	LANL, 1994
Phenanthrene carboxylic acid(d)							
Phenanthrene(d)							
Phenanthrene(g)							
Phenol	60.0	EPA, 1993b	rat		fetus		
Phthalate ester(d)							
Pyrene	75.0	EPA, 1993b	mouse		kidney		
Tetradecanoic acid(d)							
Toxaphene	8.0	Kennedy et al., 1973 In: Opreska, 1994	rat		reproduction, chronic NOAEL		
Vinyl Acetate	100.0	LANL, 1994					
High Explosives							
1,3,5-TNB (trinitrobenzene)	0.51	EPA, 1993b	rat		spleen		
1,3-DNB (dinitrobenzene)	0.4	EPA, 1993b	rat		spleen		

Table A-1a cont.

ANALYTE	NOAEL mg/kg/d	Reference*	Test Species	Chemical Form	Endpoint, Comment and/or Test Species	Comparison NOAEL (mg/kg/d)	Reference to Comparison Value
2,4,6-TNT (trinitrotoluene)	0.5	EPA, 1993b	dog		liver, LOAEL		
2,4-DNT (dinitrotoluene)	0.2	EPA, 1993b	dog		CNS		
2,6-DNT (dinitrotoluene)							
2-amino-2,6-DNT (aminodinitrotoluene) (g)							
2-amino-4,6-Dinitrotoluene (d)							
4-amino-2,6-DNT (aminodinitrotoluene) (g)							
Ammonium nitrate (g)							
Barium nitrate (soluble barium)							
CEF (tri[b-chloroethyl] phosphate) (g)							
DPA (diphenylamine)	2.5	EPA, 1993	dog		whole body, NOEL		
HMX (cyclotetramethylenete- tranitramine)	50.0	LANL, 1994					
Nitrocellulose (non-toxic) (g/k)							
Nitromethane(g)							
NP (bis[2,2-dinitropropyl] acetyl/formal)(g)							
PETN (pentaerythritol tetranitrate)							
RDX (trimethylenetrinitramine)	0.30	LANL, 1994					
TATB (triaminotrinitrobenzene) (g)							
Tetryl (N-methyl-N,2,4,6- tetranitrobenzeneamine)							

Gallegos (1997b)

Table A-1b. Radionuclide Toxicity Reference Values (TRVs) used in the Preliminary Risk Assessment of the Southwestern Willow Flycatcher at Los Alamos National Laboratory

Radionuclide	ESAL (pCi/g)	Reference	Human SAL (pCi/g)
Americium-241	200.0	SNL 1998	17.0
Carbon-14	41.0	FIMAD	41.0
Cerium-144	56.0	FIMAD	56.0
Cesium-134	1.8	FIMAD	1.8
Cesium-137	290.0	SNL 1998	4.0
Cobalt-57	40.0	FIMAD	40.0
Cobalt-60	0.9	FIMAD	0.9
Gross Alpha Activity			
Iodine-129	41.0	FIMAD	41.0
Manganese-54	3.4	FIMAD	3.4
Plutonium-238	390.0	SNL 1998	20.0
Plutonium-239	420.0	SNL 1998	18.0
Potassium-40	12.0	FIMAD	12.0
Radium-226	2.8	SNL 1998	5.0
Radium-228	5.0	FIMAD	5.0
Ruthenium-106	14.0	FIMAD	14.0
Sodium-22	1.3	FIMAD	1.3
Strontium-90	39.0	SNL 1998	5.9
Technetium-99	38.0	FIMAD	38.0
Thorium-228	1.7	FIMAD	1.7
Thorium-230	5.0	FIMAD	5.0
Thorium-232	310.0	SNL 1998	5.0
Tritium	1.2E+05	SNL 1998	820.0
Uranium-233	86.0	FIMAD	86.0
Uranium-234	250.0	SNL 1998	86.0
Uranium-235	240.0	SNL 1998	18.0
Uranium-238	240.0	SNL 1998	59.0
Depleted Uranium	59.0	FIMAD	59.0
Uranium	66.0	FIMAD	66.0

Table A-2. Selected 'Source' HQs Contributed to Seven Hypothetical Nest Sites (Nest #s 40, 23, 19, 28, 62, 9, 88) for Foraging Scenario #8. Scenario #8 is Considered Relatively "Realistic"

Nest Site No. 40					Nest Site No. 23					Nest Site No. 19					Nest Site No. 28				
Col.	Row	pHQ	% of Total	Cumulative Total	Col.	Row	pHQ	% of Total	Cumulative Total	Col.	Row	pHQ	% of Total	Cumulative Total	Col.	Row	pHQ	% of Total	Cumulative Total
69	63	0.84	21	21%	68	61	1.49	38	38%	68	61	1.08	32	32%	72	60	1.29	38	38%
68	62	0.77	20	41%	68	62	0.67	17	55%	68	62	0.70	20	52%	68	61	0.78	23	60%
70	63	0.61	15	56%	69	63	0.36	9	64%	69	63	0.45	13	65%	68	62	0.36	11	71%
68	61	0.57	14	71%	72	60	0.35	9	73%	70	63	0.38	11	76%	70	63	0.29	8	80%
68	63	0.54	14	84%	70	63	0.33	8	81%	68	63	0.34	10	86%	69	63	0.25	7	87%
68	64	0.29	7	92%	68	63	0.29	7	89%	68	64	0.16	5	91%	68	63	0.17	5	92%
66	63	0.11	3	94%	68	64	0.14	4	92%	72	60	0.15	4	96%	68	64	8.28E-02	2	
72	60	7.75E-02	2		65	61	0.12	3	95%	66	63	9.65E-02	3		65	61	7.26E-02	2	
65	63	4.81E-02	1		66	63	0.11	3	98%	65	63	4.62E-02	1		66	63	5.66E-02	2	
69	66	4.55E-02	1		65	63	5.73E-02	1		64	65	7.67E-03	0		64	61	3.13E-02	1	
68	66	4.14E-02	1		62	62	7.52E-03	0		62	64	2.33E-03	0		65	63	3.02E-02	1	
64	65	9.75E-03	0		62	64	3.12E-03	0		61	65	8.66E-04	0		62	62	4.49E-03	0	
62	64	2.40E-03	0		61	63	2.01E-03	0		63	65	3.95E-05	0		62	64	1.69E-03	0	
61	65	9.44E-04	0		61	65	1.11E-03	0		11	100	0.00E+00	0		11	100	0.00E+00	0	
63	65	4.72E-05	0		63	65	4.60E-05	0		14	102	0.00E+00	0		14	102	0.00E+00	0	
11	100	0.00E+00	0		11	100	0.00E+00	0		6	102	0.00E+00	0		6	102	0.00E+00	0	
14	102	0.00E+00	0		14	102	0.00E+00	0		9	102	0.00E+00	0		9	102	0.00E+00	0	
6	102	0.00E+00	0		6	102	0.00E+00	0		9	103	0.00E+00	0		9	103	0.00E+00	0	
9	102	0.00E+00	0		9	102	0.00E+00	0		23	104	0.00E+00	0		23	104	0.00E+00	0	
9	103	0.00E+00	0		9	103	0.00E+00	0		7	104	0.00E+00	0		7	104	0.00E+00	0	
23	104	0.00E+00	0		23	104	0.00E+00	0		8	104	0.00E+00	0		8	104	0.00E+00	0	
7	104	0.00E+00	0		7	104	0.00E+00	0		11	105	0.00E+00	0		11	105	0.00E+00	0	
8	104	0.00E+00	0		8	104	0.00E+00	0		23	105	0.00E+00	0		23	105	0.00E+00	0	
11	105	0.00E+00	0		11	105	0.00E+00	0		7	105	0.00E+00	0		7	105	0.00E+00	0	
23	105	0.00E+00	0		23	105	0.00E+00	0		8	105	0.00E+00	0		8	105	0.00E+00	0	
7	105	0.00E+00	0		7	105	0.00E+00	0		10	106	0.00E+00	0		10	106	0.00E+00	0	
8	105	0.00E+00	0		8	105	0.00E+00	0		11	106	0.00E+00	0		11	106	0.00E+00	0	
10	106	0.00E+00	0		10	106	0.00E+00	0		10	107	0.00E+00	0		10	107	0.00E+00	0	
11	106	0.00E+00	0		11	106	0.00E+00	0		7	107	0.00E+00	0		7	107	0.00E+00	0	
10	107	0.00E+00	0		10	107	0.00E+00	0		21	108	0.00E+00	0		21	108	0.00E+00	0	

Table A-2 cont.

Nest Site No. 62					Nest Site No. 9					Nest Site No. 88				
Col.	Row	pHQ	% of Total	Cumulative Total	Col.	Row	pHQ	% of Total	Cumulative Total	Col.	Row	pHQ	% of Total	Cumulative Total
70	63	1.13	35	35%	72	60	1.80	62	62%	72	60	1.13	72	
69	63	0.75	23	59%	70	63	0.28	10	72%	68	61	0.22	14	
68	62	0.41	13	71%	68	61	0.27	9	81%	68	62	9.92E-02	6	
68	63	0.33	10	82%	69	63	0.18	6	88%	65	59	6.96E-02	4	
68	64	0.22	7	88%	68	62	0.17	6	94%	65	61	2.84E-02	2	
72	60	0.20	6	95%	68	63	9.59E-02	3		64	61	1.32E-02	1	
66	63	5.95E-02	2		68	64	5.41E-02	2		11	100	0.00E+00	0	
69	66	5.26E-02	2		66	63	2.24E-02	1		14	102	0.00E+00	0	
68	66	3.90E-02	1		65	63	1.06E-02	0		6	102	0.00E+00	0	
68	67	1.69E-02	1		64	65	1.82E-03	0		9	102	0.00E+00	0	
64	65	5.73E-03	0		63	65	9.20E-06	0		9	103	0.00E+00	0	
63	65	2.70E-05	0		11	100	0.00E+00	0		23	104	0.00E+00	0	
11	100	0.00E+00	0		14	102	0.00E+00	0		7	104	0.00E+00	0	
14	102	0.00E+00	0		6	102	0.00E+00	0		8	104	0.00E+00	0	
6	102	0.00E+00	0		9	102	0.00E+00	0		11	105	0.00E+00	0	
9	102	0.00E+00	0		9	103	0.00E+00	0		23	105	0.00E+00	0	
9	103	0.00E+00	0		23	104	0.00E+00	0		7	105	0.00E+00	0	
23	104	0.00E+00	0		7	104	0.00E+00	0		8	105	0.00E+00	0	
7	104	0.00E+00	0		8	104	0.00E+00	0		10	106	0.00E+00	0	
8	104	0.00E+00	0		11	105	0.00E+00	0		11	106	0.00E+00	0	
11	105	0.00E+00	0		23	105	0.00E+00	0		10	107	0.00E+00	0	
23	105	0.00E+00	0		7	105	0.00E+00	0		7	107	0.00E+00	0	
7	105	0.00E+00	0		8	105	0.00E+00	0		21	108	0.00E+00	0	
8	105	0.00E+00	0		10	106	0.00E+00	0		33	108	0.00E+00	0	
10	106	0.00E+00	0		11	106	0.00E+00	0		34	108	0.00E+00	0	
11	106	0.00E+00	0		10	107	0.00E+00	0		21	109	0.00E+00	0	
10	107	0.00E+00	0		7	107	0.00E+00	0		21	110	0.00E+00	0	
7	107	0.00E+00	0		21	108	0.00E+00	0		28	110	0.00E+00	0	
21	108	0.00E+00	0		33	108	0.00E+00	0		31	110	0.00E+00	0	
33	108	0.00E+00	0		34	108	0.00E+00	0		30	111	0.00E+00	0	

Appendix D

Laboratory Reports and Chain-of-custody Documents



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

August 06, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX:

RE: Kaufman 1

OrderNo.: 1907617

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 23 sample(s) on 7/12/2019 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued July 19, 2019.

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. 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. All samples are reported as received unless otherwise indicated.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", with a stylized flourish at the end.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109



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

Case Narrative

WO#: 1907617
Date: 8/6/2019

CLIENT: Timberwolf Environmental

Project: Kaufman 1

Water samples in this report were SPLP leached

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB1**Project:** Kaufman 1**Collection Date:** 7/11/2019 9:20:00 AM**Lab ID:** 1907617-001**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	47	9.9		mg/Kg	1	7/17/2019 1:07:31 PM	46205
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	7/17/2019 1:07:31 PM	46205
Surr: DNOP	78.9	70-130		%Rec	1	7/17/2019 1:07:31 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	300	25		mg/Kg	5	7/16/2019 5:11:36 PM	46191
Surr: BFB	526	73.8-119	S	%Rec	5	7/16/2019 5:11:36 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.13	0.12		mg/Kg	5	7/16/2019 5:11:36 PM	46191
Toluene	ND	0.25		mg/Kg	5	7/16/2019 5:11:36 PM	46191
Ethylbenzene	0.86	0.25		mg/Kg	5	7/16/2019 5:11:36 PM	46191
Xylenes, Total	3.2	0.49		mg/Kg	5	7/16/2019 5:11:36 PM	46191
Surr: 4-Bromofluorobenzene	116	80-120		%Rec	5	7/16/2019 5:11:36 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: EB2

Project: Kaufman 1

Collection Date: 7/11/2019 9:25:00 AM

Lab ID: 1907617-002

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	210	9.6		mg/Kg	1	7/17/2019 2:20:44 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/17/2019 2:20:44 PM	46205
Surr: DNOP	101	70-130		%Rec	1	7/17/2019 2:20:44 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	360	24		mg/Kg	5	7/16/2019 5:35:12 PM	46191
Surr: BFB	567	73.8-119	S	%Rec	5	7/16/2019 5:35:12 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.28	0.12		mg/Kg	5	7/16/2019 5:35:12 PM	46191
Toluene	ND	0.24		mg/Kg	5	7/16/2019 5:35:12 PM	46191
Ethylbenzene	2.2	0.24		mg/Kg	5	7/16/2019 5:35:12 PM	46191
Xylenes, Total	12	0.49		mg/Kg	5	7/16/2019 5:35:12 PM	46191
Surr: 4-Bromofluorobenzene	120	80-120		%Rec	5	7/16/2019 5:35:12 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: EB3

Project: Kaufman 1

Collection Date: 7/11/2019 9:30:00 AM

Lab ID: 1907617-003

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	2000	97		mg/Kg	10	7/18/2019 5:31:05 PM	46205
Motor Oil Range Organics (MRO)	ND	480		mg/Kg	10	7/18/2019 5:31:05 PM	46205
Surr: DNOP	0	70-130	S	%Rec	10	7/18/2019 5:31:05 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	3700	49		mg/Kg	10	7/16/2019 5:58:53 PM	46191
Surr: BFB	1350	73.8-119	S	%Rec	10	7/16/2019 5:58:53 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	6.2	0.25		mg/Kg	10	7/16/2019 5:58:53 PM	46191
Toluene	17	0.49		mg/Kg	10	7/16/2019 5:58:53 PM	46191
Ethylbenzene	35	0.49		mg/Kg	10	7/16/2019 5:58:53 PM	46191
Xylenes, Total	410	20		mg/Kg	200	7/17/2019 10:18:39 AM	46191
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	200	7/17/2019 10:18:39 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB4**Project:** Kaufman 1**Collection Date:** 7/11/2019 9:45:00 AM**Lab ID:** 1907617-004**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	7/17/2019 3:09:44 PM	46205
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	7/17/2019 3:09:44 PM	46205
Surr: DNOP	105	70-130		%Rec	1	7/17/2019 3:09:44 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	51	4.9		mg/Kg	1	7/17/2019 10:42:03 AM	46191
Surr: BFB	636	73.8-119	S	%Rec	1	7/17/2019 10:42:03 AM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	7/17/2019 10:42:03 AM	46191
Toluene	ND	0.049		mg/Kg	1	7/17/2019 10:42:03 AM	46191
Ethylbenzene	0.081	0.049		mg/Kg	1	7/17/2019 10:42:03 AM	46191
Xylenes, Total	0.24	0.097		mg/Kg	1	7/17/2019 10:42:03 AM	46191
Surr: 4-Bromofluorobenzene	112	80-120		%Rec	1	7/17/2019 10:42:03 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB5**Project:** Kaufman 1**Collection Date:** 7/11/2019 9:50:00 AM**Lab ID:** 1907617-005**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	53	9.8		mg/Kg	1	7/17/2019 3:34:19 PM	46205
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	7/17/2019 3:34:19 PM	46205
Surr: DNOP	107	70-130		%Rec	1	7/17/2019 3:34:19 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	110	4.9		mg/Kg	1	7/16/2019 6:46:18 PM	46191
Surr: BFB	954	73.8-119	S	%Rec	1	7/16/2019 6:46:18 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.35	0.024		mg/Kg	1	7/16/2019 6:46:18 PM	46191
Toluene	ND	0.049		mg/Kg	1	7/16/2019 6:46:18 PM	46191
Ethylbenzene	1.6	0.049		mg/Kg	1	7/16/2019 6:46:18 PM	46191
Xylenes, Total	3.0	0.098		mg/Kg	1	7/16/2019 6:46:18 PM	46191
Surr: 4-Bromofluorobenzene	149	80-120	S	%Rec	1	7/16/2019 6:46:18 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: EB6

Project: Kaufman 1

Collection Date: 7/11/2019 10:00:00 AM

Lab ID: 1907617-006

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	210	9.6		mg/Kg	1	7/17/2019 3:58:40 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/17/2019 3:58:40 PM	46205
Surr: DNOP	111	70-130		%Rec	1	7/17/2019 3:58:40 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	1700	25		mg/Kg	5	7/16/2019 7:10:03 PM	46191
Surr: BFB	1660	73.8-119	S	%Rec	5	7/16/2019 7:10:03 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	1.5	0.12		mg/Kg	5	7/16/2019 7:10:03 PM	46191
Toluene	0.86	0.25		mg/Kg	5	7/16/2019 7:10:03 PM	46191
Ethylbenzene	7.7	0.25		mg/Kg	5	7/16/2019 7:10:03 PM	46191
Xylenes, Total	68	4.9		mg/Kg	50	7/17/2019 11:05:33 AM	46191
Surr: 4-Bromofluorobenzene	107	80-120		%Rec	50	7/17/2019 11:05:33 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB8**Project:** Kaufman 1**Collection Date:** 7/11/2019 10:15:00 AM**Lab ID:** 1907617-008**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	220	10		mg/Kg	1	7/17/2019 4:23:15 PM	46205
Motor Oil Range Organics (MRO)	130	50		mg/Kg	1	7/17/2019 4:23:15 PM	46205
Surr: DNOP	114	70-130		%Rec	1	7/17/2019 4:23:15 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	50	5.0		mg/Kg	1	7/17/2019 11:29:05 AM	46191
Surr: BFB	183	73.8-119	S	%Rec	1	7/17/2019 11:29:05 AM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	7/17/2019 11:29:05 AM	46191
Toluene	ND	0.050		mg/Kg	1	7/17/2019 11:29:05 AM	46191
Ethylbenzene	ND	0.050		mg/Kg	1	7/17/2019 11:29:05 AM	46191
Xylenes, Total	ND	0.10		mg/Kg	1	7/17/2019 11:29:05 AM	46191
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	7/17/2019 11:29:05 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB9**Project:** Kaufman 1**Collection Date:** 7/11/2019 10:25:00 AM**Lab ID:** 1907617-009**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	410	9.4		mg/Kg	1	7/17/2019 4:47:37 PM	46205
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	7/17/2019 4:47:37 PM	46205
Surr: DNOP	101	70-130		%Rec	1	7/17/2019 4:47:37 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	1200	24		mg/Kg	5	7/16/2019 7:57:23 PM	46191
Surr: BFB	1120	73.8-119	S	%Rec	5	7/16/2019 7:57:23 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	1.7	0.12		mg/Kg	5	7/16/2019 7:57:23 PM	46191
Toluene	ND	0.24		mg/Kg	5	7/16/2019 7:57:23 PM	46191
Ethylbenzene	13	0.24		mg/Kg	5	7/16/2019 7:57:23 PM	46191
Xylenes, Total	120	9.8		mg/Kg	100	7/17/2019 11:52:34 AM	46191
Surr: 4-Bromofluorobenzene	97.2	80-120		%Rec	100	7/17/2019 11:52:34 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** ESW1 0-2**Project:** Kaufman 1**Collection Date:** 7/11/2019 10:30:00 AM**Lab ID:** 1907617-010**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	13	9.8		mg/Kg	1	7/17/2019 5:12:11 PM	46205
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	7/17/2019 5:12:11 PM	46205
Surr: DNOP	98.4	70-130		%Rec	1	7/17/2019 5:12:11 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	7/16/2019 8:20:59 PM	46191
Surr: BFB	124	73.8-119	S	%Rec	1	7/16/2019 8:20:59 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	7/16/2019 8:20:59 PM	46191
Toluene	ND	0.049		mg/Kg	1	7/16/2019 8:20:59 PM	46191
Ethylbenzene	ND	0.049		mg/Kg	1	7/16/2019 8:20:59 PM	46191
Xylenes, Total	ND	0.098		mg/Kg	1	7/16/2019 8:20:59 PM	46191
Surr: 4-Bromofluorobenzene	97.3	80-120		%Rec	1	7/16/2019 8:20:59 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW1 2.5-3.5

Project: Kaufman 1

Collection Date: 7/11/2019 10:45:00 AM

Lab ID: 1907617-011

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	7/17/2019 5:36:50 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/17/2019 5:36:50 PM	46205
Surr: DNOP	105	70-130		%Rec	1	7/17/2019 5:36:50 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	7/16/2019 8:44:30 PM	46191
Surr: BFB	95.4	73.8-119		%Rec	1	7/16/2019 8:44:30 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	7/16/2019 8:44:30 PM	46191
Toluene	ND	0.050		mg/Kg	1	7/16/2019 8:44:30 PM	46191
Ethylbenzene	ND	0.050		mg/Kg	1	7/16/2019 8:44:30 PM	46191
Xylenes, Total	ND	0.10		mg/Kg	1	7/16/2019 8:44:30 PM	46191
Surr: 4-Bromofluorobenzene	94.3	80-120		%Rec	1	7/16/2019 8:44:30 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW2 0-2

Project: Kaufman 1

Collection Date: 7/11/2019 10:50:00 AM

Lab ID: 1907617-012

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	700	9.5		mg/Kg	1	7/17/2019 6:01:42 PM	46205
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	7/17/2019 6:01:42 PM	46205
Surr: DNOP	104	70-130		%Rec	1	7/17/2019 6:01:42 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	180	24		mg/Kg	5	7/17/2019 12:16:04 PM	46191
Surr: BFB	471	73.8-119	S	%Rec	5	7/17/2019 12:16:04 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	7/17/2019 12:16:04 PM	46191
Toluene	ND	0.24		mg/Kg	5	7/17/2019 12:16:04 PM	46191
Ethylbenzene	ND	0.24		mg/Kg	5	7/17/2019 12:16:04 PM	46191
Xylenes, Total	ND	0.49		mg/Kg	5	7/17/2019 12:16:04 PM	46191
Surr: 4-Bromofluorobenzene	107	80-120		%Rec	5	7/17/2019 12:16:04 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW2 2.5-3.5

Project: Kaufman 1

Collection Date: 7/11/2019 10:55:00 AM

Lab ID: 1907617-013

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	110	9.5		mg/Kg	1	7/17/2019 6:26:19 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/17/2019 6:26:19 PM	46205
Surr: DNOP	105	70-130		%Rec	1	7/17/2019 6:26:19 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	77	10		mg/Kg	2	7/17/2019 12:39:40 PM	46191
Surr: BFB	154	73.8-119	S	%Rec	2	7/17/2019 12:39:40 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.050		mg/Kg	2	7/17/2019 12:39:40 PM	46191
Toluene	ND	0.10		mg/Kg	2	7/17/2019 12:39:40 PM	46191
Ethylbenzene	0.19	0.10		mg/Kg	2	7/17/2019 12:39:40 PM	46191
Xylenes, Total	0.63	0.20		mg/Kg	2	7/17/2019 12:39:40 PM	46191
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	2	7/17/2019 12:39:40 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW3 0-2

Project: Kaufman 1

Collection Date: 7/11/2019 10:50:00 AM

Lab ID: 1907617-014

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	290	9.4		mg/Kg	1	7/17/2019 6:51:02 PM	46205
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	7/17/2019 6:51:02 PM	46205
Surr: DNOP	101	70-130		%Rec	1	7/17/2019 6:51:02 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	120	24		mg/Kg	5	7/16/2019 10:42:24 PM	46191
Surr: BFB	122	73.8-119	S	%Rec	5	7/16/2019 10:42:24 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	7/16/2019 10:42:24 PM	46191
Toluene	ND	0.24		mg/Kg	5	7/16/2019 10:42:24 PM	46191
Ethylbenzene	ND	0.24		mg/Kg	5	7/16/2019 10:42:24 PM	46191
Xylenes, Total	0.80	0.49		mg/Kg	5	7/16/2019 10:42:24 PM	46191
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	5	7/16/2019 10:42:24 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW3 2.5-3.5

Project: Kaufman 1

Collection Date: 7/11/2019 10:55:00 AM

Lab ID: 1907617-015

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	170	9.9		mg/Kg	1	7/17/2019 7:15:29 PM	46205
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	7/17/2019 7:15:29 PM	46205
Surr: DNOP	104	70-130		%Rec	1	7/17/2019 7:15:29 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	530	24		mg/Kg	5	7/16/2019 11:06:03 PM	46191
Surr: BFB	776	73.8-119	S	%Rec	5	7/16/2019 11:06:03 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.67	0.12		mg/Kg	5	7/16/2019 11:06:03 PM	46191
Toluene	ND	0.24		mg/Kg	5	7/16/2019 11:06:03 PM	46191
Ethylbenzene	4.7	0.24		mg/Kg	5	7/16/2019 11:06:03 PM	46191
Xylenes, Total	27	0.49		mg/Kg	5	7/16/2019 11:06:03 PM	46191
Surr: 4-Bromofluorobenzene	134	80-120	S	%Rec	5	7/16/2019 11:06:03 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW4 0-2

Project: Kaufman 1

Collection Date: 7/11/2019 11:00:00 AM

Lab ID: 1907617-016

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	1000	96		mg/Kg	10	7/18/2019 5:56:07 PM	46205
Motor Oil Range Organics (MRO)	ND	480		mg/Kg	10	7/18/2019 5:56:07 PM	46205
Surr: DNOP	0	70-130	S	%Rec	10	7/18/2019 5:56:07 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	2200	49		mg/Kg	10	7/16/2019 11:29:37 PM	46191
Surr: BFB	964	73.8-119	S	%Rec	10	7/16/2019 11:29:37 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	2.0	0.24		mg/Kg	10	7/16/2019 11:29:37 PM	46191
Toluene	2.8	0.49		mg/Kg	10	7/16/2019 11:29:37 PM	46191
Ethylbenzene	9.8	0.49		mg/Kg	10	7/16/2019 11:29:37 PM	46191
Xylenes, Total	190	9.8		mg/Kg	100	7/17/2019 1:03:19 PM	46191
Surr: 4-Bromofluorobenzene	98.8	80-120		%Rec	100	7/17/2019 1:03:19 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW4 2.5-3.5

Project: Kaufman 1

Collection Date: 7/11/2019 11:05:00 AM

Lab ID: 1907617-017

Matrix: SOIL

Received Date: 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	78	9.5		mg/Kg	1	7/17/2019 8:04:27 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/17/2019 8:04:27 PM	46205
Surr: DNOP	97.6	70-130		%Rec	1	7/17/2019 8:04:27 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	150	4.9		mg/Kg	1	7/16/2019 11:53:11 PM	46191
Surr: BFB	969	73.8-119	S	%Rec	1	7/16/2019 11:53:11 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.53	0.024		mg/Kg	1	7/16/2019 11:53:11 PM	46191
Toluene	0.14	0.049		mg/Kg	1	7/16/2019 11:53:11 PM	46191
Ethylbenzene	2.4	0.049		mg/Kg	1	7/16/2019 11:53:11 PM	46191
Xylenes, Total	12	0.97		mg/Kg	10	7/17/2019 1:27:02 PM	46191
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	10	7/17/2019 1:27:02 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** ESW5 0-2**Project:** Kaufman 1**Collection Date:** 7/11/2019 11:30:00 AM**Lab ID:** 1907617-018**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	7/18/2019 6:45:58 PM	46205
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	7/18/2019 6:45:58 PM	46205
Surr: DNOP	104	70-130		%Rec	1	7/18/2019 6:45:58 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	60	4.9		mg/Kg	1	7/17/2019 12:16:47 AM	46191
Surr: BFB	383	73.8-119	S	%Rec	1	7/17/2019 12:16:47 AM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.30	0.024		mg/Kg	1	7/17/2019 12:16:47 AM	46191
Toluene	0.16	0.049		mg/Kg	1	7/17/2019 12:16:47 AM	46191
Ethylbenzene	0.41	0.049		mg/Kg	1	7/17/2019 12:16:47 AM	46191
Xylenes, Total	6.0	0.098		mg/Kg	1	7/17/2019 12:16:47 AM	46191
Surr: 4-Bromofluorobenzene	116	80-120		%Rec	1	7/17/2019 12:16:47 AM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** ESW5 2.5-3.5**Project:** Kaufman 1**Collection Date:** 7/11/2019 11:35:00 AM**Lab ID:** 1907617-019**Matrix:** SOIL**Received Date:** 7/12/2019 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	380	9.6		mg/Kg	1	7/18/2019 6:20:58 PM	46205
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	7/18/2019 6:20:58 PM	46205
Surr: DNOP	109	70-130		%Rec	1	7/18/2019 6:20:58 PM	46205
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	690	99		mg/Kg	20	7/17/2019 2:38:06 PM	46191
Surr: BFB	247	73.8-119	S	%Rec	20	7/17/2019 2:38:06 PM	46191
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	1.9	0.025		mg/Kg	1	7/17/2019 12:40:23 AM	46191
Toluene	0.77	0.050		mg/Kg	1	7/17/2019 12:40:23 AM	46191
Ethylbenzene	6.2	0.99		mg/Kg	20	7/17/2019 2:38:06 PM	46191
Xylenes, Total	44	2.0		mg/Kg	20	7/17/2019 2:38:06 PM	46191
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	20	7/17/2019 2:38:06 PM	46191

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** EB3-Leachate**Project:** Kaufman 1**Collection Date:** 7/26/2019 1:00:00 PM**Lab ID:** 1907617-020**Matrix:** LEACHATE**Received Date:** 7/26/2019 1:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: JMR
Gasoline Range Organics (GRO)	26	1.0		mg/L	20	8/1/2019 1:44:39 PM	G61843
Surr: BFB	93.0	70-130		%Rec	20	8/1/2019 1:44:39 PM	G61843
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: TOM
Diesel Range Organics (DRO)	2.3	1.0		mg/L	1	7/31/2019 9:17:09 AM	46486
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/31/2019 9:17:09 AM	46486
Surr: DNOP	100	70-130		%Rec	1	7/31/2019 9:17:09 AM	46486
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: JMR
Benzene	120	20		µg/L	20	8/1/2019 1:44:39 PM	SL61843
Surr: 1,2-Dichloroethane-d4	99.7	70-130		%Rec	20	8/1/2019 1:44:39 PM	SL61843
Surr: 4-Bromofluorobenzene	100	70-130		%Rec	20	8/1/2019 1:44:39 PM	SL61843
Surr: Dibromofluoromethane	95.6	70-130		%Rec	20	8/1/2019 1:44:39 PM	SL61843
Surr: Toluene-d8	102	70-130		%Rec	20	8/1/2019 1:44:39 PM	SL61843

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**

Date Reported: **8/6/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW3 2.5-3.5' Leachate

Project: Kaufman 1

Collection Date: 7/26/2019 1:00:00 PM

Lab ID: 1907617-021

Matrix: LEACHATE

Received Date: 7/26/2019 1:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: JMR
Gasoline Range Organics (GRO)	4.1	0.050		mg/L	1	7/31/2019 9:34:05 PM	G61815
Surr: BFB	96.5	70-130		%Rec	1	7/31/2019 9:34:05 PM	G61815
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: TOM
Diesel Range Organics (DRO)	1.1	1.0		mg/L	1	7/31/2019 10:29:48 AM	46486
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/31/2019 10:29:48 AM	46486
Surr: DNOP	102	70-130		%Rec	1	7/31/2019 10:29:48 AM	46486
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: JMR
Benzene	7.2	1.0		µg/L	1	7/31/2019 9:34:05 PM	SL61815
Surr: 1,2-Dichloroethane-d4	96.5	70-130		%Rec	1	7/31/2019 9:34:05 PM	SL61815
Surr: 4-Bromofluorobenzene	113	70-130		%Rec	1	7/31/2019 9:34:05 PM	SL61815
Surr: Dibromofluoromethane	107	70-130		%Rec	1	7/31/2019 9:34:05 PM	SL61815
Surr: Toluene-d8	109	70-130		%Rec	1	7/31/2019 9:34:05 PM	SL61815

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** ESW4 2.5-3.5' Leachate**Project:** Kaufman 1**Collection Date:** 7/26/2019 1:00:00 PM**Lab ID:** 1907617-022**Matrix:** LEACHATE**Received Date:** 7/26/2019 1:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: JMR
Gasoline Range Organics (GRO)	0.77	0.050		mg/L	1	8/1/2019 1:53:07 AM	G61815
Surr: BFB	93.2	70-130		%Rec	1	8/1/2019 1:53:07 AM	G61815
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: TOM
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	7/31/2019 10:54:10 AM	46486
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/31/2019 10:54:10 AM	46486
Surr: DNOP	107	70-130		%Rec	1	7/31/2019 10:54:10 AM	46486
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	1.0		µg/L	1	8/1/2019 1:53:07 AM	SL61815
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	1	8/1/2019 1:53:07 AM	SL61815
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	8/1/2019 1:53:07 AM	SL61815
Surr: Dibromofluoromethane	102	70-130		%Rec	1	8/1/2019 1:53:07 AM	SL61815
Surr: Toluene-d8	101	70-130		%Rec	1	8/1/2019 1:53:07 AM	SL61815

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907617**Date Reported: **8/6/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** ESW5 2.5-3.5' Leachate**Project:** Kaufman 1**Collection Date:** 7/26/2019 1:00:00 PM**Lab ID:** 1907617-023**Matrix:** LEACHATE**Received Date:** 7/26/2019 1:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: JMR
Gasoline Range Organics (GRO)	6.0	0.050		mg/L	1	8/1/2019 2:22:03 AM	G61815
Surr: BFB	94.2	70-130		%Rec	1	8/1/2019 2:22:03 AM	G61815
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: TOM
Diesel Range Organics (DRO)	1.2	1.0		mg/L	1	7/31/2019 11:18:24 AM	46486
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/31/2019 11:18:24 AM	46486
Surr: DNOP	107	70-130		%Rec	1	7/31/2019 11:18:24 AM	46486
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: JMR
Benzene	1.8	1.0		µg/L	1	8/1/2019 2:22:03 AM	SL61815
Surr: 1,2-Dichloroethane-d4	95.6	70-130		%Rec	1	8/1/2019 2:22:03 AM	SL61815
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	8/1/2019 2:22:03 AM	SL61815
Surr: Dibromofluoromethane	110	70-130		%Rec	1	8/1/2019 2:22:03 AM	SL61815
Surr: Toluene-d8	104	70-130		%Rec	1	8/1/2019 2:22:03 AM	SL61815

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: LCS-46205	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 46205		RunNo: 61424							
Prep Date: 7/16/2019	Analysis Date: 7/17/2019		SeqNo: 2083940		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	61	10	50.00	0	123	63.9	124			
Surr: DNOP	4.3		5.000		86.6	70	130			

Sample ID: 1907617-001AMS	SampType: MS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: EB1	Batch ID: 46205		RunNo: 61424							
Prep Date: 7/16/2019	Analysis Date: 7/17/2019		SeqNo: 2084111		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	110	9.7	48.54	46.67	126	57	142			
Surr: DNOP	3.6		4.854		74.8	70	130			

Sample ID: 1907617-001AMSD	SampType: MSD		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: EB1	Batch ID: 46205		RunNo: 61424							
Prep Date: 7/16/2019	Analysis Date: 7/17/2019		SeqNo: 2084112		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	280	9.7	48.69	46.67	471	57	142	87.6	20	RS
Surr: DNOP	3.9		4.869		79.9	70	130	0	0	

Sample ID: MB-46205	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 46205		RunNo: 61424							
Prep Date: 7/16/2019	Analysis Date: 7/17/2019		SeqNo: 2084132		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		114	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: 1907617-020BMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range
Client ID: EB3-Leachate	Batch ID: 46486	RunNo: 61771
Prep Date: 7/30/2019	Analysis Date: 7/31/2019	SeqNo: 2094851 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	7.6	1.0 5.000 2.330 106 68.1 137
Surr: DNOP	0.49	0.5000 97.6 70 130

Sample ID: 1907617-020BMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range
Client ID: EB3-Leachate	Batch ID: 46486	RunNo: 61771
Prep Date: 7/30/2019	Analysis Date: 7/31/2019	SeqNo: 2094852 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	7.4	1.0 5.000 2.330 102 68.1 137 2.51 20
Surr: DNOP	0.49	0.5000 97.8 70 130 0 0

Sample ID: LCS-46486	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range
Client ID: LCSW	Batch ID: 46486	RunNo: 61771
Prep Date: 7/30/2019	Analysis Date: 7/31/2019	SeqNo: 2094864 Units: mg/L
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	4.7	1.0 5.000 0 94.5 71.8 135
Surr: DNOP	0.44	0.5000 87.5 70 130

Sample ID: MB-46486	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range
Client ID: PBW	Batch ID: 46486	RunNo: 61771
Prep Date: 7/30/2019	Analysis Date: 7/31/2019	SeqNo: 2094865 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	0.95	1.000 94.9 70 130

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: MB-46191	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 46191	RunNo: 61407								
Prep Date: 7/15/2019	Analysis Date: 7/16/2019	SeqNo: 2081967	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1000		1000		100	73.8	119			

Sample ID: LCS-46191	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 46191	RunNo: 61407								
Prep Date: 7/15/2019	Analysis Date: 7/16/2019	SeqNo: 2081968	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	88.0	80.1	123			
Surr: BFB	1100		1000		112	73.8	119			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: MB-46191		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID: PBS		Batch ID: 46191		RunNo: 61407						
Prep Date: 7/15/2019		Analysis Date: 7/16/2019		SeqNo: 2081996			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		104	80	120			

Sample ID: LCS-46191		SampType: LCS		TestCode: EPA Method 8021B: Volatiles						
Client ID: LCSS		Batch ID: 46191		RunNo: 61407						
Prep Date: 7/15/2019		Analysis Date: 7/16/2019		SeqNo: 2081997			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	96.7	80	120			
Toluene	1.0	0.050	1.000	0	103	80	120			
Ethylbenzene	1.0	0.050	1.000	0	104	80	120			
Xylenes, Total	3.1	0.10	3.000	0	103	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: 100ng lcs2		SampType: LCS		TestCode: EPA Method 8260: Volatiles Short List						
Client ID: LCSW		Batch ID: SL61815			RunNo: 61815					
Prep Date:		Analysis Date: 7/31/2019			SeqNo: 2095678		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	90.7	70	130			
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.0	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		100	70	130			
Surr: Dibromofluoromethane	9.7		10.00		96.9	70	130			
Surr: Toluene-d8	9.8		10.00		98.3	70	130			

Sample ID: rb3		SampType: MBLK		TestCode: EPA Method 8260: Volatiles Short List						
Client ID: PBW		Batch ID: SL61815		RunNo: 61815						
Prep Date:		Analysis Date: 7/31/2019		SeqNo: 2095679			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.2	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.9	70	130			
Surr: Dibromofluoromethane	9.7		10.00		97.3	70	130			
Surr: Toluene-d8	10		10.00		99.9	70	130			

Sample ID: 1907617-020ams		SampType: MS		TestCode: EPA Method 8260: Volatiles Short List						
Client ID: EB3-Leachate		Batch ID: SL61815		RunNo: 61815						
Prep Date:		Analysis Date: 7/31/2019		SeqNo: 2095681		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	120	1.0	20.00	101.4	79.1	70	130			E
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.7	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		109	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	11		10.00		107	70	130			

Sample ID: 1907617-020amsd		SampType: MSD		TestCode: EPA Method 8260: Volatiles Short List							
Client ID: EB3-Leachate		Batch ID: SL61815		RunNo: 61815							
Prep Date:		Analysis Date: 7/31/2019		SeqNo: 2095682		Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	120	1.0	20.00	101.4	78.2	70	130	0.148	20	E	
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.0	70	130	0	0		
Surr: 4-Bromofluorobenzene	11		10.00		111	70	130	0	0		
Surr: Dibromofluoromethane	10		10.00		103	70	130	0	0		
Surr: Toluene-d8	11		10.00		106	70	130	0	0		

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: 100ng lcs		SampType: LCS		TestCode: EPA Method 8260: Volatiles Short List						
Client ID: LCSW		Batch ID: SL61843		RunNo: 61843						
Prep Date:		Analysis Date: 8/1/2019		SeqNo: 2096681		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	17	1.0	20.00	0	83.8	70	130			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		91.4	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.1	70	130			
Surr: Dibromofluoromethane	9.1		10.00		90.9	70	130			
Surr: Toluene-d8	9.5		10.00		95.2	70	130			

Sample ID: rb		SampType: MBLK		TestCode: EPA Method 8260: Volatiles Short List							
Client ID: PBW		Batch ID: SL61843		RunNo: 61843							
Prep Date:		Analysis Date: 8/1/2019		SeqNo: 2096682			Units: µg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene		ND	1.0								
Surr: 1,2-Dichloroethane-d4		8.9		10.00		88.7	70	130			
Surr: 4-Bromofluorobenzene		10		10.00		100	70	130			
Surr: Dibromofluoromethane		9.2		10.00		92.3	70	130			
Surr: Toluene-d8		10		10.00		101	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: 2.5ug gro lcs2	SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: LCSW	Batch ID: G61815		RunNo: 61815							
Prep Date:	Analysis Date: 7/31/2019		SeqNo: 2095686		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.39	0.050	0.5000	0	78.9	70	130			
Surr: BFB	9.5		10.00		95.3	70	130			

Sample ID: rb3	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBW	Batch ID: G61815		RunNo: 61815							
Prep Date:	Analysis Date: 7/31/2019		SeqNo: 2095687		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	9.3		10.00		93.3	70	130			

Sample ID: 1907617-021ams	SampType: MS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: ESW3 2.5-3.5' Leach	Batch ID: G61815		RunNo: 61815							
Prep Date:	Analysis Date: 7/31/2019		SeqNo: 2096356		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	4.3	0.050	0.5000	4.068	52.7	70	130			S
Surr: BFB	9.3		10.00		92.6	70	130			

Sample ID: 1907617-021amsd	SampType: MSD		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: ESW3 2.5-3.5' Leach	Batch ID: G61815		RunNo: 61815							
Prep Date:	Analysis Date: 7/31/2019		SeqNo: 2096357		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	4.2	0.050	0.5000	4.068	24.8	70	130	3.27	20	S
Surr: BFB	9.4		10.00		94.3	70	130	0	0	

Sample ID: 2.5ug gro lcs	SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: LCSW	Batch ID: G61843		RunNo: 61843							
Prep Date:	Analysis Date: 8/1/2019		SeqNo: 2096841		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.40	0.050	0.5000	0	79.6	70	130			
Surr: BFB	9.4		10.00		93.9	70	130			

Sample ID: rb	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBW	Batch ID: G61843		RunNo: 61843							
Prep Date:	Analysis Date: 8/1/2019		SeqNo: 2096842		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907617

06-Aug-19

Client: Timberwolf Environmental

Project: Kaufman 1

Sample ID: rb	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBW	Batch ID: G61843		RunNo: 61843							
Prep Date:	Analysis Date: 8/1/2019		SeqNo: 2096842		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	9.4		10.00		93.6	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit



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: TIMBERWOLF ENVIRON

Work Order Number: 1907617

RcptNo: 1

Received By: Desiree Dominguez

7/12/2019 8:05:00 AM

Completed By: Yazmine Garduno

7/12/2019 11:49:52 AM

Reviewed By: EN M

7/12/19

[Signature]
[Signature]

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 $>0^{\circ}\text{C}$ 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? Yes ☒ No ☐

(Note discrepancies on chain of custody)

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? Yes ☒ No ☐

(If no, notify customer for authorization.)

of preserved
bottles checked
for pH:

(<2 or >12 unless noted)

Adjusted? _____

Checked by: YG 7/12/19

Special Handling (if applicable)

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

Person Notified: Jim Foster

Date: 7/12/19

By Whom: Yazmine Garduno

Via: ☐ eMail ☒ Phone ☐ Fax ☐ In Person

Regarding: missing sample on and collection time discrepancy

Client Instructions: disregard sample -007 use collection time on

16. Additional remarks: COG. YG 7/12/19

17. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.3	Good	Yes			

Chain-of-Custody Record

Client: Timberwells EURN

Mailing Address: 691 CR 233, #B4

Durango CO 81301

Phone #: 970-516-8419

email or Fax#: jean@timberwells.com

QA/QC Package: ☒ Standard (5-day) ☐ Level 4 (Full Validation)

Accreditation: ☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name:

Kaufman #1

Project #:

HFC-130061

Project Manager:

J. Foster

Sampler:

On Ice: ☒ Yes ☐ No

Sample Temperature: 4.7-6.4=4.32

HEAL No. 1907617

Container Type and #

Preservative Type

TPH 8015B (GRO / DRO / MRO)

BTEX + MTBE + TMBs (8021)

BTEX + MTBE + TMBs (8021)

TPH (Method 418.1)

EDB (Method 504.1)

PAH's (8310 or 8270 SIMS)

RCRA 8 Metals

Anions (F, Cl, NO₃, NO₂, PO₄, SO₄)

8081 Pesticides / 8082 PCB's

8260B (VOA)

8270 (Semi-VOA)

Air Bubbles (Y or N)

Date: 7/11/19 Time: 11:15

Relinquished by: James McV...

Date: 7/11/19 Time: 11:15

Relinquished by: James McV...

Received by: ESD

Date: 7/12/19 Time: 8:05

Received by: ESD

Date: 7/12/19 Time: 8:05

Remarks:



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

June 28, 2019

Jim Foster
Timberwolf Environmental
691 CR 233 #B4
Durango, CO 81301
TEL: (970) 516-8419
FAX

RE: HEC-180061

OrderNo.: 1906D17

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 12 sample(s) on 6/22/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB1 9-10'

Project: HEC-180061

Collection Date: 6/20/2019 10:00:00 AM

Lab ID: 1906D17-001

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	6/26/2019 3:09:54 PM	45808
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	6/26/2019 3:09:54 PM	45808
Surr: DNOP	101	70-130		%Rec	1	6/26/2019 3:09:54 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/26/2019 9:58:50 AM	45799
Surr: BFB	86.1	73.8-119		%Rec	1	6/26/2019 9:58:50 AM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB2 9-10'

Project: HEC-180061

Collection Date: 6/20/2019 10:55:00 AM

Lab ID: 1906D17-002

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	8.7		mg/Kg	1	6/26/2019 3:34:19 PM	45808
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	6/26/2019 3:34:19 PM	45808
Surr: DNOP	105	70-130		%Rec	1	6/26/2019 3:34:19 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/26/2019 11:09:28 AM	45799
Surr: BFB	87.9	73.8-119		%Rec	1	6/26/2019 11:09:28 AM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB3 9-10'

Project: HEC-180061

Collection Date: 6/20/2019 12:55:00 PM

Lab ID: 1906D17-003

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	8.9		mg/Kg	1	6/26/2019 3:58:45 PM	45808
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	6/26/2019 3:58:45 PM	45808
Surr: DNOP	94.1	70-130		%Rec	1	6/26/2019 3:58:45 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/26/2019 11:32:52 AM	45799
Surr: BFB	85.2	73.8-119		%Rec	1	6/26/2019 11:32:52 AM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB4 9-10'

Project: HEC-180061

Collection Date: 6/21/2019 12:15:00 PM

Lab ID: 1906D17-004

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	6/26/2019 4:23:11 PM	45808
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	6/26/2019 4:23:11 PM	45808
Surr: DNOP	94.1	70-130		%Rec	1	6/26/2019 4:23:11 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/26/2019 11:56:17 AM	45799
Surr: BFB	87.6	73.8-119		%Rec	1	6/26/2019 11:56:17 AM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB5 9-10'

Project: HEC-180061

Collection Date: 6/21/2019 1:45:00 PM

Lab ID: 1906D17-005

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	6/26/2019 4:47:34 PM	45808
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/26/2019 4:47:34 PM	45808
Surr: DNOP	94.9	70-130		%Rec	1	6/26/2019 4:47:34 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/26/2019 12:19:48 PM	45799
Surr: BFB	85.8	73.8-119		%Rec	1	6/26/2019 12:19:48 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB6 4-5'

Project: HEC-180061

Collection Date: 6/21/2019 10:00:00 AM

Lab ID: 1906D17-006

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	6/26/2019 5:11:58 PM	45808
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	6/26/2019 5:11:58 PM	45808
Surr: DNOP	96.8	70-130		%Rec	1	6/26/2019 5:11:58 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/26/2019 12:43:16 PM	45799
Surr: BFB	87.9	73.8-119		%Rec	1	6/26/2019 12:43:16 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	6/26/2019 12:43:16 PM	45799
Toluene	ND	0.050		mg/Kg	1	6/26/2019 12:43:16 PM	45799
Ethylbenzene	ND	0.050		mg/Kg	1	6/26/2019 12:43:16 PM	45799
Xylenes, Total	ND	0.10		mg/Kg	1	6/26/2019 12:43:16 PM	45799
Surr: 4-Bromofluorobenzene	94.7	80-120		%Rec	1	6/26/2019 12:43:16 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB7 3-4'

Project: HEC-180061

Collection Date: 6/21/2019 10:25:00 AM

Lab ID: 1906D17-007

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	6/26/2019 5:36:44 PM	45808
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	6/26/2019 5:36:44 PM	45808
Surr: DNOP	95.1	70-130		%Rec	1	6/26/2019 5:36:44 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/26/2019 1:53:55 PM	45799
Surr: BFB	90.0	73.8-119		%Rec	1	6/26/2019 1:53:55 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	6/26/2019 1:53:55 PM	45799
Toluene	ND	0.050		mg/Kg	1	6/26/2019 1:53:55 PM	45799
Ethylbenzene	ND	0.050		mg/Kg	1	6/26/2019 1:53:55 PM	45799
Xylenes, Total	ND	0.099		mg/Kg	1	6/26/2019 1:53:55 PM	45799
Surr: 4-Bromofluorobenzene	97.0	80-120		%Rec	1	6/26/2019 1:53:55 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB8 3-4'

Project: HEC-180061

Collection Date: 6/21/2019 10:51:00 AM

Lab ID: 1906D17-008

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	6/26/2019 6:01:32 PM	45808
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/26/2019 6:01:32 PM	45808
Surr: DNOP	93.1	70-130		%Rec	1	6/26/2019 6:01:32 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/26/2019 3:04:52 PM	45799
Surr: BFB	92.6	73.8-119		%Rec	1	6/26/2019 3:04:52 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	6/26/2019 3:04:52 PM	45799
Toluene	ND	0.049		mg/Kg	1	6/26/2019 3:04:52 PM	45799
Ethylbenzene	ND	0.049		mg/Kg	1	6/26/2019 3:04:52 PM	45799
Xylenes, Total	ND	0.099		mg/Kg	1	6/26/2019 3:04:52 PM	45799
Surr: 4-Bromofluorobenzene	98.5	80-120		%Rec	1	6/26/2019 3:04:52 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**Date Reported: **6/28/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** SB9 3-4'**Project:** HEC-180061**Collection Date:** 6/21/2019 11:25:00 AM**Lab ID:** 1906D17-009**Matrix:** SOIL**Received Date:** 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	6/26/2019 6:26:18 PM	45808
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/26/2019 6:26:18 PM	45808
Surr: DNOP	98.8	70-130		%Rec	1	6/26/2019 6:26:18 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/26/2019 3:28:28 PM	45799
Surr: BFB	90.4	73.8-119		%Rec	1	6/26/2019 3:28:28 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/26/2019 3:28:28 PM	45799
Toluene	ND	0.048		mg/Kg	1	6/26/2019 3:28:28 PM	45799
Ethylbenzene	ND	0.048		mg/Kg	1	6/26/2019 3:28:28 PM	45799
Xylenes, Total	ND	0.097		mg/Kg	1	6/26/2019 3:28:28 PM	45799
Surr: 4-Bromofluorobenzene	97.5	80-120		%Rec	1	6/26/2019 3:28:28 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB10 4-5'

Project: HEC-180061

Collection Date: 6/21/2019 2:20:00 PM

Lab ID: 1906D17-010

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	90	9.5		mg/Kg	1	6/27/2019 8:23:18 AM	45808
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	6/27/2019 8:23:18 AM	45808
Surr: DNOP	95.5	70-130		%Rec	1	6/27/2019 8:23:18 AM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	5.1	4.9		mg/Kg	1	6/26/2019 8:34:19 PM	45799
Surr: BFB	118	73.8-119		%Rec	1	6/26/2019 8:34:19 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.037	0.024		mg/Kg	1	6/26/2019 8:34:19 PM	45799
Toluene	ND	0.049		mg/Kg	1	6/26/2019 8:34:19 PM	45799
Ethylbenzene	ND	0.049		mg/Kg	1	6/26/2019 8:34:19 PM	45799
Xylenes, Total	ND	0.097		mg/Kg	1	6/26/2019 8:34:19 PM	45799
Surr: 4-Bromofluorobenzene	95.0	80-120		%Rec	1	6/26/2019 8:34:19 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB11 4-5'

Project: HEC-180061

Collection Date: 6/21/2019 2:35:00 PM

Lab ID: 1906D17-011

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	130	9.6		mg/Kg	1	6/26/2019 7:15:41 PM	45808
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/26/2019 7:15:41 PM	45808
Surr: DNOP	95.4	70-130		%Rec	1	6/26/2019 7:15:41 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	150	4.9		mg/Kg	1	6/26/2019 8:57:52 PM	45799
Surr: BFB	844	73.8-119	S	%Rec	1	6/26/2019 8:57:52 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	6/26/2019 8:57:52 PM	45799
Toluene	0.072	0.049		mg/Kg	1	6/26/2019 8:57:52 PM	45799
Ethylbenzene	ND	0.049		mg/Kg	1	6/26/2019 8:57:52 PM	45799
Xylenes, Total	ND	0.099		mg/Kg	1	6/26/2019 8:57:52 PM	45799
Surr: 4-Bromofluorobenzene	115	80-120		%Rec	1	6/26/2019 8:57:52 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1906D17**

Date Reported: **6/28/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: SB12 4-5'

Project: HEC-180061

Collection Date: 6/21/2019 3:00:00 PM

Lab ID: 1906D17-012

Matrix: SOIL

Received Date: 6/22/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	11	9.6		mg/Kg	1	6/26/2019 7:40:23 PM	45808
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/26/2019 7:40:23 PM	45808
Surr: DNOP	100	70-130		%Rec	1	6/26/2019 7:40:23 PM	45808
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/26/2019 9:21:14 PM	45799
Surr: BFB	98.0	73.8-119		%Rec	1	6/26/2019 9:21:14 PM	45799
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	6/26/2019 9:21:14 PM	45799
Toluene	ND	0.049		mg/Kg	1	6/26/2019 9:21:14 PM	45799
Ethylbenzene	ND	0.049		mg/Kg	1	6/26/2019 9:21:14 PM	45799
Xylenes, Total	ND	0.099		mg/Kg	1	6/26/2019 9:21:14 PM	45799
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	6/26/2019 9:21:14 PM	45799

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1906D17

28-Jun-19

Client: Timberwolf Environmental

Project: HEC-180061

Sample ID: MB-45806	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 45806		RunNo: 60933							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2062847		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.3		10.00		92.7	70	130			

Sample ID: LCS-45806	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 45806		RunNo: 60933							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2062994		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.3		5.000		85.2	70	130			

Sample ID: MB-45808	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 45808		RunNo: 60941							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2062999		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.6		10.00		96.1	70	130			

Sample ID: LCS-45808	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 45808		RunNo: 60941							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063000		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	50.00	0	94.1	63.9	124			
Surr: DNOP	4.7		5.000		94.7	70	130			

Sample ID: LCS-45807	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 45807		RunNo: 60940							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063347		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.0		5.000		101	70	130			

Sample ID: MB-45807	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 45807		RunNo: 60940							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063349		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	11		10.00		107	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1906D17

28-Jun-19

Client: Timberwolf Environmental

Project: HEC-180061

Sample ID: MB-45799	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBS	Batch ID: 45799		RunNo: 60946							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063953		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	890		1000		89.4	73.8	119			

Sample ID: LCS-45799	SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: LCSS	Batch ID: 45799		RunNo: 60946							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063955		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	92.3	80.1	123			
Surr: BFB	1000		1000		101	73.8	119			

Sample ID: 1906D17-001AMS	SampType: MS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: SB1 9-10'	Batch ID: 45799		RunNo: 60946							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063958		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.9	24.68	0	100	69.1	142			
Surr: BFB	1000		987.2		103	73.8	119			

Sample ID: 1906D17-001AMSD	SampType: MSD		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: SB1 9-10'	Batch ID: 45799		RunNo: 60946							
Prep Date: 6/25/2019	Analysis Date: 6/26/2019		SeqNo: 2063960		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	105	69.1	142	5.97	20	
Surr: BFB	1000		1000		101	73.8	119	0	0	

Sample ID: RB	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBS	Batch ID: G60946		RunNo: 60946							
Prep Date:	Analysis Date: 6/26/2019		SeqNo: 2063987		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	960		1000		96.3	73.8	119			

Sample ID: 2.5UG GRO LCS	SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: LCSS	Batch ID: G60946		RunNo: 60946							
Prep Date:	Analysis Date: 6/26/2019		SeqNo: 2063988		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1200		1000		120	73.8	119			S

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1906D17

28-Jun-19

Client: Timberwolf Environmental

Project: HEC-180061

Sample ID: MB-45799	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 45799	RunNo: 60946								
Prep Date: 6/25/2019	Analysis Date: 6/26/2019	SeqNo: 2064010			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.95		1.000		94.8	80	120			

Sample ID: LCS-45799	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 45799	RunNo: 60946								
Prep Date: 6/25/2019	Analysis Date: 6/26/2019	SeqNo: 2064011			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	97.8	80	120			
Toluene	1.0	0.050	1.000	0	104	80	120			
Ethylbenzene	1.1	0.050	1.000	0	106	80	120			
Xylenes, Total	3.2	0.10	3.000	0	106	80	120			
Surr: 4-Bromofluorobenzene	0.95		1.000		94.9	80	120			

Sample ID: 1906D17-006AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: SB6 4-5'	Batch ID: 45799	RunNo: 60946								
Prep Date: 6/25/2019	Analysis Date: 6/26/2019	SeqNo: 2064013			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	0.9862	0	105	63.9	127			
Toluene	1.1	0.049	0.9862	0.009491	113	69.9	131			
Ethylbenzene	1.2	0.049	0.9862	0	118	71	132			
Xylenes, Total	3.5	0.099	2.959	0	117	71.8	131			
Surr: 4-Bromofluorobenzene	0.97		0.9862		98.7	80	120			

Sample ID: 1906D17-006AMSD	SampType: MSD	TestCode: EPA Method 8021B: Volatiles								
Client ID: SB6 4-5'	Batch ID: 45799	RunNo: 60946								
Prep Date: 6/25/2019	Analysis Date: 6/26/2019	SeqNo: 2064014			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9775	0	107	63.9	127	1.12	20	
Toluene	1.1	0.049	0.9775	0.009491	115	69.9	131	0.819	20	
Ethylbenzene	1.2	0.049	0.9775	0	120	71	132	0.700	20	
Xylenes, Total	3.5	0.098	2.933	0	119	71.8	131	0.371	20	
Surr: 4-Bromofluorobenzene	0.96		0.9775		98.6	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1906D17**

RcptNo: **1**

Received By: **Andy Freeman**

6/22/2019 8:00:00 AM

Completed By: **Leah Baca**

6/25/2019 9:40:06 AM

Reviewed By: **YG 6/25/19**

Andy Freeman

Leah Baca

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 $>0^{\circ}\text{C}$ 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 ☐ **IO**
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: **6/25/19**
(<2 or >12 unless noted)
- Adjusted? _____
- Checked by: _____

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 $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.3	Good	Yes			



CHAIN OF CUSTODY

SGS North America Inc. - Houston
10165 Harwin Dr, Ste 150 Houston, TX 77036
TEL: 713-271-4700 FAX: 713-271-4770
www.sgs.com/enhsusa

Client / Reporting Information				Project Information				Requested Analyses				Matrix Codes			
Company Name Timberline				Project Name HEC-180061											
Street Address 691 CR 233 #B4				City Durango, CO				State 81301				Zip 81301			
Project Contact Jim Foster				Project # HEC-180061				Billing Information (if different from Report to)							
Phone # 970-516-8419				Client Purchase Order #				Street Address							
Sampler(s) Name(s) James M. N. H.				Phone # 316-2620				City				State			
				Project Manager				Attention:							
				Field ID / Point of Collection				Collection				Number of preserved bottles			
SGS Sample #				Date				Time				Matrix			
S1B1 9-10'				6/20/19				10:00				JBM			
S2 9-10'				6/20/19				10:55				JBM			
S3 9-10'				6/20/19				12:55				JBM			
S34 9-10'				6/21/19				12:15				JBM			
S35 9-10'				6/21/19				12:45				JBM			
S36 4-5'				6/21/19				10:00				JBM			
S37 3-4'				6/21/19				10:25				JBM			
S38 3-4'				6/21/19				10:51				JBM			
S39 3-4'				6/21/19				11:25				JBM			
S310 4-5'				6/21/19				14:20				JBM			
S311 4-5'				6/21/19				14:35				JBM			
S312 4-5'				6/21/19				15:00				JBM			
Turnaround Time (Business days)				Approved By (SGS PM): / Date:				Data Deliverable Information				Comments / Special Instructions			
<input checked="" type="checkbox"/> Standard 10 Business Days								<input type="checkbox"/> Commercial "A" (Level 1)				<input type="checkbox"/> TRRP			
<input type="checkbox"/> 5 Business Days RUSH								<input type="checkbox"/> Commercial "B" (Level 2)				<input type="checkbox"/> EDD Format			
<input type="checkbox"/> 4 Business Days RUSH								<input type="checkbox"/> FULT1 (Level 3+4)				<input type="checkbox"/> Other			
<input type="checkbox"/> 3 Business Days RUSH								<input type="checkbox"/> REDT1 (Level 3+4)							
<input type="checkbox"/> 2 Business Days RUSH								<input type="checkbox"/> Commercial "C"							
<input type="checkbox"/> 1 Business Day EMERGENCY								Commercial "A" = Results Only							
Emergency & Rush T/A data available via Lablink. Approval needed for RUSH/Emergency TAT								Commercial "B" = Results + QC Summary							
								Commercial "C" = Results + QC Summary + Partial Raw Data							
Relinquished by: 1 James M. N. H.				Date / Time: 6/20/19 10:00				Relinquished By: 11/21/19 10:00				Date / Time: 6/21/19 10:00			
Relinquished by: 3				Date / Time: 6/20/19 10:00				Relinquished By: 4				Date / Time: 6/21/19 10:00			
Relinquished by: 5				Date / Time: 6/20/19 10:00				Relinquished By: 5				Date / Time: 6/21/19 10:00			

Received By:		Received By:		Received By:		Received By:	
Date / Time:	6/20/19 10:00	Date / Time:	6/21/19 10:00	Date / Time:	6/21/19 10:00	Date / Time:	6/21/19 10:00
Signature:	<i>James M. N. H.</i>	Signature:	<i>11/21/19 10:00</i>	Signature:	<i>4</i>	Signature:	<i>5</i>

On Ice		Cooler Temp. °C	
<input type="checkbox"/> Inlet	<input type="checkbox"/> Absent	Therm. ID	2.3 C

Sample Custody must be documented below each time samples change possession, including courier delivery.

3 day TAT per Tim 6/24/19



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

November 11, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX

RE: Kaufman No. 1

OrderNo.: 1911169

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/6/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911169**

Date Reported: **11/11/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: GP3

Project: Kaufman No. 1

Collection Date: 11/5/2019 8:40:00 AM

Lab ID: 1911169-001

Matrix: GROUNDWA

Received Date: 11/6/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	55	1.0		µg/L	1	11/8/2019 9:39:24 AM	B64337
Toluene	1.0	1.0		µg/L	1	11/8/2019 9:39:24 AM	B64337
Ethylbenzene	38	1.0		µg/L	1	11/8/2019 9:39:24 AM	B64337
Xylenes, Total	210	2.0		µg/L	1	11/8/2019 9:39:24 AM	B64337
Surr: 4-Bromofluorobenzene	260	80-120	S	%Rec	1	11/8/2019 9:39:24 AM	B64337

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911169

11-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No. 1

Sample ID: RB	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBW	Batch ID: B64337	RunNo: 64337								
Prep Date:	Analysis Date: 11/8/2019	SeqNo: 2202869			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								
Xylenes, Total	ND	2.0								
Surr: 4-Bromofluorobenzene	20		20.00		98.1	80	120			

Sample ID: 100NG BTEX LCS	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSW	Batch ID: B64337	RunNo: 64337								
Prep Date:	Analysis Date: 11/8/2019	SeqNo: 2202870			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	105	80	120			
Toluene	21	1.0	20.00	0	106	80	120			
Ethylbenzene	21	1.0	20.00	0	106	80	120			
Xylenes, Total	64	2.0	60.00	0	106	80	119			
Surr: 4-Bromofluorobenzene	20		20.00		102	80	120			

Sample ID: 1911169-001AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: GP3	Batch ID: B64337	RunNo: 64337								
Prep Date:	Analysis Date: 11/8/2019	SeqNo: 2202872			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	87	1.0	20.00	55.40	160	80	120			S
Toluene	24	1.0	20.00	1.020	116	75.5	120			
Ethylbenzene	70	1.0	20.00	38.27	157	80	120			S
Xylenes, Total	310	2.0	60.00	208.2	165	77.3	119			ES
Surr: 4-Bromofluorobenzene	59		20.00		295	80	120			S

Sample ID: 1911169-001AMSD	SampType: MSD	TestCode: EPA Method 8021B: Volatiles								
Client ID: GP3	Batch ID: B64337	RunNo: 64337								
Prep Date:	Analysis Date: 11/8/2019	SeqNo: 2202873			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	76	1.0	20.00	55.40	103	80	120	13.8	20	
Toluene	21	1.0	20.00	1.020	99.8	75.5	120	14.3	20	
Ethylbenzene	60	1.0	20.00	38.27	110	80	120	14.6	20	
Xylenes, Total	270	2.0	60.00	208.2	99.1	77.3	119	13.8	20	
Surr: 4-Bromofluorobenzene	54		20.00		272	80	120	0	0	S

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1911169**

RcptNo: 1

Received By: **Daniel Marquez**

11/6/2019 8:00:00 AM

Completed By: **Daniel Marquez**

11/6/2019 8:24:34 AM

Reviewed By: **ENM**

11/6/19

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 $>0^{\circ}\text{C}$ 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:

(<2 or >12 unless noted)

Adjusted?

Checked by: **JR 11/6/19**

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 $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.3	Good				

www.hallenvironmental.com

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

Analysis Request

[illegible]

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.



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

November 14, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX

RE: Kaufman No 1

OrderNo.: 1911245

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 10 sample(s) on 11/7/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 11/14/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP1 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 2:08:00 PM

Lab ID: 1911245-001

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	300	9.4		mg/Kg	1	11/12/2019 1:56:12 PM	48715
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/12/2019 1:56:12 PM	48715
Surr: DNOP	85.1	70-130		%Rec	1	11/12/2019 1:56:12 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	630	24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Surr: BFB	400	77.4-118	S	%Rec	5	11/12/2019 10:01:38 AM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Toluene	ND	0.24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Ethylbenzene	ND	0.24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Xylenes, Total	ND	0.48		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Surr: 4-Bromofluorobenzene	139	80-120	S	%Rec	5	11/12/2019 10:01:38 AM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP2 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 2:37:00 PM**Lab ID:** 1911245-002**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	8.9		mg/Kg	1	11/12/2019 2:31:47 PM	48715
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	11/12/2019 2:31:47 PM	48715
Surr: DNOP	74.2	70-130		%Rec	1	11/12/2019 2:31:47 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Surr: BFB	95.4	77.4-118		%Rec	1	11/12/2019 1:08:50 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Toluene	ND	0.047		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Ethylbenzene	ND	0.047		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Xylenes, Total	ND	0.095		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	11/12/2019 1:08:50 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP3 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 2:51:00 PM**Lab ID:** 1911245-003**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	11/12/2019 2:40:48 PM	48715
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/12/2019 2:40:48 PM	48715
Surr: DNOP	76.8	70-130		%Rec	1	11/12/2019 2:40:48 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Surr: BFB	90.5	77.4-118		%Rec	1	11/12/2019 1:32:10 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Xylenes, Total	ND	0.099		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Surr: 4-Bromofluorobenzene	98.4	80-120		%Rec	1	11/12/2019 1:32:10 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP4 4'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:01:00 PM**Lab ID:** 1911245-004**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	95	8.2		mg/Kg	1	11/12/2019 2:49:54 PM	48715
Motor Oil Range Organics (MRO)	ND	41		mg/Kg	1	11/12/2019 2:49:54 PM	48715
Surr: DNOP	78.2	70-130		%Rec	1	11/12/2019 2:49:54 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	310	23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Surr: BFB	417	77.4-118	S	%Rec	5	11/12/2019 1:55:31 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Toluene	ND	0.23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Ethylbenzene	2.3	0.23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Xylenes, Total	22	0.47		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Surr: 4-Bromofluorobenzene	121	80-120	S	%Rec	5	11/12/2019 1:55:31 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 11/14/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP5 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:04:00 PM

Lab ID: 1911245-005

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	17	9.1		mg/Kg	1	11/12/2019 2:59:00 PM	48715
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	11/12/2019 2:59:00 PM	48715
Surr: DNOP	83.3	70-130		%Rec	1	11/12/2019 2:59:00 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	23	4.7		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Surr: BFB	103	77.4-118		%Rec	1	11/12/2019 2:42:13 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Toluene	ND	0.047		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Ethylbenzene	ND	0.047		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Xylenes, Total	0.16	0.095		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	11/12/2019 2:42:13 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP6 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:14:00 PM**Lab ID:** 1911245-006**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	11/12/2019 3:08:09 PM	48715
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/12/2019 3:08:09 PM	48715
Surr: DNOP	79.3	70-130		%Rec	1	11/12/2019 3:08:09 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Surr: BFB	92.5	77.4-118		%Rec	1	11/12/2019 4:15:13 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Xylenes, Total	ND	0.098		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	11/12/2019 4:15:13 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 11/14/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP7 4'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:26:00 PM

Lab ID: 1911245-007

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	100	8.5		mg/Kg	1	11/12/2019 3:17:16 PM	48715
Motor Oil Range Organics (MRO)	ND	42		mg/Kg	1	11/12/2019 3:17:16 PM	48715
Surr: DNOP	91.5	70-130		%Rec	1	11/12/2019 3:17:16 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	830	25		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Surr: BFB	823	77.4-118	S	%Rec	5	11/12/2019 11:11:47 AM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Toluene	0.36	0.25		mg/Kg	5	11/13/2019 9:40:15 AM	48709
Ethylbenzene	0.99	0.25		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Xylenes, Total	8.1	0.49		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Surr: 4-Bromofluorobenzene	147	80-120	S	%Rec	5	11/12/2019 11:11:47 AM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP8 3.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:32:00 PM**Lab ID:** 1911245-008**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	11/12/2019 3:26:25 PM	48715
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/12/2019 3:26:25 PM	48715
Surr: DNOP	76.4	70-130		%Rec	1	11/12/2019 3:26:25 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Surr: BFB	90.5	77.4-118		%Rec	1	11/12/2019 4:38:25 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Xylenes, Total	ND	0.098		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Surr: 4-Bromofluorobenzene	99.2	80-120		%Rec	1	11/12/2019 4:38:25 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **11/14/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP9 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:35:00 PM**Lab ID:** 1911245-009**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	18	9.0		mg/Kg	1	11/13/2019 9:23:42 AM	48728
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	11/13/2019 9:23:42 AM	48728
Surr: DNOP	81.2	70-130		%Rec	1	11/13/2019 9:23:42 AM	48728
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Surr: BFB	107	77.4-118		%Rec	1	11/13/2019 11:15:08 AM	48720
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Toluene	ND	0.048		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Ethylbenzene	ND	0.048		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Xylenes, Total	ND	0.097		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	1	11/13/2019 11:15:08 AM	48720

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**

Date Reported: **11/14/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: TP10 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:38:00 PM

Lab ID: 1911245-010

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	65	10		mg/Kg	1	11/13/2019 9:50:45 AM	48728
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/13/2019 9:50:45 AM	48728
Surr: DNOP	78.3	70-130		%Rec	1	11/13/2019 9:50:45 AM	48728
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Surr: BFB	146	77.4-118	S	%Rec	1	11/13/2019 12:25:29 PM	48720
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Toluene	ND	0.049		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Ethylbenzene	ND	0.049		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Xylenes, Total	ND	0.098		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Surr: 4-Bromofluorobenzene	98.7	80-120		%Rec	1	11/13/2019 12:25:29 PM	48720

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-001AMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP1 4.5'	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205831 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	360	9.2 45.91 305.0 123 57 142
Surr: DNOP	3.8	4.591 82.8 70 130

Sample ID: 1911245-001AMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP1 4.5'	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205832 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	370	9.3 46.64 305.0 131 57 142 1.36 20
Surr: DNOP	4.3	4.664 92.6 70 130 0 0

Sample ID: LCS-48715	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: LCSS	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205865 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	42	10 50.00 0 84.0 63.9 124
Surr: DNOP	3.4	5.000 68.9 70 130 S

Sample ID: MB-48715	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: PBS	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205874 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	ND	10
Motor Oil Range Organics (MRO)	ND	50
Surr: DNOP	7.8	10.00 77.9 70 130

Sample ID: 1911245-009AMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP9 4.5'	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206722 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	84	8.6 43.18 18.08 153 57 142 S
Surr: DNOP	3.3	4.318 76.7 70 130

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-009AMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP9 4.5'	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206723 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	55	8.8 44.13 18.08 84.5 57 142 41.0 20 R
Surr: DNOP	3.2	4.413 73.4 70 130 0 0

Sample ID: LCS-48728	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: LCSS	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206729 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	41	10 50.00 0 82.8 63.9 124
Surr: DNOP	3.5	5.000 69.3 70 130 S

Sample ID: MB-48728	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: PBS	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206730 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	ND	10
Motor Oil Range Organics (MRO)	ND	50
Surr: DNOP	7.8	10.00 78.4 70 130

Sample ID: LCS-48767	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: LCSS	Batch ID: 48767	RunNo: 64440
Prep Date: 11/13/2019	Analysis Date: 11/13/2019	SeqNo: 2207141 Units: %Rec
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Surr: DNOP	4.0	5.000 80.9 70 130

Sample ID: MB-48767	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: PBS	Batch ID: 48767	RunNo: 64440
Prep Date: 11/13/2019	Analysis Date: 11/13/2019	SeqNo: 2207142 Units: %Rec
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Surr: DNOP	7.5	10.00 74.8 70 130

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: MB-48709	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 48709	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205936 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1000		1000		104	77.4	118			

Sample ID: LCS-48709	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 48709	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205937 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	98.2	80	120			
Surr: BFB	1100		1000		114	77.4	118			

Sample ID: MB-48720	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 48720	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205949 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	910		1000		91.3	77.4	118			

Sample ID: LCS-48720	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 48720	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205950 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	89.4	80	120			
Surr: BFB	1000		1000		99.6	77.4	118			

Sample ID: 1911245-009AMS	SampType: MS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: TP9 4.5'	Batch ID: 48720	RunNo: 64479								
Prep Date: 11/11/2019	Analysis Date: 11/13/2019	SeqNo: 2207364 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	4.6	23.04	0	103	69.1	142			
Surr: BFB	1100		921.7		125	77.4	118			S

Sample ID: 1911245-009AMSD	SampType: MSD	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: TP9 4.5'	Batch ID: 48720	RunNo: 64479								
Prep Date: 11/11/2019	Analysis Date: 11/13/2019	SeqNo: 2207365 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-009AMSD		SampType: MSD		TestCode: EPA Method 8015D: Gasoline Range						
Client ID: TP9 4.5'		Batch ID: 48720		RunNo: 64479						
Prep Date: 11/11/2019		Analysis Date: 11/13/2019		SeqNo: 2207365		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.6	23.08	0	110	69.1	142	6.95	20	
Surr: BFB	910		923.4		99.0	77.4	118	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: MB-48709		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID: PBS		Batch ID: 48709		RunNo: 64437						
Prep Date: 11/11/2019		Analysis Date: 11/12/2019		SeqNo: 2205956		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		112	80	120			

Sample ID: LCS-48709		SampType: LCS		TestCode: EPA Method 8021B: Volatiles						
Client ID: LCSS		Batch ID: 48709		RunNo: 64437						
Prep Date: 11/11/2019		Analysis Date: 11/12/2019		SeqNo: 2205957			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	101	80	120			
Toluene	1.1	0.050	1.000	0	105	80	120			
Ethylbenzene	1.1	0.050	1.000	0	106	80	120			
Xylenes, Total	3.2	0.10	3.000	0	106	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		105	80	120			

Sample ID: MB-48720		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID: PBS		Batch ID: 48720		RunNo: 64437						
Prep Date: 11/11/2019		Analysis Date: 11/12/2019		SeqNo: 2205978			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		100	80	120			

Sample ID: LCS-48720		SampType: LCS		TestCode: EPA Method 8021B: Volatiles						
Client ID: LCSS		Batch ID: 48720			RunNo: 64437					
Prep Date: 11/11/2019		Analysis Date: 11/12/2019			SeqNo: 2205979		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	90.2	80	120			
Toluene	0.97	0.050	1.000	0	97.0	80	120			
Ethylbenzene	0.96	0.050	1.000	0	96.0	80	120			
Xylenes, Total	2.9	0.10	3.000	0	96.7	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		100	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

14-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-010AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: TP10 4.5'	Batch ID: 48720			RunNo: 64479						
Prep Date: 11/11/2019	Analysis Date: 11/13/2019			SeqNo: 2207487			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.025	0.9823	0	88.4	76	123			
Toluene	0.93	0.049	0.9823	0.01035	93.1	80.3	127			
Ethylbenzene	0.94	0.049	0.9823	0	95.4	80.2	131			
Xylenes, Total	2.8	0.098	2.947	0.04443	94.4	78	133			
Surr: 4-Bromofluorobenzene	1.0		0.9823		102	80	120			

Sample ID: 1911245-010AMSD		SampType: MSD		TestCode: EPA Method 8021B: Volatiles						
Client ID: TP10 4.5'		Batch ID: 48720		RunNo: 64479						
Prep Date: 11/11/2019		Analysis Date: 11/13/2019		SeqNo: 2207488		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.85	0.023	0.9346	0	91.1	76	123	1.98	20	
Toluene	0.89	0.047	0.9346	0.01035	94.6	80.3	127	3.34	20	
Ethylbenzene	0.92	0.047	0.9346	0	97.9	80.2	131	2.41	20	
Xylenes, Total	2.8	0.093	2.804	0.04443	96.8	78	133	2.45	20	
Surr: 4-Bromofluorobenzene	0.93		0.9346		100	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1911245**

RcptNo: **1**

Received By: **Daniel Marquez** 11/6/2019 8:00:00 AM

Completed By: **Desiree Dominguez** 11/7/2019 9:01:29 AM

Reviewed By: *DM 11/11/19*

DM

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:

(<2 or >12 unless noted)

Adjusted? _____

Checked by: *DAD 11/11/19*

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	5.5	Good	Not Present			
2	3.6	Good	Not Present			



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

November 08, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX

RE: Kaufman No 1

OrderNo.: 1911240

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 18 sample(s) on 11/7/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW6 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 1:40:00 PM

Lab ID: 1911240-001

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	ND	0.41		mg/Kg	20	11/7/2019 10:20:03 AM	SS64307
Toluene	2.6	0.82		mg/Kg	20	11/7/2019 10:20:03 AM	SS64307
Ethylbenzene	0.69	0.41		mg/Kg	20	11/7/2019 10:20:03 AM	SS64307
Xylenes, Total	130	1.6		mg/Kg	20	11/7/2019 10:20:03 AM	SS64307
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	20	11/7/2019 10:20:03 AM	SS64307
Surr: 4-Bromofluorobenzene	111	70-130		%Rec	20	11/7/2019 10:20:03 AM	SS64307
Surr: Dibromofluoromethane	111	70-130		%Rec	20	11/7/2019 10:20:03 AM	SS64307
Surr: Toluene-d8	108	70-130		%Rec	20	11/7/2019 10:20:03 AM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW6 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 1:41:00 PM

Lab ID: 1911240-002

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	0.12	0.079		mg/Kg	5	11/7/2019 10:49:11 AM	SS64307
Toluene	0.14	0.079		mg/Kg	5	11/7/2019 10:49:11 AM	SS64307
Ethylbenzene	2.0	0.16		mg/Kg	5	11/7/2019 10:49:11 AM	SS64307
Xylenes, Total	14	0.31		mg/Kg	5	11/7/2019 10:49:11 AM	SS64307
Surr: 1,2-Dichloroethane-d4	93.9	70-130		%Rec	5	11/7/2019 10:49:11 AM	SS64307
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	5	11/7/2019 10:49:11 AM	SS64307
Surr: Dibromofluoromethane	107	70-130		%Rec	5	11/7/2019 10:49:11 AM	SS64307
Surr: Toluene-d8	103	70-130		%Rec	5	11/7/2019 10:49:11 AM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW7 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 1:45:00 PM

Lab ID: 1911240-003

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	ND	0.12		mg/Kg	5	11/7/2019 11:18:24 AM	SS64307
Toluene	ND	0.23		mg/Kg	5	11/7/2019 11:18:24 AM	SS64307
Ethylbenzene	ND	0.23		mg/Kg	5	11/7/2019 11:18:24 AM	SS64307
Xylenes, Total	1.9	0.47		mg/Kg	5	11/7/2019 11:18:24 AM	SS64307
Surr: 1,2-Dichloroethane-d4	94.4	70-130		%Rec	5	11/7/2019 11:18:24 AM	SS64307
Surr: 4-Bromofluorobenzene	94.9	70-130		%Rec	5	11/7/2019 11:18:24 AM	SS64307
Surr: Dibromofluoromethane	111	70-130		%Rec	5	11/7/2019 11:18:24 AM	SS64307
Surr: Toluene-d8	98.6	70-130		%Rec	5	11/7/2019 11:18:24 AM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911240

Date Reported: 11/8/2019

CLIENT: Timberwolf Environmental

Client Sample ID: ESW7 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 1:51:00 PM

Lab ID: 1911240-004

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	ND	0.088		mg/Kg	5	11/7/2019 11:47:45 AM	SS64307
Toluene	ND	0.18		mg/Kg	5	11/7/2019 11:47:45 AM	SS64307
Ethylbenzene	0.23	0.18		mg/Kg	5	11/7/2019 11:47:45 AM	SS64307
Xylenes, Total	4.1	0.35		mg/Kg	5	11/7/2019 11:47:45 AM	SS64307
Surr: 1,2-Dichloroethane-d4	98.1	70-130		%Rec	5	11/7/2019 11:47:45 AM	SS64307
Surr: 4-Bromofluorobenzene	92.8	70-130		%Rec	5	11/7/2019 11:47:45 AM	SS64307
Surr: Dibromofluoromethane	113	70-130		%Rec	5	11/7/2019 11:47:45 AM	SS64307
Surr: Toluene-d8	101	70-130		%Rec	5	11/7/2019 11:47:45 AM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW8 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 2:00:00 PM

Lab ID: 1911240-005

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	ND	0.022		mg/Kg	1	11/7/2019 3:11:47 PM	SS64307
Toluene	ND	0.044		mg/Kg	1	11/7/2019 3:11:47 PM	SS64307
Ethylbenzene	ND	0.044		mg/Kg	1	11/7/2019 3:11:47 PM	SS64307
Xylenes, Total	0.20	0.089		mg/Kg	1	11/7/2019 3:11:47 PM	SS64307
Surr: 1,2-Dichloroethane-d4	99.9	70-130		%Rec	1	11/7/2019 3:11:47 PM	SS64307
Surr: 4-Bromofluorobenzene	84.9	70-130		%Rec	1	11/7/2019 3:11:47 PM	SS64307
Surr: Dibromofluoromethane	115	70-130		%Rec	1	11/7/2019 3:11:47 PM	SS64307
Surr: Toluene-d8	99.0	70-130		%Rec	1	11/7/2019 3:11:47 PM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW8 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 2:01:00 PM

Lab ID: 1911240-006

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: DJF
Benzene	ND	0.022		mg/Kg	1	11/7/2019 3:40:43 PM	SS64307
Toluene	ND	0.043		mg/Kg	1	11/7/2019 3:40:43 PM	SS64307
Ethylbenzene	ND	0.043		mg/Kg	1	11/7/2019 3:40:43 PM	SS64307
Xylenes, Total	ND	0.087		mg/Kg	1	11/7/2019 3:40:43 PM	SS64307
Surr: 1,2-Dichloroethane-d4	99.5	70-130		%Rec	1	11/7/2019 3:40:43 PM	SS64307
Surr: 4-Bromofluorobenzene	88.6	70-130		%Rec	1	11/7/2019 3:40:43 PM	SS64307
Surr: Dibromofluoromethane	113	70-130		%Rec	1	11/7/2019 3:40:43 PM	SS64307
Surr: Toluene-d8	105	70-130		%Rec	1	11/7/2019 3:40:43 PM	SS64307

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW9 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:58:00 PM

Lab ID: 1911240-007

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	0.019		mg/Kg	1	11/7/2019 11:06:38 AM	SL64312
Toluene	ND	0.037		mg/Kg	1	11/7/2019 11:06:38 AM	SL64312
Ethylbenzene	ND	0.037		mg/Kg	1	11/7/2019 11:06:38 AM	SL64312
Xylenes, Total	ND	0.074		mg/Kg	1	11/7/2019 11:06:38 AM	SL64312
Surr: 1,2-Dichloroethane-d4	91.4	70-130		%Rec	1	11/7/2019 11:06:38 AM	SL64312
Surr: 4-Bromofluorobenzene	89.2	70-130		%Rec	1	11/7/2019 11:06:38 AM	SL64312
Surr: Dibromofluoromethane	102	70-130		%Rec	1	11/7/2019 11:06:38 AM	SL64312
Surr: Toluene-d8	96.5	70-130		%Rec	1	11/7/2019 11:06:38 AM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911240

Date Reported: 11/8/2019

CLIENT: Timberwolf Environmental

Client Sample ID: ESW9 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:07:00 PM

Lab ID: 1911240-008

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	0.017		mg/Kg	1	11/7/2019 11:35:10 AM	SL64312
Toluene	ND	0.034		mg/Kg	1	11/7/2019 11:35:10 AM	SL64312
Ethylbenzene	ND	0.034		mg/Kg	1	11/7/2019 11:35:10 AM	SL64312
Xylenes, Total	ND	0.068		mg/Kg	1	11/7/2019 11:35:10 AM	SL64312
Surr: 1,2-Dichloroethane-d4	91.7	70-130		%Rec	1	11/7/2019 11:35:10 AM	SL64312
Surr: 4-Bromofluorobenzene	90.0	70-130		%Rec	1	11/7/2019 11:35:10 AM	SL64312
Surr: Dibromofluoromethane	102	70-130		%Rec	1	11/7/2019 11:35:10 AM	SL64312
Surr: Toluene-d8	95.6	70-130		%Rec	1	11/7/2019 11:35:10 AM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW10 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:00:00 PM

Lab ID: 1911240-009

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	0.020		mg/Kg	1	11/7/2019 12:03:42 PM	SL64312
Toluene	ND	0.039		mg/Kg	1	11/7/2019 12:03:42 PM	SL64312
Ethylbenzene	ND	0.039		mg/Kg	1	11/7/2019 12:03:42 PM	SL64312
Xylenes, Total	0.082	0.079		mg/Kg	1	11/7/2019 12:03:42 PM	SL64312
Surr: 1,2-Dichloroethane-d4	94.6	70-130		%Rec	1	11/7/2019 12:03:42 PM	SL64312
Surr: 4-Bromofluorobenzene	90.4	70-130		%Rec	1	11/7/2019 12:03:42 PM	SL64312
Surr: Dibromofluoromethane	102	70-130		%Rec	1	11/7/2019 12:03:42 PM	SL64312
Surr: Toluene-d8	94.5	70-130		%Rec	1	11/7/2019 12:03:42 PM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW10 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:00:00 PM

Lab ID: 1911240-010

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	0.018		mg/Kg	1	11/7/2019 12:32:15 PM	SL64312
Toluene	ND	0.035		mg/Kg	1	11/7/2019 12:32:15 PM	SL64312
Ethylbenzene	ND	0.035		mg/Kg	1	11/7/2019 12:32:15 PM	SL64312
Xylenes, Total	ND	0.071		mg/Kg	1	11/7/2019 12:32:15 PM	SL64312
Surr: 1,2-Dichloroethane-d4	92.7	70-130		%Rec	1	11/7/2019 12:32:15 PM	SL64312
Surr: 4-Bromofluorobenzene	89.6	70-130		%Rec	1	11/7/2019 12:32:15 PM	SL64312
Surr: Dibromofluoromethane	100	70-130		%Rec	1	11/7/2019 12:32:15 PM	SL64312
Surr: Toluene-d8	94.9	70-130		%Rec	1	11/7/2019 12:32:15 PM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW11 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:05:00 PM

Lab ID: 1911240-011

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	ND	0.021		mg/Kg	1	11/7/2019 1:00:50 PM	SL64312
Toluene	ND	0.041		mg/Kg	1	11/7/2019 1:00:50 PM	SL64312
Ethylbenzene	ND	0.041		mg/Kg	1	11/7/2019 1:00:50 PM	SL64312
Xylenes, Total	0.14	0.082		mg/Kg	1	11/7/2019 1:00:50 PM	SL64312
Surr: 1,2-Dichloroethane-d4	96.2	70-130		%Rec	1	11/7/2019 1:00:50 PM	SL64312
Surr: 4-Bromofluorobenzene	90.3	70-130		%Rec	1	11/7/2019 1:00:50 PM	SL64312
Surr: Dibromofluoromethane	105	70-130		%Rec	1	11/7/2019 1:00:50 PM	SL64312
Surr: Toluene-d8	94.1	70-130		%Rec	1	11/7/2019 1:00:50 PM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW11 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:05:00 PM

Lab ID: 1911240-012

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: JMR
Benzene	0.024	0.017		mg/Kg	1	11/7/2019 1:29:30 PM	SL64312
Toluene	ND	0.034		mg/Kg	1	11/7/2019 1:29:30 PM	SL64312
Ethylbenzene	ND	0.034		mg/Kg	1	11/7/2019 1:29:30 PM	SL64312
Xylenes, Total	ND	0.068		mg/Kg	1	11/7/2019 1:29:30 PM	SL64312
Surr: 1,2-Dichloroethane-d4	92.6	70-130		%Rec	1	11/7/2019 1:29:30 PM	SL64312
Surr: 4-Bromofluorobenzene	81.9	70-130		%Rec	1	11/7/2019 1:29:30 PM	SL64312
Surr: Dibromofluoromethane	105	70-130		%Rec	1	11/7/2019 1:29:30 PM	SL64312
Surr: Toluene-d8	92.6	70-130		%Rec	1	11/7/2019 1:29:30 PM	SL64312

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW12 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:08:00 PM

Lab ID: 1911240-013

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.032		mg/Kg	1	11/7/2019 11:57:30 AM	B64315
Toluene	ND	0.064		mg/Kg	1	11/7/2019 11:57:30 AM	B64315
Ethylbenzene	ND	0.064		mg/Kg	1	11/7/2019 11:57:30 AM	B64315
Xylenes, Total	ND	0.13		mg/Kg	1	11/7/2019 11:57:30 AM	B64315
Surr: 4-Bromofluorobenzene	95.3	80-120		%Rec	1	11/7/2019 11:57:30 AM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW12 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:08:00 PM

Lab ID: 1911240-014

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.022		mg/Kg	1	11/7/2019 12:20:29 PM	B64315
Toluene	ND	0.044		mg/Kg	1	11/7/2019 12:20:29 PM	B64315
Ethylbenzene	ND	0.044		mg/Kg	1	11/7/2019 12:20:29 PM	B64315
Xylenes, Total	ND	0.087		mg/Kg	1	11/7/2019 12:20:29 PM	B64315
Surr: 4-Bromofluorobenzene	92.9	80-120		%Rec	1	11/7/2019 12:20:29 PM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW13 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:10:00 PM

Lab ID: 1911240-015

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.075		mg/Kg	5	11/7/2019 12:43:27 PM	B64315
Toluene	ND	0.15		mg/Kg	5	11/7/2019 12:43:27 PM	B64315
Ethylbenzene	ND	0.15		mg/Kg	5	11/7/2019 12:43:27 PM	B64315
Xylenes, Total	ND	0.30		mg/Kg	5	11/7/2019 12:43:27 PM	B64315
Surr: 4-Bromofluorobenzene	94.8	80-120		%Rec	5	11/7/2019 12:43:27 PM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW13 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:10:00 PM

Lab ID: 1911240-016

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.020		mg/Kg	1	11/7/2019 1:29:19 PM	B64315
Toluene	ND	0.039		mg/Kg	1	11/7/2019 1:29:19 PM	B64315
Ethylbenzene	ND	0.039		mg/Kg	1	11/7/2019 1:29:19 PM	B64315
Xylenes, Total	ND	0.079		mg/Kg	1	11/7/2019 1:29:19 PM	B64315
Surr: 4-Bromofluorobenzene	94.4	80-120		%Rec	1	11/7/2019 1:29:19 PM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW14 0-2'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:12:00 PM

Lab ID: 1911240-017

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	11/7/2019 1:52:09 PM	B64315
Toluene	ND	0.046		mg/Kg	1	11/7/2019 1:52:09 PM	B64315
Ethylbenzene	ND	0.046		mg/Kg	1	11/7/2019 1:52:09 PM	B64315
Xylenes, Total	ND	0.092		mg/Kg	1	11/7/2019 1:52:09 PM	B64315
Surr: 4-Bromofluorobenzene	91.2	80-120		%Rec	1	11/7/2019 1:52:09 PM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911240**

Date Reported: **11/8/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW14 3'

Project: Kaufman No 1

Collection Date: 11/6/2019 4:12:00 PM

Lab ID: 1911240-018

Matrix: MEOH (SOIL)

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.019		mg/Kg	1	11/7/2019 2:14:56 PM	B64315
Toluene	ND	0.037		mg/Kg	1	11/7/2019 2:14:56 PM	B64315
Ethylbenzene	ND	0.037		mg/Kg	1	11/7/2019 2:14:56 PM	B64315
Xylenes, Total	ND	0.075		mg/Kg	1	11/7/2019 2:14:56 PM	B64315
Surr: 4-Bromofluorobenzene	96.2	80-120		%Rec	1	11/7/2019 2:14:56 PM	B64315

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911240

08-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: RB	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: B64315	RunNo: 64315								
Prep Date:	Analysis Date: 11/7/2019	SeqNo: 2201299	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.94		1.000		94.3	80	120			

Sample ID: 100NG BTEX LCS	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: B64315	RunNo: 64315								
Prep Date:	Analysis Date: 11/7/2019	SeqNo: 2201300	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	1.000	0	95.0	80	120			
Toluene	0.90	0.050	1.000	0	89.6	80	120			
Ethylbenzene	0.89	0.050	1.000	0	89.4	80	120			
Xylenes, Total	2.7	0.10	3.000	0	89.5	80	120			
Surr: 4-Bromofluorobenzene	0.98		1.000		98.4	80	120			

Sample ID: MB-48621	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 48621	RunNo: 64315								
Prep Date: 11/6/2019	Analysis Date: 11/7/2019	SeqNo: 2201304	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.95		1.000		95.4	80	120			

Sample ID: LCS-48621	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 48621	RunNo: 64315								
Prep Date: 11/6/2019	Analysis Date: 11/7/2019	SeqNo: 2201305	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.98		1.000		98.4	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911240

08-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: rb	SampType: MBLK	TestCode: EPA Method 8260B: Volatiles Short List								
Client ID: PBS	Batch ID: SS64307	RunNo: 64307								
Prep Date:	Analysis Date: 11/7/2019	SeqNo: 2201392	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.6	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.5	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		112	70	130			
Surr: Toluene-d8	0.50		0.5000		99.7	70	130			

Sample ID: 100ng lcs	SampType: LCS	TestCode: EPA Method 8260B: Volatiles Short List								
Client ID: LCSS	Batch ID: SS64307	RunNo: 64307								
Prep Date:	Analysis Date: 11/7/2019	SeqNo: 2201393	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.025	1.000	0	86.8	68	135			
Toluene	0.89	0.050	1.000	0	88.8	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.6	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		88.9	70	130			
Surr: Dibromofluoromethane	0.45		0.5000		89.3	70	130			
Surr: Toluene-d8	0.49		0.5000		98.7	70	130			

Sample ID: mb-48621	SampType: MBLK	TestCode: EPA Method 8260B: Volatiles Short List								
Client ID: PBS	Batch ID: 48621	RunNo: 64307								
Prep Date: 11/6/2019	Analysis Date: 11/7/2019	SeqNo: 2201458	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.42		0.5000		84.4	70	130			
Surr: Dibromofluoromethane	0.57		0.5000		113	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: lcs-48621	SampType: LCS	TestCode: EPA Method 8260B: Volatiles Short List								
Client ID: LCSS	Batch ID: 48621	RunNo: 64307								
Prep Date: 11/6/2019	Analysis Date: 11/7/2019	SeqNo: 2201459	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.5	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		87.6	70	130			
Surr: Dibromofluoromethane	0.47		0.5000		94.9	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911240

08-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911240-007a ms		SampType: MS		TestCode: EPA Method 8260B: Volatiles Short List						
Client ID: ESW9 0-2'		Batch ID: SL64312		RunNo: 64312						
Prep Date:		Analysis Date: 11/7/2019		SeqNo: 2201833		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.74	0.019	0.7407	0	100	57.1	141			
Toluene	0.69	0.037	0.7407	0	92.9	70	130			
Surr: 1,2-Dichloroethane-d4	0.35		0.3704		94.1	70	130			
Surr: 4-Bromofluorobenzene	0.33		0.3704		88.3	70	130			
Surr: Dibromofluoromethane	0.38		0.3704		103	70	130			
Surr: Toluene-d8	0.35		0.3704		93.4	70	130			

Sample ID: 1911240-007a msd		SampType: MSD		TestCode: EPA Method 8260B: Volatiles Short List						
Client ID: ESW9 0-2'		Batch ID: SL64312		RunNo: 64312						
Prep Date:		Analysis Date: 11/7/2019		SeqNo: 2201834		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.69	0.019	0.7407	0	93.4	57.1	141	6.93	20	
Toluene	0.64	0.037	0.7407	0	85.8	70	130	7.94	20	
Surr: 1,2-Dichloroethane-d4	0.34		0.3704		92.1	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.34		0.3704		90.7	70	130	0	0	
Surr: Dibromofluoromethane	0.38		0.3704		103	70	130	0	0	
Surr: Toluene-d8	0.34		0.3704		91.3	70	130	0	0	

Sample ID: rb	SampType: MBLK			TestCode: EPA Method 8260B: Volatiles Short List						
Client ID: PBS	Batch ID: SL64312			RunNo: 64312						
Prep Date:	Analysis Date: 11/7/2019			SeqNo: 2202285		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		89.3	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.1	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.2	70	130			
Surr: Toluene-d8	0.48		0.5000		95.8	70	130			

Sample ID: 100ng lcs		SampType: LCS		TestCode: EPA Method 8260B: Volatiles Short List						
Client ID: LCSS		Batch ID: SL64312		RunNo: 64312						
Prep Date:		Analysis Date: 11/7/2019		SeqNo: 2202287		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	99.7	68	135			
Toluene	0.94	0.050	1.000	0	93.8	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911240

08-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 100ng lcs	SampType: LCS	TestCode: EPA Method 8260B: Volatiles Short List								
Client ID: LCSS	Batch ID: SL64312	RunNo: 64312								
Prep Date:	Analysis Date: 11/7/2019	SeqNo: 2202287	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.9	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.2	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.47		0.5000		94.8	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1911240**

RcptNo: 1

Received By: **Daniel Marquez** 11/7/2019 8:00:00 AM

Completed By: **Leah Baca** 11/7/2019 8:27:24 AM

Reviewed By: *LB* 11/7/19

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 $>0^{\circ}\text{C}$ 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:

(<2 or >12 unless noted)

Adjusted?

Checked by: *ENM 11/7/19*

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	5.4	Good	Yes			

2701

Turn-Around Time: Same Day
☐ Standard ☒ Rush 24w TAT

Kaufman No. 1

HEC-180061

Project Manager: Jim Foster

Jim Foster

Sampler: Michael Morse / Jim F.

On Ice: ☒ Yes ☐ No

On Ice: ☒ Yes ☐ No

of Coolers: /

Cooler Temp (including CF):	Container Type and #	Preservative Type	HEAL No. 8	1911201
55-0.1=54°C	40z 1	N/A	-001	1911201
	40z 1	N/A	-002	1911201
	40z 1	N/A	-003	1911201
	40z 1	N/A	-004	1911201
	40z 1	N/A	-005	1911201
	40z 1	N/A	-006	1911201
	40z 1	N/A	-007	1911201
	40z 1	N/A	-008	1911201
	40z 1	N/A	-009	1911201
	40z 1	N/A	-010	1911201
	40z 1	N/A	-011	1911201
	40z 1	N/A	-012	1911201

Received by:	Via:	Date	Time
--------------	------	------	------

Christie 11/6/1972

Received by: _____ Via: _____ Date: _____ Time: _____

Received by: Courier Date: 11/7/19 Time: 80

Remarks:	Rush
	24 hr TAT



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

November 12, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX:

RE: Kaufman No 1

OrderNo.: 1911389

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 2 sample(s) on 11/9/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911389**

Date Reported: **11/12/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW6A 0.2'

Project: Kaufman No 1

Collection Date: 11/8/2019 8:58:00 AM

Lab ID: 1911389-001

Matrix: MEOH (SOIL)

Received Date: 11/9/2019 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.020		mg/Kg	1	11/11/2019 9:33:51 AM	B64387
Toluene	ND	0.041		mg/Kg	1	11/11/2019 9:33:51 AM	B64387
Ethylbenzene	ND	0.041		mg/Kg	1	11/11/2019 9:33:51 AM	B64387
Xylenes, Total	ND	0.081		mg/Kg	1	11/11/2019 9:33:51 AM	B64387
Surr: 4-Bromofluorobenzene	94.7	80-120		%Rec	1	11/11/2019 9:33:51 AM	B64387

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911389**

Date Reported: **11/12/2019**

CLIENT: Timberwolf Environmental

Client Sample ID: ESW6B 0.2'

Project: Kaufman No 1

Collection Date: 11/8/2019 8:58:00 AM

Lab ID: 1911389-002

Matrix: MEOH (SOIL)

Received Date: 11/9/2019 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.022		mg/Kg	1	11/11/2019 9:56:56 AM	B64387
Toluene	ND	0.045		mg/Kg	1	11/11/2019 9:56:56 AM	B64387
Ethylbenzene	ND	0.045		mg/Kg	1	11/11/2019 9:56:56 AM	B64387
Xylenes, Total	ND	0.090		mg/Kg	1	11/11/2019 9:56:56 AM	B64387
Surr: 4-Bromofluorobenzene	90.1	80-120		%Rec	1	11/11/2019 9:56:56 AM	B64387

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911389

12-Nov-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: RB	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: B64387	RunNo: 64387								
Prep Date:	Analysis Date: 11/11/2019	SeqNo: 2204132			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		99.9	80	120			

Sample ID: 100NG BTEX LCS	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: B64387	RunNo: 64387								
Prep Date:	Analysis Date: 11/11/2019	SeqNo: 2204133			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.88	0.025	1.000	0	88.0	80	120			
Toluene	0.90	0.050	1.000	0	90.0	80	120			
Ethylbenzene	0.89	0.050	1.000	0	89.0	80	120			
Xylenes, Total	2.7	0.10	3.000	0	88.8	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Sample ID: 1911389-001AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: ESW6A 0.2'	Batch ID: B64387	RunNo: 64387								
Prep Date:	Analysis Date: 11/11/2019	SeqNo: 2204134			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.69	0.020	0.8110	0.008767	84.1	76	123			
Toluene	0.72	0.041	0.8110	0.006391	88.4	80.3	127			
Ethylbenzene	0.72	0.041	0.8110	0.008791	88.1	80.2	131			
Xylenes, Total	2.1	0.081	2.433	0.01313	87.0	78	133			
Surr: 4-Bromofluorobenzene	0.75		0.8110		92.5	80	120			

Sample ID: 1911389-001AMSD	SampType: MSD	TestCode: EPA Method 8021B: Volatiles								
Client ID: ESW6A 0.2'	Batch ID: B64387	RunNo: 64387								
Prep Date:	Analysis Date: 11/11/2019	SeqNo: 2204135			Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.76	0.020	0.8110	0.008767	92.1	76	123	8.95	20	
Toluene	0.72	0.041	0.8110	0.006391	88.5	80.3	127	0.0717	20	
Ethylbenzene	0.71	0.041	0.8110	0.008791	86.5	80.2	131	1.85	20	
Xylenes, Total	2.2	0.081	2.433	0.01313	88.4	78	133	1.59	20	
Surr: 4-Bromofluorobenzene	0.78		0.8110		95.7	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1911389**

RcptNo: 1

Received By: **Isaiah Ortiz**

11/9/2019 9:20:00 AM

IOX

Completed By: **Yazmine Garduno**

11/10/2019 8:17:17 AM

Yazmine Garduno

Reviewed By: **DAD 11/11/19**

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? Yes ☒ No ☐
(Note discrepancies on chain of custody)
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? Yes ☒ No ☐
(If no, notify customer for authorization.)

of preserved bottles checked for pH: _____
(<2 of >12 unless noted)
Adjusted? _____
Checked by: *DM 11/11/19*

Special Handling (if applicable)

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

Person Notified:		Date:	
By Whom:		Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> 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	2.4	Good				



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

December 10, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX:

RE: Kaufman No 1

OrderNo.: 1911245

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 10 sample(s) on 11/7/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **12/10/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP1 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 2:08:00 PM**Lab ID:** 1911245-001**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	300	9.4		mg/Kg	1	11/12/2019 1:56:12 PM	48715
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/12/2019 1:56:12 PM	48715
Surr: DNOP	85.1	70-130		%Rec	1	11/12/2019 1:56:12 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	630	24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Surr: BFB	400	77.4-118	S	%Rec	5	11/12/2019 10:01:38 AM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Toluene	ND	0.24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Ethylbenzene	ND	0.24		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Xylenes, Total	ND	0.48		mg/Kg	5	11/12/2019 10:01:38 AM	48709
Surr: 4-Bromofluorobenzene	139	80-120	S	%Rec	5	11/12/2019 10:01:38 AM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 12/10/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP2 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 2:37:00 PM

Lab ID: 1911245-002

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	8.9		mg/Kg	1	11/12/2019 2:31:47 PM	48715
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	11/12/2019 2:31:47 PM	48715
Surr: DNOP	74.2	70-130		%Rec	1	11/12/2019 2:31:47 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Surr: BFB	95.4	77.4-118		%Rec	1	11/12/2019 1:08:50 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Toluene	ND	0.047		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Ethylbenzene	ND	0.047		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Xylenes, Total	ND	0.095		mg/Kg	1	11/12/2019 1:08:50 PM	48709
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	11/12/2019 1:08:50 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **12/10/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP3 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 2:51:00 PM**Lab ID:** 1911245-003**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	11/12/2019 2:40:48 PM	48715
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/12/2019 2:40:48 PM	48715
Surr: DNOP	76.8	70-130		%Rec	1	11/12/2019 2:40:48 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Surr: BFB	90.5	77.4-118		%Rec	1	11/12/2019 1:32:10 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Xylenes, Total	ND	0.099		mg/Kg	1	11/12/2019 1:32:10 PM	48709
Surr: 4-Bromofluorobenzene	98.4	80-120		%Rec	1	11/12/2019 1:32:10 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **12/10/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP4 4'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:01:00 PM**Lab ID:** 1911245-004**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	95	8.2		mg/Kg	1	11/12/2019 2:49:54 PM	48715
Motor Oil Range Organics (MRO)	ND	41		mg/Kg	1	11/12/2019 2:49:54 PM	48715
Surr: DNOP	78.2	70-130		%Rec	1	11/12/2019 2:49:54 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	310	23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Surr: BFB	417	77.4-118	S	%Rec	5	11/12/2019 1:55:31 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Toluene	ND	0.23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Ethylbenzene	2.3	0.23		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Xylenes, Total	22	0.47		mg/Kg	5	11/12/2019 1:55:31 PM	48709
Surr: 4-Bromofluorobenzene	121	80-120	S	%Rec	5	11/12/2019 1:55:31 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 12/10/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP5 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:04:00 PM

Lab ID: 1911245-005

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	17	9.1		mg/Kg	1	11/12/2019 2:59:00 PM	48715
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	11/12/2019 2:59:00 PM	48715
Surr: DNOP	83.3	70-130		%Rec	1	11/12/2019 2:59:00 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	23	4.7		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Surr: BFB	103	77.4-118		%Rec	1	11/12/2019 2:42:13 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Toluene	ND	0.047		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Ethylbenzene	ND	0.047		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Xylenes, Total	0.16	0.095		mg/Kg	1	11/12/2019 2:42:13 PM	48709
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	11/12/2019 2:42:13 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **12/10/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP6 4.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:14:00 PM**Lab ID:** 1911245-006**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	11/12/2019 3:08:09 PM	48715
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/12/2019 3:08:09 PM	48715
Surr: DNOP	79.3	70-130		%Rec	1	11/12/2019 3:08:09 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Surr: BFB	92.5	77.4-118		%Rec	1	11/12/2019 4:15:13 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Xylenes, Total	ND	0.098		mg/Kg	1	11/12/2019 4:15:13 PM	48709
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	11/12/2019 4:15:13 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 12/10/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP7 4'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:26:00 PM

Lab ID: 1911245-007

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	100	8.5		mg/Kg	1	11/12/2019 3:17:16 PM	48715
Motor Oil Range Organics (MRO)	ND	42		mg/Kg	1	11/12/2019 3:17:16 PM	48715
Surr: DNOP	91.5	70-130		%Rec	1	11/12/2019 3:17:16 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	830	25		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Surr: BFB	823	77.4-118	S	%Rec	5	11/12/2019 11:11:47 AM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.12		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Toluene	0.36	0.25		mg/Kg	5	11/13/2019 9:40:15 AM	48709
Ethylbenzene	0.99	0.25		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Xylenes, Total	8.1	0.49		mg/Kg	5	11/12/2019 11:11:47 AM	48709
Surr: 4-Bromofluorobenzene	147	80-120	S	%Rec	5	11/12/2019 11:11:47 AM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1911245**Date Reported: **12/10/2019****CLIENT:** Timberwolf Environmental**Client Sample ID:** TP8 3.5'**Project:** Kaufman No 1**Collection Date:** 11/6/2019 3:32:00 PM**Lab ID:** 1911245-008**Matrix:** SOIL**Received Date:** 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	11/12/2019 3:26:25 PM	48715
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/12/2019 3:26:25 PM	48715
Surr: DNOP	76.4	70-130		%Rec	1	11/12/2019 3:26:25 PM	48715
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Surr: BFB	90.5	77.4-118		%Rec	1	11/12/2019 4:38:25 PM	48709
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Toluene	ND	0.049		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Ethylbenzene	ND	0.049		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Xylenes, Total	ND	0.098		mg/Kg	1	11/12/2019 4:38:25 PM	48709
Surr: 4-Bromofluorobenzene	99.2	80-120		%Rec	1	11/12/2019 4:38:25 PM	48709

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 12/10/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP9 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:35:00 PM

Lab ID: 1911245-009

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	18	9.0		mg/Kg	1	11/13/2019 9:23:42 AM	48728
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	11/13/2019 9:23:42 AM	48728
Surr: DNOP	81.2	70-130		%Rec	1	11/13/2019 9:23:42 AM	48728
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Surr: BFB	107	77.4-118		%Rec	1	11/13/2019 11:15:08 AM	48720
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Toluene	ND	0.048		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Ethylbenzene	ND	0.048		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Xylenes, Total	ND	0.097		mg/Kg	1	11/13/2019 11:15:08 AM	48720
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	1	11/13/2019 11:15:08 AM	48720

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1911245

Date Reported: 12/10/2019

CLIENT: Timberwolf Environmental

Client Sample ID: TP10 4.5'

Project: Kaufman No 1

Collection Date: 11/6/2019 3:38:00 PM

Lab ID: 1911245-010

Matrix: SOIL

Received Date: 11/7/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	65	10		mg/Kg	1	11/13/2019 9:50:45 AM	48728
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/13/2019 9:50:45 AM	48728
Surr: DNOP	78.3	70-130		%Rec	1	11/13/2019 9:50:45 AM	48728
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Surr: BFB	146	77.4-118	S	%Rec	1	11/13/2019 12:25:29 PM	48720
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Toluene	ND	0.049		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Ethylbenzene	ND	0.049		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Xylenes, Total	ND	0.098		mg/Kg	1	11/13/2019 12:25:29 PM	48720
Surr: 4-Bromofluorobenzene	98.7	80-120		%Rec	1	11/13/2019 12:25:29 PM	48720

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

ANALYTICAL REPORT

November 22, 2019

1911245

Hall Environmental Analysis Laboratory

Sample Delivery Group: L1162857

Samples Received: 11/20/2019

Project Number:

Description:

Report To:

4901 Hawkins NE

Albuquerque, NM 87109

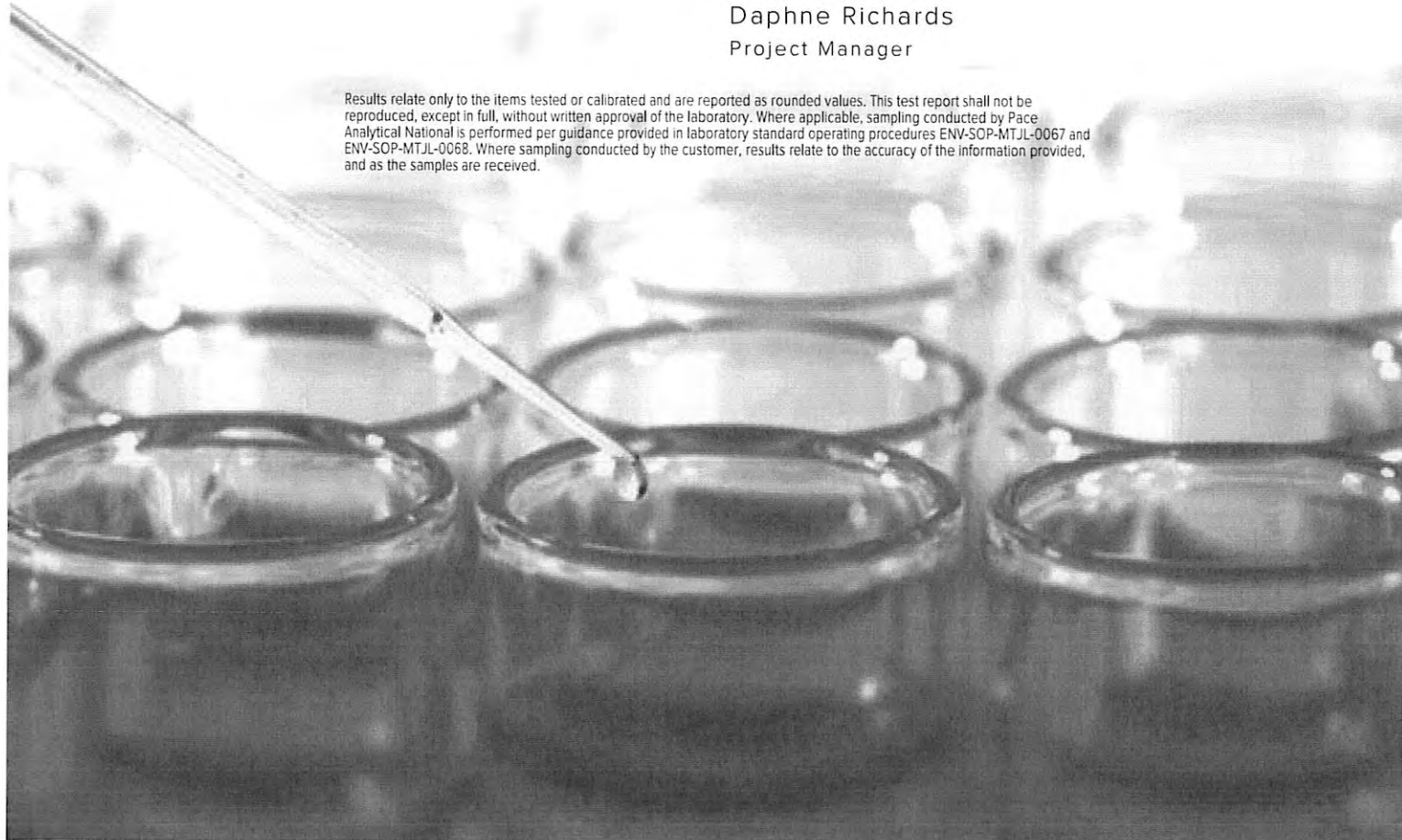
Entire Report Reviewed By:



Daphne Richards

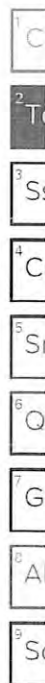
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



1911245-001B TP1 4.5' L1162857-01 Solid				Collected by	Collected date/time	Received date/time
					11/06/19 14:08	11/20/19 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
TPH by TCEQ Method 1005	WG1384032	1	11/20/19 19:57	11/21/19 05:46	CLG	Mt. Juliet, TN

1911245-004B TP4 4' L1162857-02 Solid				Collected by	Collected date/time	Received date/time
					11/06/19 15:01	11/20/19 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
TPH by TCEQ Method 1005	WG1384032	1	11/20/19 19:57	11/21/19 05:59	CLG	Mt. Juliet, TN

1911245-007B TP7 4' L1162857-03 Solid				Collected by	Collected date/time	Received date/time
					11/06/19 15:26	11/20/19 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
TPH by TCEQ Method 1005	WG1384032	1	11/20/19 19:57	11/21/19 06:12	CLG	Mt. Juliet, TN

ACCOUNT:

Hall Environmental Analysis Laboratory

PROJECT:

SDG:

L1162857

DATE/TIME:

11/22/19 09:12

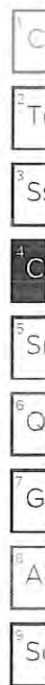
PAGE:

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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.

Daphne Richards
Project Manager



1911245-001B TP1 4.5'

Collected date/time: 11/06/19 14:08

SAMPLE RESULTS - 01

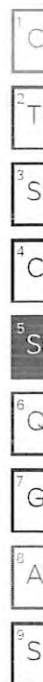
L1162857

ONE LAB. NATIONWIDE.



TPH by TCEQ Method 1005

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH C6 - C12	109		50.0	1	11/21/2019 05:46	<u>WG1384032</u>
TPH C12 - C28	59.7		50.0	1	11/21/2019 05:46	<u>WG1384032</u>
TPH C28 - C35	ND		50.0	1	11/21/2019 05:46	<u>WG1384032</u>
TPH C6 - C35	169		50.0	1	11/21/2019 05:46	<u>WG1384032</u>
(S) o-Terphenyl	111		70.0-130		11/21/2019 05:46	<u>WG1384032</u>



ACCOUNT:

Hall Environmental Analysis Laboratory

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SDG:

L1162857

DATE/TIME:

11/22/19 09:12

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TPH by TCEQ Method 1005

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH C6 - C12	148		50.0	1	11/21/2019 05:59	<u>WG1384032</u>
TPH C12 - C28	100		50.0	1	11/21/2019 05:59	<u>WG1384032</u>
TPH C28 - C35	ND		50.0	1	11/21/2019 05:59	<u>WG1384032</u>
TPH C6 - C35	248		50.0	1	11/21/2019 05:59	<u>WG1384032</u>
(S) o-Terphenyl	112		70.0-130		11/21/2019 05:59	<u>WG1384032</u>

1 C

2 To

3 St

4 C

5 St

6 Q

7 G

8 Al

9 Sc



TPH by TCEQ Method 1005

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH C6 - C12	74.6		50.0	1	11/21/2019 06:12	WG1384032
TPH C12 - C28	ND		50.0	1	11/21/2019 06:12	WG1384032
TPH C28 - C35	ND		50.0	1	11/21/2019 06:12	WG1384032
TPH C6 - C35	74.6		50.0	1	11/21/2019 06:12	WG1384032
(S) o-Terphenyl	109		70.0-130		11/21/2019 06:12	WG1384032



WG1384032

TPH by TCEQ Method 1005

QUALITY CONTROL SUMMARY

L1162857-01.02.03

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3474676-1 11/21/19 01:36					
Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg	
TPH C6 - C12	U		15.0	50.0	
TPH C12 - C28	U		15.0	50.0	
TPH C28 - C35	U		15.0	50.0	
TPH C6 - C35	U		15.0	50.0	
(S) o-Terphenyl	104			70.0-130	

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

(LCS) R3474676-4 11/21/19 11:12 • (LCSD) R3474676-5 11/21/19 11:26									
Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD
TPH C6 - C12	250	299	292	120	117	75.0-125			2.37
TPH C12 - C28	250	295	293	118	117	75.0-125			0.680
TPH C6 - C35	500	594	585	119	117	75.0-125			1.53
(S) o-Terphenyl				108	103	70.0-130			

L1161753-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1161753-08 11/21/19 02:16 • (MS) R3474676-2 11/21/19 02:29 • (MSD) R3474676-3 11/21/19 02:42																		
Analyte	Spike Amount		Original Result		MS Result		MSD Result		MS Rec.		MSD Rec.		Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%						
TPH C6 - C12	248		U		312		313		126		126		1	75.0-125	J5	J5	0.320	20
TPH C12 - C28	248		U		312		310		126		125		1	75.0-125	J5	J5	0.643	20
TPH C6 - C35	496		U		624		623		126		126		1	75.0-125	J5	J5	0.160	20
(S) o-Terphenyl										111		110		70.0-130				

ACCOUNT

PROJECT

SDG

DATE/TIME

PAGE



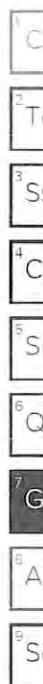
Guide to Reading and Understanding Your Laboratory Report

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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
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
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.





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-05-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,5}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
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.





CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

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

SUB CONTRACTOR: ESC PACE		COMPANY: ESC PACE		PHONE: (800) 767-5859	FAX: (615) 758-5859		
ADDRESS: 12065 Lebanon Rd		ACCOUNT #:					
CITY, STATE, ZIP: Mt. Juliet, TN 37122		EMAIL:					
ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1911245-001B	TP1 4.5'	40ZGU	Soil	11/6/2019 2:08:00 PM	1 TX1005	L-1162857-01
2	1911245-004B	TP4 4'	40ZGU	Soil	11/6/2019 3:01:00 PM	1 TX1005	02
3	1911245-007B	TP7 4'	40ZGU	Soil	11/6/2019 3:26:00 PM	1 TX1005	03

Analyze out of field
LB 11/12/19

CCSZ

RAD SCREEN: <0.5 mR/hr


SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

4516 1667 1975/2009

Relinquished By: <i>LR</i>	Date: 11/19/2019	Time: 12:29 PM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: <i>mm</i>	Date: 11/20/19	Time: 8:45
TAT: <input type="checkbox"/> Standard <input type="checkbox"/> RUSH	Next BD <input type="checkbox"/>	2nd BD <input type="checkbox"/>	3rd BD <input type="checkbox"/>		
REPORT TRANSMITTAL DESIRED: <input type="checkbox"/> HARD COPY (extra cost) <input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE			FOR LAB USE ONLY Temp of samples: 24-20.2.7°C Attempt to Cool? <input type="checkbox"/>		
Comments:			6W		

Pace Analytical National Center for Testing & Innovation Cooler Receipt Form

Client:	HALLENVANN	61162857
Cooler Received/Opened On:	1/20/19	Temperature: 05
Received By:	MICHAEL PAPPAS	
Signature:		
Receipt Check List		
	NP	Yes No
COC Seal Present / Intact?		/
COC Signed / Accurate?		/
Bottles arrive intact?		/
Correct bottles used?		/
Sufficient volume sent?		/
If Applicable		
VOA Zero headspace?		
Preservation Correct / Checked?		

ANALYTICAL REPORT

December 09, 2019

111245

Hall Environmental Analysis Laboratory

Sample Delivery Group: L1165223

Samples Received: 11/20/2019

Project Number:

Description:

Report To:

4901 Hawkins NE

Albuquerque, NM 87109

Entire Report Reviewed By:

Daphne R Richards

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

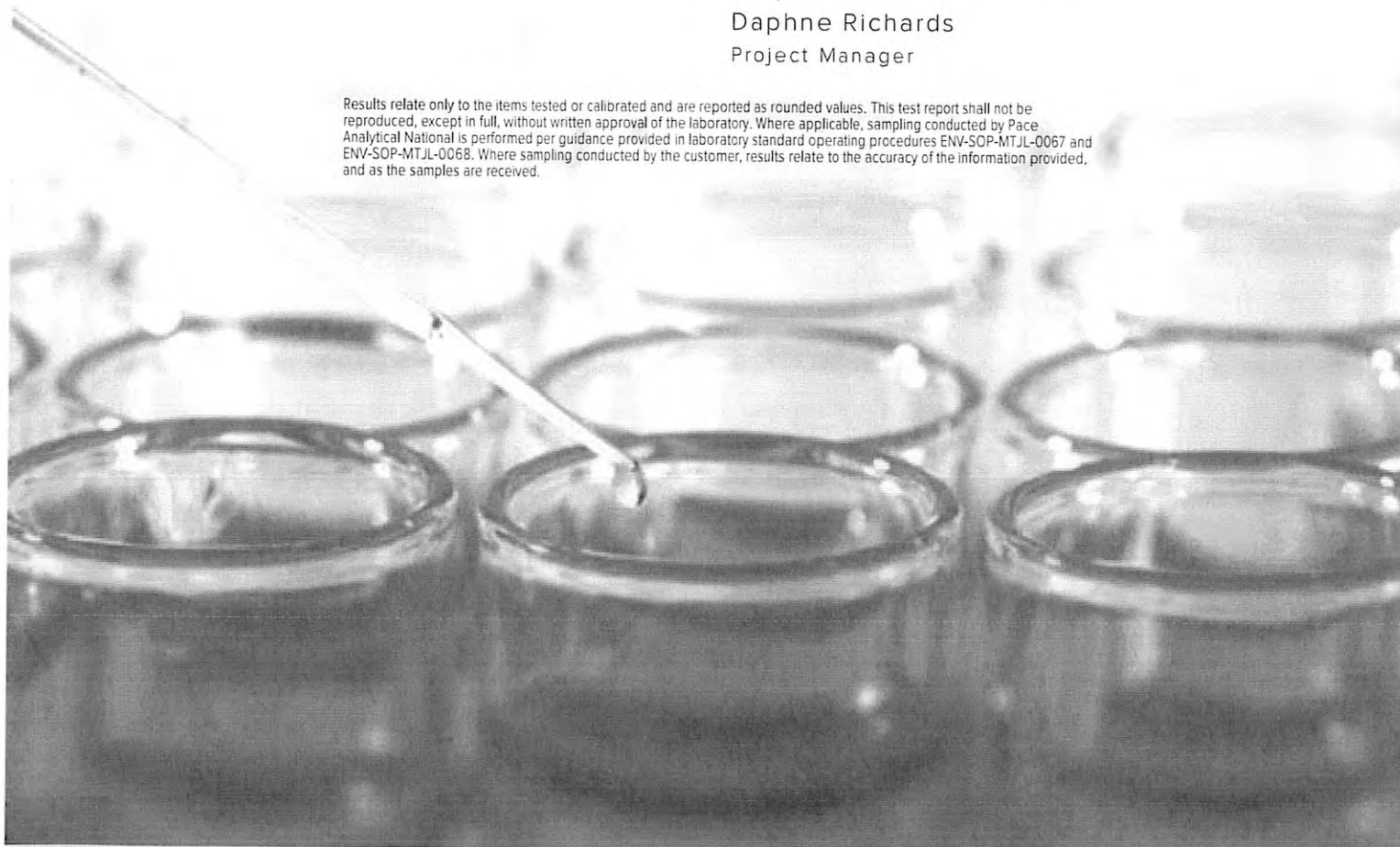


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ONE LAB. NATIONWIDE.



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1
C

2
Tc

3
Ss

4
C

5
Sr

6
Q

7
G

8
Al

9
Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



1911245-004B TP4 4' L1165223-01 Solid				Collected by	Collected date/time	Received date/time
					11/06/19 15:01	11/20/19 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
TPH by TCEQ Method 1006	WG1390625	1	12/04/19 05:06	12/04/19 10:41	SHG	Mt. Juliet, TN
TPH by TCEQ Method 1006	WG1390625	1	12/04/19 05:06	12/04/19 10:57	SHG	Mt. Juliet, TN





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.

Daphne Richards
Project Manager

1 C

2 T

3 S

4 C

5 S

6 Q

7 G

8 A

9 S

1911245-004B TP4 4'

Collected date/time: 11/06/19 15:01

SAMPLE RESULTS - 01

L1165223

ONE LAB. NATIONWIDE.



TPH by TCEQ Method 1006

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C6 Aliphatics	ND		20.0	1	12/04/2019 10:41	WG1390625
C6-C8 Aliphatics	ND		20.0	1	12/04/2019 10:41	WG1390625
C8-C10 Aliphatics	39.7		20.0	1	12/04/2019 10:41	WG1390625
C10-C12 Aliphatics	34.9		20.0	1	12/04/2019 10:41	WG1390625
C12-C16 Aliphatics	35.5		20.0	1	12/04/2019 10:41	WG1390625
C16-C21 Aliphatics	ND		20.0	1	12/04/2019 10:41	WG1390625
C21-C35 Aliphatics	ND		20.0	1	12/04/2019 10:41	WG1390625
C7-C8 Aromatics(Toluene only)	ND		20.0	1	12/04/2019 10:57	WG1390625
C8-C10 Aromatics	ND		20.0	1	12/04/2019 10:57	WG1390625
C10-C12 Aromatics	ND		20.0	1	12/04/2019 10:57	WG1390625
C12-C16 Aromatics	ND		20.0	1	12/04/2019 10:57	WG1390625
C16-C21 Aromatics	ND		20.0	1	12/04/2019 10:57	WG1390625
C21-C35 Aromatics	ND		20.0	1	12/04/2019 10:57	WG1390625

1 C
2 To
3 Se
4 C
5 S
6 Q
7 G
8 Al
9 Sc

ACCOUNT:

Hall Environmental Analysis Laboratory

PROJECT:

SDG:

L1165223

DATE/TIME:

12/09/19 12:01

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WG1390625

TPH by TCEQ Method 1006

QUALITY CONTROL SUMMARY

L1165223-01

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3479257-1 12/04/19 09:12

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C6 Aliphatics	U		10.0	20.0
C12-C16 Aliphatics	U		10.0	20.0
C16-C21 Aliphatics	U		10.0	20.0
TPH C6 - C35	U		10.0	20.0
C6-C8 Aliphatics	U		10.0	20.0
C8-C10 Aliphatics	U		10.0	20.0
C10-C12 Aliphatics	U		10.0	20.0
C21-C35 Aliphatics	U		10.0	20.0

Method Blank (MB)

(MB) R3479257-4 12/04/19 09:56

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C12-C16 Aromatics	U		10.0	20.0
C16-C21 Aromatics	U		10.0	20.0
C21-C35 Aromatics	U		10.0	20.0
C7-C8 Aromatics(Toluene only)	U		10.0	20.0
C8-C10 Aromatics	U		10.0	20.0
C10-C12 Aromatics	U		10.0	20.0

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

(LCS) R3479257-5 12/04/19 10:11 • (LCSD) R3479257-6 12/04/19 10:26

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 C6 - C35	594	506	460	85.2	78.6	60.0-140			9.52	20

ACCOUNT

PROJECT

SNC

DATE/TIME

PAGE



Guide to Reading and Understanding Your Laboratory Report

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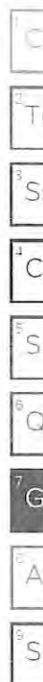
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
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

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



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

Alabama	40660	Nebraska	NE-05-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 5}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
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

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		

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.



PAGE:
8 of 10



CHAIN OF CUSTODY RECORD

PAGE: 1 OF 1

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

SUB CONTRACTOR: ESC PACE		COMPANY: ESC PACE		PHONE: (800) 767-5859	FAX: (615) 758-5859		
ADDRESS: 12065 Lebanon Rd		ACCOUNT #					
CITY, STATE, ZIP: Mt. Juliet, TN 37122		EMAIL:					
ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1911245-001B TP1 4.5'		4OZGU	Soil	11/6/2019 2:08:00 PM	1 TX1005	C215 L1165223
2	1911245-004B TP4 4'		4OZGU	Soil	11/6/2019 3:01:00 PM	1 TX1005	L11628857-01
3	1911245-007B TP7 4'		4OZGU	Soil	11/6/2019 3:28:00 PM	1 TX1005	-01-07

Analyze out of field
LB 11/13/19

CCCSZ

RAD SCREEN: <0.5 mR/hr

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

4516 1667 1975/2009

Relinquished By: LR	Date: 11/19/2019	Time: 12:29 PM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: WMM	Date: 11/20/19	Time: 8:45
TAT: Standard <input type="checkbox"/> RUSH <input type="checkbox"/>			Next BD <input type="checkbox"/> 2nd BD <input type="checkbox"/> 3rd BD <input type="checkbox"/>		
REPORT TRANSMITTAL DESIRED: <input type="checkbox"/> HARD COPY (extra cost) <input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE					
FOR LAB USE ONLY Temp of samples 24-20.27°C Attempt to Cool? <input checked="" type="checkbox"/>					
Comments:					

Andy Vann

From: Daphne Richards
Sent: Wednesday, November 27, 2019 9:40 AM
To: Project Service
Subject: Relog L1162857-02 HALLENVANM

Please relog L1162857-02 for TPHTX1006

Originally ran in TPHTX WG1384032

Thanks

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-001AMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP1 4.5'	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205831 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	360	9.2 45.91 305.0 123 57 142
Surr: DNOP	3.8	4.591 82.8 70 130

Sample ID: 1911245-001AMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP1 4.5'	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205832 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	370	9.3 46.64 305.0 131 57 142 1.36 20
Surr: DNOP	4.3	4.664 92.6 70 130 0 0

Sample ID: LCS-48715	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: LCSS	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205865 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	42	10 50.00 0 84.0 63.9 124
Surr: DNOP	3.4	5.000 68.9 70 130 S

Sample ID: MB-48715	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: PBS	Batch ID: 48715	RunNo: 64436
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205874 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	ND	10
Motor Oil Range Organics (MRO)	ND	50
Surr: DNOP	7.8	10.00 77.9 70 130

Sample ID: 1911245-009AMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP9 4.5'	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206722 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	84	8.6 43.18 18.08 153 57 142 S
Surr: DNOP	3.3	4.318 76.7 70 130

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-009AMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: TP9 4.5'	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206723 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	55	8.8 44.13 18.08 84.5 57 142 41.0 20 R
Surr: DNOP	3.2	4.413 73.4 70 130 0 0

Sample ID: LCS-48728	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: LCSS	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206729 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	41	10 50.00 0 82.8 63.9 124
Surr: DNOP	3.5	5.000 69.3 70 130 S

Sample ID: MB-48728	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics
Client ID: PBS	Batch ID: 48728	RunNo: 64440
Prep Date: 11/12/2019	Analysis Date: 11/13/2019	SeqNo: 2206730 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Diesel Range Organics (DRO)	ND	10
Motor Oil Range Organics (MRO)	ND	50
Surr: DNOP	7.8	10.00 78.4 70 130

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: MB-48709	SampType: MBLK			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: PBS	Batch ID: 48709			RunNo: 64437						
Prep Date: 11/11/2019	Analysis Date: 11/12/2019			SeqNo: 2205936		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1000		1000		104	77.4	118			

Sample ID: LCS-48709	SampType: LCS			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: LCSS	Batch ID: 48709			RunNo: 64437						
Prep Date: 11/11/2019	Analysis Date: 11/12/2019			SeqNo: 2205937		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	98.2	80	120			
Surr: BFB	1100		1000		114	77.4	118			

Sample ID: MB-48720	SampType: MBLK			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: PBS	Batch ID: 48720			RunNo: 64437						
Prep Date: 11/11/2019	Analysis Date: 11/12/2019			SeqNo: 2205949		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	910		1000		91.3	77.4	118			

Sample ID: LCS-48720	SampType: LCS			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: LCSS	Batch ID: 48720			RunNo: 64437						
Prep Date: 11/11/2019	Analysis Date: 11/12/2019			SeqNo: 2205950		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	89.4	80	120			
Surr: BFB	1000		1000		99.6	77.4	118			

Sample ID: 1911245-009AMS	SampType: MS			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: TP9 4.5'	Batch ID: 48720			RunNo: 64479						
Prep Date: 11/11/2019	Analysis Date: 11/13/2019			SeqNo: 2207364		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	4.6	23.04	0	103	69.1	142			
Surr: BFB	1100		921.7		125	77.4	118			S

Sample ID: 1911245-009AMSD	SampType: MSD			TestCode: EPA Method 8015D: Gasoline Range						
Client ID: TP9 4.5'	Batch ID: 48720			RunNo: 64479						
Prep Date: 11/11/2019	Analysis Date: 11/13/2019			SeqNo: 2207365		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-009AMSD		SampType: MSD		TestCode: EPA Method 8015D: Gasoline Range						
Client ID: TP9 4.5'		Batch ID: 48720		RunNo: 64479						
Prep Date: 11/11/2019		Analysis Date: 11/13/2019		SeqNo: 2207365		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.6	23.08	0	110	69.1	142	6.95	20	
Surr: BFB	910		923.4		99.0	77.4	118	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: MB-48709	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 48709	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205956 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		112	80	120			

Sample ID: LCS-48709	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 48709	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205957 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	101	80	120			
Toluene	1.1	0.050	1.000	0	105	80	120			
Ethylbenzene	1.1	0.050	1.000	0	106	80	120			
Xylenes, Total	3.2	0.10	3.000	0	106	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		105	80	120			

Sample ID: MB-48720	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 48720	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205978 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		100	80	120			

Sample ID: LCS-48720	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 48720	RunNo: 64437								
Prep Date: 11/11/2019	Analysis Date: 11/12/2019	SeqNo: 2205979 Units: mg/Kg								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	90.2	80	120			
Toluene	0.97	0.050	1.000	0	97.0	80	120			
Ethylbenzene	0.96	0.050	1.000	0	96.0	80	120			
Xylenes, Total	2.9	0.10	3.000	0	96.7	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		100	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1911245

10-Dec-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1911245-010AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: TP10 4.5'	Batch ID: 48720			RunNo: 64479						
Prep Date: 11/11/2019	Analysis Date: 11/13/2019			SeqNo: 2207487		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.025	0.9823	0	88.4	76	123			
Toluene	0.93	0.049	0.9823	0.01035	93.1	80.3	127			
Ethylbenzene	0.94	0.049	0.9823	0	95.4	80.2	131			
Xylenes, Total	2.8	0.098	2.947	0.04443	94.4	78	133			
Surr: 4-Bromofluorobenzene	1.0		0.9823		102	80	120			

Sample ID: 1911245-010AMSD		SampType: MSD		TestCode: EPA Method 8021B: Volatiles						
Client ID: TP10 4.5'		Batch ID: 48720		RunNo: 64479						
Prep Date: 11/11/2019		Analysis Date: 11/13/2019		SeqNo: 2207488		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.85	0.023	0.9346	0	91.1	76	123	1.98	20	
Toluene	0.89	0.047	0.9346	0.01035	94.6	80.3	127	3.34	20	
Ethylbenzene	0.92	0.047	0.9346	0	97.9	80.2	131	2.41	20	
Xylenes, Total	2.8	0.093	2.804	0.04443	96.8	78	133	2.45	20	
Surr: 4-Bromofluorobenzene	0.93		0.9346		100	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1911245**

RcptNo: **1**

Received By: **Daniel Marquez** 11/6/2019 8:00:00 AM

Completed By: **Desiree Dominguez** 11/7/2019 9:01:29 AM

Reviewed By: *DM 11/11/19*

Handwritten initials

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? Yes ☒ No ☐
(Note discrepancies on chain of custody)
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? Yes ☒ No ☐
(If no, notify customer for authorization.)

of preserved
bottles checked
for pH:

(<2 or >12 unless noted)

Adjusted? _____

Checked by: *DAD 11/11/19*

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	5.5	Good	Not Present			
2	3.6	Good	Not Present			



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

February 01, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX

RE: Kaufman No1

OrderNo.: 1901789

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 6 sample(s) on 1/19/2019 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,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW2

Project: Kaufman No1

Collection Date: 1/17/2019 10:26:00 AM

Lab ID: 1901789-001

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	150	5.0		mg/L	10	1/21/2019 9:47:54 PM	R57149
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	1/22/2019 11:56:31 AM	R57171
Surr: BFB	98.6	70-130		%Rec	1	1/22/2019 11:56:31 AM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 9:58:20 AM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 9:58:20 AM	42745
Surr: DNOP	110	70-130		%Rec	1	1/23/2019 9:58:20 AM	42745
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	1.0		µg/L	1	1/22/2019 11:56:31 AM	A57171
Toluene	ND	1.0		µg/L	1	1/22/2019 11:56:31 AM	A57171
Ethylbenzene	ND	1.0		µg/L	1	1/22/2019 11:56:31 AM	A57171
Xylenes, Total	ND	1.5		µg/L	1	1/22/2019 11:56:31 AM	A57171
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/22/2019 11:56:31 AM	A57171
Surr: Toluene-d8	103	70-130		%Rec	1	1/22/2019 11:56:31 AM	A57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW3

Project: Kaufman No1

Collection Date: 1/17/2019 12:15:00 PM

Lab ID: 1901789-002

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	140	5.0		mg/L	10	1/21/2019 10:13:38 PM	R57149
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	1/22/2019 1:22:09 PM	R57171
Surr: BFB	97.0	70-130		%Rec	1	1/22/2019 1:22:09 PM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 11:04:31 AM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 11:04:31 AM	42745
Surr: DNOP	102	70-130		%Rec	1	1/23/2019 11:04:31 AM	42745
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	1.0		µg/L	1	1/22/2019 1:22:09 PM	A57171
Toluene	ND	1.0		µg/L	1	1/22/2019 1:22:09 PM	A57171
Ethylbenzene	ND	1.0		µg/L	1	1/22/2019 1:22:09 PM	A57171
Xylenes, Total	ND	1.5		µg/L	1	1/22/2019 1:22:09 PM	A57171
Surr: 4-Bromofluorobenzene	109	70-130		%Rec	1	1/22/2019 1:22:09 PM	A57171
Surr: Toluene-d8	101	70-130		%Rec	1	1/22/2019 1:22:09 PM	A57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW4

Project: Kaufman No1

Collection Date: 1/17/2019 1:30:00 PM

Lab ID: 1901789-003

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	140	5.0		mg/L	10	1/21/2019 10:39:21 PM	R57149
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	1/22/2019 2:47:49 PM	R57171
Surr: BFB	97.8	70-130		%Rec	1	1/22/2019 2:47:49 PM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 11:26:23 AM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 11:26:23 AM	42745
Surr: DNOP	106	70-130		%Rec	1	1/23/2019 11:26:23 AM	42745
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	1.0		µg/L	1	1/22/2019 2:47:49 PM	A57171
Toluene	ND	1.0		µg/L	1	1/22/2019 2:47:49 PM	A57171
Ethylbenzene	ND	1.0		µg/L	1	1/22/2019 2:47:49 PM	A57171
Xylenes, Total	ND	1.5		µg/L	1	1/22/2019 2:47:49 PM	A57171
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	1/22/2019 2:47:49 PM	A57171
Surr: Toluene-d8	104	70-130		%Rec	1	1/22/2019 2:47:49 PM	A57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW5

Project: Kaufman No1

Collection Date: 1/17/2019 2:45:00 PM

Lab ID: 1901789-004

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	130	5.0		mg/L	10	1/21/2019 11:05:04 PM	R57149
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	0.32	0.050		mg/L	1	1/22/2019 3:16:21 PM	R57171
Surr: BFB	95.8	70-130		%Rec	1	1/22/2019 3:16:21 PM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 11:48:26 AM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 11:48:26 AM	42745
Surr: DNOP	107	70-130		%Rec	1	1/23/2019 11:48:26 AM	42745
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	1.0		µg/L	1	1/22/2019 3:16:21 PM	A57171
Toluene	ND	1.0		µg/L	1	1/22/2019 3:16:21 PM	A57171
Ethylbenzene	ND	1.0		µg/L	1	1/22/2019 3:16:21 PM	A57171
Xylenes, Total	ND	1.5		µg/L	1	1/22/2019 3:16:21 PM	A57171
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	1	1/22/2019 3:16:21 PM	A57171
Surr: Toluene-d8	99.5	70-130		%Rec	1	1/22/2019 3:16:21 PM	A57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW6

Project: Kaufman No1

Collection Date: 1/18/2019 1:35:00 PM

Lab ID: 1901789-005

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	180	5.0		mg/L	10	1/21/2019 11:30:46 PM	R57149
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	1.1	0.050		mg/L	1	1/22/2019 3:44:54 PM	R57171
Surr: BFB	95.5	70-130		%Rec	1	1/22/2019 3:44:54 PM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 12:10:26 PM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 12:10:26 PM	42745
Surr: DNOP	103	70-130		%Rec	1	1/23/2019 12:10:26 PM	42745
EPA METHOD 8260: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	1.0		µg/L	1	1/22/2019 3:44:54 PM	A57171
Toluene	ND	1.0		µg/L	1	1/22/2019 3:44:54 PM	A57171
Ethylbenzene	ND	1.0		µg/L	1	1/22/2019 3:44:54 PM	A57171
Xylenes, Total	ND	1.5		µg/L	1	1/22/2019 3:44:54 PM	A57171
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	1/22/2019 3:44:54 PM	A57171
Surr: Toluene-d8	96.1	70-130		%Rec	1	1/22/2019 3:44:54 PM	A57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW1

Project: Kaufman No1

Collection Date: 1/18/2019 3:15:00 PM

Lab ID: 1901789-006

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Fluoride	ND	1.0		mg/L	10	1/22/2019 12:22:13 AM	R57149
Chloride	130	5.0		mg/L	10	1/22/2019 12:22:13 AM	R57149
Nitrogen, Nitrite (As N)	ND	1.0	H	mg/L	10	1/22/2019 12:22:13 AM	R57149
Bromide	ND	1.0		mg/L	10	1/22/2019 12:22:13 AM	R57149
Nitrogen, Nitrate (As N)	ND	1.0	H	mg/L	10	1/22/2019 12:22:13 AM	R57149
Phosphorus, Orthophosphate (As P)	ND	5.0	H	mg/L	10	1/22/2019 12:22:13 AM	R57149
Sulfate	1700	50	*	mg/L	100	1/22/2019 12:35:04 AM	R57149
SM2510B: SPECIFIC CONDUCTANCE							Analyst: MRA
Conductivity	3600	5.0		µmhos/c	1	1/21/2019 9:31:21 PM	R57160
SM2540C MOD: TOTAL DISSOLVED SOLIDS							Analyst: KS
Total Dissolved Solids	3130	40.0	*D	mg/L	1	1/23/2019 3:44:00 PM	42739
EPA METHOD 7470: MERCURY							Analyst: pmf
Mercury	ND	0.00020		mg/L	1	1/23/2019 5:51:24 PM	42731
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: rde
Arsenic	ND	0.020		mg/L	1	1/29/2019 2:53:21 PM	42806
Barium	0.079	0.020		mg/L	1	1/28/2019 5:31:55 PM	42806
Cadmium	ND	0.0020		mg/L	1	1/28/2019 5:31:55 PM	42806
Calcium	430	5.0		mg/L	5	1/28/2019 6:52:17 PM	42806
Chromium	ND	0.0060		mg/L	1	1/28/2019 5:31:55 PM	42806
Lead	ND	0.0050		mg/L	1	1/28/2019 6:47:08 PM	42806
Magnesium	88	1.0		mg/L	1	1/28/2019 5:31:55 PM	42806
Potassium	3.3	1.0		mg/L	1	1/28/2019 5:31:55 PM	42806
Selenium	ND	0.050		mg/L	1	1/28/2019 5:31:55 PM	42806
Silver	0.0068	0.0050		mg/L	1	1/28/2019 5:31:55 PM	42806
Sodium	370	5.0		mg/L	5	1/28/2019 6:52:17 PM	42806
EPA METHOD 8015D: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	2.4	0.050		mg/L	1	1/22/2019 4:13:29 PM	R57171
Surr: BFB	98.5	70-130		%Rec	1	1/22/2019 4:13:29 PM	R57171
EPA METHOD 8015M/D: DIESEL RANGE							Analyst: CLP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	1/23/2019 12:32:30 PM	42745
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	1/23/2019 12:32:30 PM	42745
Surr: DNOP	111	70-130		%Rec	1	1/23/2019 12:32:30 PM	42745
EPA METHOD 8270C: SEMIVOLATILES							Analyst: DAM
Acenaphthene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Acenaphthylene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Aniline	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW1

Project: Kaufman No1

Collection Date: 1/18/2019 3:15:00 PM

Lab ID: 1901789-006

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES							Analyst: DAM
Anthracene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Azobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benz(a)anthracene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzo(a)pyrene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzo(b)fluoranthene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzo(g,h,i)perylene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzo(k)fluoranthene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzoic acid	ND	20		µg/L	1	1/28/2019 4:34:16 PM	42755
Benzyl alcohol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Bis(2-chloroethyl)ether	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Bromophenyl phenyl ether	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Butyl benzyl phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Carbazole	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Chloro-3-methylphenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Chloroaniline	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Chloronaphthalene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Chlorophenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Chrysene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Di-n-butyl phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Di-n-octyl phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Dibenz(a,h)anthracene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Dibenzofuran	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
1,2-Dichlorobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
1,3-Dichlorobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
1,4-Dichlorobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
3,3'-Dichlorobenzidine	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Diethyl phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Dimethyl phthalate	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4-Dichlorophenol	ND	20		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4-Dimethylphenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4,6-Dinitro-2-methylphenol	ND	20		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4-Dinitrophenol	ND	20		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4-Dinitrotoluene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2,6-Dinitrotoluene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Fluoranthene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW1

Project: Kaufman No1

Collection Date: 1/18/2019 3:15:00 PM

Lab ID: 1901789-006

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES							Analyst: DAM
Fluorene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Hexachlorobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Hexachlorobutadiene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Hexachlorocyclopentadiene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Hexachloroethane	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Isophorone	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
1-Methylnaphthalene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Methylnaphthalene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Methylphenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
3+4-Methylphenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
N-Nitrosodimethylamine	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
N-Nitrosodiphenylamine	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Naphthalene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Nitroaniline	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
3-Nitroaniline	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Nitroaniline	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Nitrobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2-Nitrophenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
4-Nitrophenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Pentachlorophenol	ND	20		µg/L	1	1/28/2019 4:34:16 PM	42755
Phenanthrene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Phenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Pyrene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Pyridine	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
1,2,4-Trichlorobenzene	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4,5-Trichlorophenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
2,4,6-Trichlorophenol	ND	10		µg/L	1	1/28/2019 4:34:16 PM	42755
Surr: 2-Fluorophenol	32.4	15-74.1		%Rec	1	1/28/2019 4:34:16 PM	42755
Surr: Phenol-d5	30.0	15-59.8		%Rec	1	1/28/2019 4:34:16 PM	42755
Surr: 2,4,6-Tribromophenol	52.1	22.1-112		%Rec	1	1/28/2019 4:34:16 PM	42755
Surr: Nitrobenzene-d5	47.5	33.2-94		%Rec	1	1/28/2019 4:34:16 PM	42755
Surr: 2-Fluorobiphenyl	39.3	34-90.9		%Rec	1	1/28/2019 4:34:16 PM	42755
Surr: 4-Terphenyl-d14	44.3	15-149		%Rec	1	1/28/2019 4:34:16 PM	42755
EPA METHOD 8260B: VOLATILES							Analyst: AG
Benzene	74	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Toluene	350	10		µg/L	10	1/23/2019 4:08:15 PM	R57206
Ethylbenzene	27	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW1

Project: Kaufman No1

Collection Date: 1/18/2019 3:15:00 PM

Lab ID: 1901789-006

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: AG
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2,4-Trimethylbenzene	32	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,3,5-Trimethylbenzene	15	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Naphthalene	3.2	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1-Methylnaphthalene	ND	4.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
2-Methylnaphthalene	ND	4.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Acetone	ND	10		µg/L	1	1/22/2019 4:13:29 PM	B57171
Bromobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Bromodichloromethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Bromoform	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Bromomethane	ND	3.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
2-Butanone	ND	10		µg/L	1	1/22/2019 4:13:29 PM	B57171
Carbon disulfide	ND	10		µg/L	1	1/22/2019 4:13:29 PM	B57171
Carbon Tetrachloride	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Chlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Chloroethane	ND	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Chloroform	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Chloromethane	ND	3.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
2-Chlorotoluene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
4-Chlorotoluene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
cis-1,2-DCE	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Dibromochloromethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Dibromomethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1-Dichloroethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1-Dichloroethene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2-Dichloropropane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,3-Dichloropropane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
2,2-Dichloropropane	ND	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1-Dichloropropene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Hexachlorobutadiene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
2-Hexanone	ND	10		µg/L	1	1/22/2019 4:13:29 PM	B57171

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 Quantitative 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.

Analytical Report

Lab Order 1901789

Date Reported: 2/1/2019

CLIENT: Timberwolf Environmental

Client Sample ID: MW1

Project: Kaufman No1

Collection Date: 1/18/2019 3:15:00 PM

Lab ID: 1901789-006

Matrix: AQUEOUS

Received Date: 1/19/2019 11:10:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: AG
Isopropylbenzene	3.1	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
4-Isopropyltoluene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
4-Methyl-2-pentanone	ND	10		µg/L	1	1/22/2019 4:13:29 PM	B57171
Methylene Chloride	ND	3.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
n-Butylbenzene	ND	3.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
n-Propylbenzene	3.9	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
sec-Butylbenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Styrene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
tert-Butylbenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
trans-1,2-DCE	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Trichlorofluoromethane	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Vinyl chloride	ND	1.0		µg/L	1	1/22/2019 4:13:29 PM	B57171
Xylenes, Total	330	15		µg/L	10	1/23/2019 4:08:15 PM	R57206
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	1/22/2019 4:13:29 PM	B57171
Surr: 4-Bromofluorobenzene	98.0	70-130		%Rec	1	1/22/2019 4:13:29 PM	B57171
Surr: Dibromofluoromethane	108	70-130		%Rec	1	1/22/2019 4:13:29 PM	B57171
Surr: Toluene-d8	104	70-130		%Rec	1	1/22/2019 4:13:29 PM	B57171

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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBW	Batch ID:	R57149	RunNo:	57149					
Prep Date:		Analysis Date:	1/21/2019	SeqNo:	1911765	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P)	ND	0.50								
Sulfate	ND	0.50								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSW	Batch ID:	R57149	RunNo:	57149					
Prep Date:		Analysis Date:	1/21/2019	SeqNo:	1911766	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.48	0.10	0.5000	0	96.4	90	110			
Chloride	4.8	0.50	5.000	0	95.5	90	110			
Nitrogen, Nitrite (As N)	0.96	0.10	1.000	0	95.9	90	110			
Bromide	2.4	0.10	2.500	0	96.5	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	100	90	110			
Phosphorus, Orthophosphate (As P)	4.8	0.50	5.000	0	95.7	90	110			
Sulfate	9.7	0.50	10.00	0	96.8	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42745		SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range					
Client ID:	PBW		Batch ID: 42745		RunNo: 57173					
Prep Date:	1/22/2019		Analysis Date: 1/23/2019		SeqNo: 1913176		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	0.98		1.000		98.2	70	130			

Sample ID	LCS-42745		SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range					
Client ID:	LCSW		Batch ID: 42745		RunNo: 57173					
Prep Date:	1/22/2019		Analysis Date: 1/23/2019		SeqNo: 1913177		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.6	1.0	5.000	0	112	71.8	135			
Surr: DNOP	0.50		0.5000		99.8	70	130			

Sample ID	1901789-001BMS		SampType: MS		TestCode: EPA Method 8015M/D: Diesel Range					
Client ID:	MW2		Batch ID: 42745		RunNo: 57173					
Prep Date:	1/22/2019		Analysis Date: 1/23/2019		SeqNo: 1913184		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.6	1.0	5.000	0	112	68.1	137			
Surr: DNOP	0.50		0.5000		99.3	70	130			

Sample ID	1901789-001BMSD		SampType:	MSD		TestCode:	EPA Method 8015M/D: Diesel Range				
Client ID:	MW2		Batch ID:	42745		RunNo:	57173				
Prep Date:	1/22/2019		Analysis Date:	1/23/2019		SeqNo:	1913185		Units: mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Diesel Range Organics (DRO)	5.7	1.0	5.000	0	114	68.1	137	2.02	20		
Surr: DNOP	0.50		0.5000		99.4	70	130	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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	100ng lcs		SampType: LCS		TestCode: EPA Method 8260: Volatiles Short List					
Client ID:	LCSW		Batch ID: A57171		RunNo: 57171					
Prep Date:			Analysis Date: 1/22/2019		SeqNo: 1912430		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	104	70	130			
Toluene	20	1.0	20.00	0	99.3	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		105	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	10		10.00		103	70	130			

Sample ID	1901789-001ams		SampType: MS		TestCode: EPA Method 8260: Volatiles Short List					
Client ID:	MW2		Batch ID: A57171		RunNo: 57171					
Prep Date:			Analysis Date: 1/22/2019		SeqNo: 1912432		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	108	70	130			
Toluene	20	1.0	20.00	0	99.8	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		106	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		111	70	130			
Surr: Dibromofluoromethane	11		10.00		109	70	130			
Surr: Toluene-d8	10		10.00		99.6	70	130			

Sample ID	1901789-001amsd		SampType: MSD		TestCode: EPA Method 8260: Volatiles Short List						
Client ID:	MW2		Batch ID: A57171		RunNo: 57171						
Prep Date:			Analysis Date: 1/22/2019		SeqNo: 1912433		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	21	1.0	20.00	0	105	70	130	2.37	20		
Toluene	19	1.0	20.00	0	93.6	70	130	6.39	20		
Surr: 1,2-Dichloroethane-d4	11		10.00		107	70	130	0	0		
Surr: 4-Bromofluorobenzene	11		10.00		108	70	130	0	0		
Surr: Dibromofluoromethane	11		10.00		109	70	130	0	0		
Surr: Toluene-d8	9.8		10.00		97.7	70	130	0	0		

Sample ID	rb	SampType:	MBLK		TestCode:	EPA Method 8260: Volatiles Short List				
Client ID:	PBW	Batch ID:	A57171		RunNo:	57171				
Prep Date:		Analysis Date:	1/22/2019		SeqNo:	1912439	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								
Xylenes, Total	ND	1.5								

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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	rb	SampType:	MBLK	TestCode:	EPA Method 8260: Volatiles Short List					
Client ID:	PBW	Batch ID:	A57171	RunNo:	57171					
Prep Date:		Analysis Date:	1/22/2019	SeqNo:	1912439	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	11		10.00		107	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	11		10.00		109	70	130			
Surr: Toluene-d8	10		10.00		100	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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	100ng lcs	SampType: LCS			TestCode: EPA Method 8260B: VOLATILES					
Client ID:	LCSW	Batch ID: B57171			RunNo: 57171					
Prep Date:		Analysis Date: 1/22/2019			SeqNo: 1912422		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	104	70	130			
Chlorobenzene	21	1.0	20.00	0	104	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	101	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	93.1	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		105	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	10		10.00		103	70	130			

Sample ID	rb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES					
Client ID:	PBW	Batch ID: B57171			RunNo: 57171					
Prep Date:		Analysis Date: 1/22/2019			SeqNo: 1912429		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	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								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	rb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES					
Client ID:	PBW	Batch ID: B57171			RunNo: 57171					
Prep Date:		Analysis Date: 1/22/2019			SeqNo: 1912429	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
Vinyl chloride	ND	1.0								
Surr: 1,2-Dichloroethane-d4	11		10.00		107	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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID rb		SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES					
Client ID: PBW		Batch ID: B57171			RunNo: 57171					
Prep Date:		Analysis Date: 1/22/2019			SeqNo: 1912429		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	11		10.00		109	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

Sample ID	100ng lcs			SampType: LCS		TestCode: EPA Method 8260B: VOLATILES				
Client ID:	LCSW			Batch ID: R57206		RunNo: 57206				
Prep Date:	Analysis Date: 1/23/2019			SeqNo: 1913462		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	19	1.0	20.00	0	93.0	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		108	70	130			
Surr: Dibromofluoromethane	11		10.00		109	70	130			
Surr: Toluene-d8	9.8		10.00		97.8	70	130			

Sample ID	rb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES					
Client ID:	PBW	Batch ID: R57206			RunNo: 57206					
Prep Date:		Analysis Date: 1/23/2019			SeqNo: 1913486		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	11		10.00		105	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		109	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	10		10.00		103	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42755		SampType: MBLK		TestCode: EPA Method 8270C: Semivolatiles					
Client ID:	PBW		Batch ID: 42755		RunNo: 57311					
Prep Date:	1/23/2019		Analysis Date: 1/28/2019		SeqNo: 1917305		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42755	SampType:	MBLK	TestCode:	EPA Method 8270C: Semivolatiles					
Client ID:	PBW	Batch ID:	42755	RunNo:	57311					
Prep Date:	1/23/2019	Analysis Date:	1/28/2019	SeqNo:	1917305	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2-Fluorophenol	180		200.0		91.9	15	74.1			S
Surr: Phenol-d5	150		200.0		75.8	15	59.8			S
Surr: 2,4,6-Tribromophenol	190		200.0		97.3	22.1	112			
Surr: Nitrobenzene-d5	99		100.0		99.4	33.2	94			S
Surr: 2-Fluorobiphenyl	91		100.0		91.4	34	90.9			S
Surr: 4-Terphenyl-d14	97		100.0		97.5	15	149			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quantitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	LCS-42755		SampType: LCS		TestCode: EPA Method 8270C: Semivolatiles					
Client ID:	LCSW		Batch ID: 42755		RunNo: 57311					
Prep Date:	1/23/2019		Analysis Date: 1/28/2019		SeqNo: 1917306		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	81	10	100.0	0	80.8	55.1	104			
4-Chloro-3-methylphenol	200	10	200.0	0	101	57	115			
2-Chlorophenol	180	10	200.0	0	89.2	43.4	112			
1,4-Dichlorobenzene	80	10	100.0	0	79.7	38	95.2			
2,4-Dinitrotoluene	75	10	100.0	0	74.7	55.1	96.7			
N-Nitrosodi-n-propylamine	95	10	100.0	0	94.6	55	112			
4-Nitrophenol	170	10	200.0	0	84.3	16.6	93			
Pentachlorophenol	160	20	200.0	0	79.3	43.2	104			
Phenol	160	10	200.0	0	78.6	21.3	85.7			
Pyrene	87	10	100.0	0	86.8	64.9	105			
1,2,4-Trichlorobenzene	84	10	100.0	0	84.2	42.6	107			
Surr: 2-Fluorophenol	160		200.0		81.7	15	74.1			S
Surr: Phenol-d5	150		200.0		74.6	15	59.8			S
Surr: 2,4,6-Tribromophenol	190		200.0		93.5	22.1	112			
Surr: Nitrobenzene-d5	89		100.0		89.2	33.2	94			
Surr: 2-Fluorobiphenyl	76		100.0		76.0	34	90.9			
Surr: 4-Terphenyl-d14	95		100.0		94.8	15	149			

Sample ID	Icsd-42755		SampType: LCSD		TestCode: EPA Method 8270C: Semivolatiles					
Client ID:	LCSS02		Batch ID: 42755		RunNo: 57332					
Prep Date:	1/23/2019		Analysis Date: 1/29/2019		SeqNo: 1918063		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	64	10	100.0	0	63.8	55.1	104	23.5	34.9	
4-Chloro-3-methylphenol	160	10	200.0	0	81.2	57	115	22.0	30.2	
2-Chlorophenol	140	10	200.0	0	72.4	43.4	112	20.7	49.5	
1,4-Dichlorobenzene	58	10	100.0	0	58.3	38	95.2	31.0	43.2	
2,4-Dinitrotoluene	61	10	100.0	0	61.1	55.1	96.7	20.1	49.9	
N-Nitrosodi-n-propylamine	73	10	100.0	0	73.1	55	112	25.5	42.1	
4-Nitrophenol	100	10	200.0	0	50.8	16.6	93	49.5	31.5	R
Pentachlorophenol	120	20	200.0	0	58.0	43.2	104	31.1	52.5	
Phenol	120	10	200.0	0	60.3	21.3	85.7	26.5	54.4	
Pyrene	70	10	100.0	0	70.1	64.9	105	21.3	30.7	
1,2,4-Trichlorobenzene	68	10	100.0	0	67.6	42.6	107	22.0	48.1	
Surr: 2-Fluorophenol	98		200.0		48.8	15	74.1	0	0	
Surr: Phenol-d5	92		200.0		46.0	15	59.8	0	0	
Surr: 2,4,6-Tribromophenol	120		200.0		62.3	22.1	112	0	0	
Surr: Nitrobenzene-d5	60		100.0		59.7	33.2	94	0	0	
Surr: 2-Fluorobiphenyl	50		100.0		49.6	34	90.9	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quantitative Limit

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	lcsd-42755	SampType:	LCSD	TestCode:	EPA Method 8270C: Semivolatiles					
Client ID:	LCSS02	Batch ID:	42755	RunNo:	57332					
Prep Date:	1/23/2019	Analysis Date:	1/29/2019	SeqNo:	1918063	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	57		100.0		56.5	15	149	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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	lcs-1 99.0uS eC		SampType: lcs		TestCode: SM2510B: Specific Conductance					
Client ID:	LCSW		Batch ID: R57160		RunNo: 57160					
Prep Date:			Analysis Date: 1/21/2019		SeqNo: 1911988		Units: µmhos/cm			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	98	5.0	99.00	0	98.9	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42731		SampType:	MBLK		TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW		Batch ID:	42731		RunNo:	57210				
Prep Date:	1/21/2019		Analysis Date:	1/23/2019		SeqNo:	1913735		Units:	mg/L	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	ND	0.00020									

Sample ID	LCS-42731		SampType: LCS		TestCode: EPA Method 7470: Mercury					
Client ID:	LCSW		Batch ID: 42731		RunNo: 57210					
Prep Date:	1/21/2019		Analysis Date: 1/23/2019		SeqNo: 1913736		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	0	106	80	120			

Sample ID	1901789-006EMS		SampType: MS		TestCode: EPA Method 7470: Mercury					
Client ID:	MW1		Batch ID: 42731		RunNo: 57210					
Prep Date:	1/21/2019		Analysis Date: 1/23/2019		SeqNo: 1913738		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0057	0.00020	0.005000	.00006954	113	75	125			

Sample ID	1901789-006EMSD			SampType:	MSD		TestCode:	EPA Method 7470: Mercury			
Client ID:	MW1			Batch ID:	42731		RunNo:	57210			
Prep Date:	1/21/2019			Analysis Date:	1/23/2019		SeqNo:	1913739		Units:	mg/L
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.0059	0.00020	0.005000	.00006954	116	75	125	2.56	20		

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42806	SampType:	MBLK	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	PBW	Batch ID:	42806	RunNo:	57316					
Prep Date:	1/24/2019	Analysis Date:	1/28/2019	SeqNo:	1917487	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								

Sample ID	LCS-42806	SampType:	LCS	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	LCSW	Batch ID:	42806	RunNo:	57316					
Prep Date:	1/24/2019	Analysis Date:	1/28/2019	SeqNo:	1917488	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.6	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Calcium	50	1.0	50.00	0	99.7	80	120			
Chromium	0.51	0.0060	0.5000	0	101	80	120			
Magnesium	50	1.0	50.00	0	99.3	80	120			
Potassium	49	1.0	50.00	0	98.2	80	120			
Selenium	0.48	0.050	0.5000	0	96.8	80	120			
Silver	0.10	0.0050	0.1000	0	101	80	120			
Sodium	49	1.0	50.00	0	98.7	80	120			

Sample ID	1901789-006EMS	SampType:	MS	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	MW1	Batch ID:	42806	RunNo:	57316					
Prep Date:	1/24/2019	Analysis Date:	1/28/2019	SeqNo:	1917493	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.55	0.020	0.5000	0.07931	93.9	75	125			
Cadmium	0.50	0.0020	0.5000	0	101	75	125			
Chromium	0.49	0.0060	0.5000	0.001728	97.0	75	125			
Potassium	54	1.0	50.00	3.337	101	75	125			
Selenium	0.48	0.050	0.5000	0	96.6	75	125			
Silver	0.11	0.0050	0.1000	0.006835	103	75	125			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	1901789-006EMSD		SampType: MSD		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	MW1		Batch ID: 42806		RunNo: 57316					
Prep Date:	1/24/2019		Analysis Date: 1/28/2019		SeqNo: 1917494		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.54	0.020	0.5000	0.07931	92.9	75	125	0.888	20	
Cadmium	0.50	0.0020	0.5000	0	100	75	125	0.552	20	
Chromium	0.48	0.0060	0.5000	0.001728	96.3	75	125	0.713	20	
Potassium	54	1.0	50.00	3.337	102	75	125	0.989	20	
Selenium	0.53	0.050	0.5000	0	106	75	125	9.27	20	
Silver	0.11	0.0050	0.1000	0.006835	102	75	125	1.70	20	

Sample ID	MB-42806	SampType:	MBLK		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	PBW	Batch ID:	42806		RunNo:	57316				
Prep Date:	1/24/2019	Analysis Date:	1/28/2019		SeqNo:	1917519	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Lead	ND	0.0050								
Sodium	ND	1.0								

Sample ID	LCS-42806		SampType: LCS		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	LCSW		Batch ID: 42806		RunNo: 57316					
Prep Date:	1/24/2019		Analysis Date: 1/28/2019		SeqNo: 1917520		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.7	80	120			
Lead	0.48	0.0050	0.5000	0	95.1	80	120			
Sodium	50	1.0	50.00	0	99.2	80	120			

Sample ID	1901789-006EMS		SampType: MS		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	MW1		Batch ID: 42806		RunNo: 57316					
Prep Date:	1/24/2019		Analysis Date: 1/28/2019		SeqNo: 1917523		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.46	0.0050	0.5000	0	91.7	75	125			

Sample ID	1901789-006EMSD		SampType:	MSD		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	MW1		Batch ID:	42806		RunNo:	57316				
Prep Date:	1/24/2019		Analysis Date:	1/28/2019		SeqNo:	1917524		Units:	mg/L	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Lead	0.46	0.0050	0.5000	0	92.2	75	125	0.519	20		

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 Quantitative 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#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42806		SampType: MBLK		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	PBW		Batch ID: 42806		RunNo: 57326					
Prep Date:	1/24/2019		Analysis Date: 1/29/2019		SeqNo: 1917932		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								

Sample ID	LCS-42806		SampType: LCS		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	LCSW		Batch ID: 42806		RunNo: 57326					
Prep Date:	1/24/2019		Analysis Date: 1/29/2019		SeqNo: 1917933		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.47	0.020	0.5000	0	93.6	80	120			

Sample ID	1901789-006EMS		SampType: MS		TestCode: EPA 6010B: Total Recoverable Metals					
Client ID:	MW1		Batch ID: 42806		RunNo: 57326					
Prep Date:	1/24/2019		Analysis Date: 1/29/2019		SeqNo: 1917936		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.49	0.020	0.5000	0	99.0	75	125			

Sample ID	1901789-006EMSD		SampType:	MSD		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	MW1		Batch ID:	42806		RunNo:	57326				
Prep Date:	1/24/2019		Analysis Date:	1/29/2019		SeqNo:	1917937		Units:	mg/L	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Arsenic	0.49	0.020	0.5000	0	98.0	75	125	0.972	20		

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	1901789-002ams		SampType: MS			TestCode: EPA Method 8015D: Gasoline Range				
Client ID:	MW3		Batch ID: R57171			RunNo: 57171				
Prep Date:			Analysis Date: 1/22/2019			SeqNo: 1912400		Units: mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.52	0.050	0.5000	0	104	63.4	130			
Surr: BFB	9.8		10.00		97.7	70	130			

Sample ID	1901789-002amsd		SampType: MSD			TestCode: EPA Method 8015D: Gasoline Range				
Client ID:	MW3		Batch ID: R57171			RunNo: 57171				
Prep Date:			Analysis Date: 1/22/2019			SeqNo: 1912401		Units: mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.49	0.050	0.5000	0	98.2	63.4	130	5.62	20	
Surr: BFB	9.7		10.00		96.8	70	130	0	0	

Sample ID	2.5ug gro lcs		SampType: LCS			TestCode: EPA Method 8015D: Gasoline Range				
Client ID:	LCSW		Batch ID: R57171			RunNo: 57171				
Prep Date:			Analysis Date: 1/22/2019			SeqNo: 1912406		Units: mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.53	0.050	0.5000	0	106	70	130			
Surr: BFB	9.8		10.00		98.0	70	130			

Sample ID	rb		SampType: MBLK			TestCode: EPA Method 8015D: Gasoline Range				
Client ID:	PBW		Batch ID: R57171			RunNo: 57171				
Prep Date:			Analysis Date: 1/22/2019			SeqNo: 1912407		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	9.7		10.00		96.6	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901789

01-Feb-19

Client: Timberwolf Environmental

Project: Kaufman No1

Sample ID	MB-42739		SampType:	MBLK		TestCode:	SM2540C MOD: Total Dissolved Solids				
Client ID:	PBW		Batch ID:	42739		RunNo:	57198				
Prep Date:	1/22/2019		Analysis Date:	1/23/2019		SeqNo:	1913205		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-42739		SampType: LCS		TestCode: SM2540C MOD: Total Dissolved Solids					
Client ID:	LCSW		Batch ID: 42739		RunNo: 57198					
Prep Date:	1/22/2019		Analysis Date: 1/23/2019		SeqNo: 1913206		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1901789**

RcptNo: 1

Received By: **Victoria Zellar**

1/19/2019 11:10:00 AM

Victoria Zellar

Completed By: **Leah Baca**

1/21/2019 10:24:02 AM

Leah Baca

Reviewed By: **ENM**

Labeled by **WVZ 1/21/19**

1/21/19

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 $>0^{\circ}\text{C}$ 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: 1
(≤ 2 or >12 unless noted)
Adjusted? **NO**
Checked by **WVZ 1/21/19**

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	3.7	Good	Yes			
2	4.3	Good	Yes			



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

October 16, 2019

Jim Foster

Timberwolf Environmental
1920 W Villa Maria Ste 205
Bryan, TX 77807
TEL: (979) 324-2139
FAX:

RE: Kaufman No 1

OrderNo.: 1910659

Dear Jim Foster:

Hall Environmental Analysis Laboratory received 8 sample(s) on 10/10/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1910659

Date Reported: 10/16/2019

CLIENT: Timberwolf Environmental

Lab Order: 1910659

Project: Kaufman No 1

Lab ID: 1910659-001

Collection Date: 10/9/2019 3:22:00 PM

Client Sample ID: MW1

Matrix: AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 9:41:10 AM	B63672
Toluene	ND	1.0		µg/L	1	10/14/2019 9:41:10 AM	B63672
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 9:41:10 AM	B63672
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 9:41:10 AM	B63672
Surr: 4-Bromofluorobenzene	95.4	80-120		%Rec	1	10/14/2019 9:41:10 AM	B63672

Lab ID: 1910659-002

Collection Date: 10/9/2019 1:05:00 PM

Client Sample ID: MW2

Matrix: AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 10:28:38 AM	B63672
Toluene	ND	1.0		µg/L	1	10/14/2019 10:28:38 AM	B63672
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 10:28:38 AM	B63672
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 10:28:38 AM	B63672
Surr: 4-Bromofluorobenzene	95.9	80-120		%Rec	1	10/14/2019 10:28:38 AM	B63672

Lab ID: 1910659-003

Collection Date: 10/9/2019 12:05:00 PM

Client Sample ID: MW3

Matrix: AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 10:52:22 AM	B63672
Toluene	ND	1.0		µg/L	1	10/14/2019 10:52:22 AM	B63672
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 10:52:22 AM	B63672
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 10:52:22 AM	B63672
Surr: 4-Bromofluorobenzene	95.3	80-120		%Rec	1	10/14/2019 10:52:22 AM	B63672

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

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Analytical Report

Lab Order: 1910659

Date Reported: 10/16/2019

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** Timberwolf Environmental**Lab Order:** 1910659**Project:** Kaufman No 1**Lab ID:** 1910659-004**Collection Date:** 10/9/2019 2:50:00 PM**Client Sample ID:** MW4**Matrix:** AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 11:16:12 AM B63672	
Toluene	ND	1.0		µg/L	1	10/14/2019 11:16:12 AM B63672	
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 11:16:12 AM B63672	
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 11:16:12 AM B63672	
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	1	10/14/2019 11:16:12 AM B63672	

Lab ID: 1910659-005**Collection Date:** 10/9/2019 2:05:00 PM**Client Sample ID:** MW5**Matrix:** AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	4.1	1.0		µg/L	1	10/14/2019 11:39:45 AM B63672	
Toluene	ND	1.0		µg/L	1	10/14/2019 11:39:45 AM B63672	
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 11:39:45 AM B63672	
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 11:39:45 AM B63672	
Surr: 4-Bromofluorobenzene	107	80-120		%Rec	1	10/14/2019 11:39:45 AM B63672	

Lab ID: 1910659-006**Collection Date:** 10/9/2019 1:38:00 PM**Client Sample ID:** MW6**Matrix:** AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 12:03:11 PM B63672	
Toluene	ND	1.0		µg/L	1	10/14/2019 12:03:11 PM B63672	
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 12:03:11 PM B63672	
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 12:03:11 PM B63672	
Surr: 4-Bromofluorobenzene	106	80-120		%Rec	1	10/14/2019 12:03:11 PM B63672	

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

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Analytical Report

Lab Order: 1910659

Date Reported: 10/16/2019

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** Timberwolf Environmental**Lab Order:** 1910659**Project:** Kaufman No 1**Lab ID:** 1910659-007**Collection Date:** 10/9/2019 3:24:00 PM**Client Sample ID:** Dup**Matrix:** AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/14/2019 3:13:09 PM	B63672
Toluene	ND	1.0		µg/L	1	10/14/2019 3:13:09 PM	B63672
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 3:13:09 PM	B63672
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 3:13:09 PM	B63672
Surr: 4-Bromofluorobenzene	92.7	80-120		%Rec	1	10/14/2019 3:13:09 PM	B63672

Lab ID: 1910659-008**Collection Date:****Client Sample ID:** Trip Blank**Matrix:** TRIP BLANK

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	10/14/2019 3:36:36 PM	B63672
Benzene	ND	1.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
Toluene	ND	1.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
Ethylbenzene	ND	1.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
Xylenes, Total	ND	2.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/14/2019 3:36:36 PM	B63672
Surr: 4-Bromofluorobenzene	93.2	80-120		%Rec	1	10/14/2019 3:36:36 PM	B63672

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 Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1910659

16-Oct-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: RB	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBW	Batch ID: B63672	RunNo: 63672								
Prep Date:	Analysis Date: 10/14/2019	SeqNo: 2175702	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	19		20.00		95.4	80	120			

Sample ID: 100NG BTEX LCS	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSW	Batch ID: B63672	RunNo: 63672								
Prep Date:	Analysis Date: 10/14/2019	SeqNo: 2175703	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	20	2.5	20.00	0	98.1	80	119			
Benzene	20	1.0	20.00	0	99.0	80	120			
Toluene	20	1.0	20.00	0	98.6	80	120			
Ethylbenzene	20	1.0	20.00	0	99.2	80	120			
Xylenes, Total	60	2.0	60.00	0	100	80	119			
1,2,4-Trimethylbenzene	20	1.0	20.00	0	98.7	80	120			
1,3,5-Trimethylbenzene	20	1.0	20.00	0	97.8	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		98.4	80	120			

Sample ID: 1910659-001AMS	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: MW1	Batch ID: B63672	RunNo: 63672								
Prep Date:	Analysis Date: 10/14/2019	SeqNo: 2175705	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17	2.5	20.00	0	84.0	61.3	119			
Benzene	19	1.0	20.00	0.2640	95.5	80	120			
Toluene	19	1.0	20.00	0	95.4	75.5	120			
Ethylbenzene	19	1.0	20.00	0	96.2	80	120			
Xylenes, Total	58	2.0	60.00	0	97.3	77.3	119			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	95.3	72.6	125			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	93.7	68.3	127			
Surr: 4-Bromofluorobenzene	20		20.00		98.0	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1910659

16-Oct-19

Client: Timberwolf Environmental

Project: Kaufman No 1

Sample ID: 1910659-001AMSD		SampType: MSD		TestCode: EPA Method 8021B: Volatiles						
Client ID: MW1		Batch ID: B63672		RunNo: 63672						
Prep Date:		Analysis Date: 10/14/2019		SeqNo: 2175706		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	18	2.5	20.00	0	87.6	61.3	119	4.21	20	
Benzene	20	1.0	20.00	0.2640	96.9	80	120	1.41	20	
Toluene	20	1.0	20.00	0	97.6	75.5	120	2.20	20	
Ethylbenzene	20	1.0	20.00	0	98.9	80	120	2.70	20	
Xylenes, Total	60	2.0	60.00	0	100	77.3	119	3.09	20	
1,2,4-Trimethylbenzene	20	1.0	20.00	0	99.9	72.6	125	4.77	20	
1,3,5-Trimethylbenzene	20	1.0	20.00	0	98.9	68.3	127	5.37	20	
Surr: 4-Bromofluorobenzene	21		20.00		105	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Sample Log-In Check List

Client Name: **TIMBERWOLF ENVIRON**

Work Order Number: **1910659**

RcptNo: 1

Received By: *Juan Rojas*

10/10/2019 7:55:00 AM

Completed By: **Leah Baca**

10/11/2019 8:01:56 AM

Reviewed By: *LB*

10/11/19

Leah Baca

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: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: DAD 10/11/19

Special Handling (if applicable)

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

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.2	Good	Not Present			

Chain-of-Custody Record

Client: Timberwolf Environmental

Mailing Address: 4901 Hawkins NE - Albuquerque, NM 87109

Phone #: 505-345-3975

email or Fax#: jim@teamtimberwolf.com

QA/QC Package: ☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other

☐ EDD (Type) _____

Date Time Matrix Sample Name

10-9-19 1522 W MW 1

10-9-19 1305 W MW 2

10-9-19 1205 W MW 3

10-9-19 1450 W MW 4

10-9-19 1405 W MW 5

10-9-19 1338 W MW 6

10-9-19 1524 W Dup.

Trip Blank

Date Time Relinquished by:

10-9-19 1705 Muel M

Date Time Relinquished by:

10/9/19 1751 Charlotte Wanda

Turn-Around Time: ☒ Standard ☐ Rush

Project Name: Kaufman No. 1

Project #: 180061

Project Manager: Jim Foster

Sampler: JF/MM

On Ice: ☒ Yes ☐ No

of Coolers: 2 JP 10/10/19

Cooler Temp (including CF): 0.1 + 0.1 = 0.2

Container Type and #

3 VOA HCL

3 VOA HCL

3 VOA HCL

3 VOA HCL

3 VOA HCL

3 VOA HCL

3 VOA HCL

HEAL No. 1910659

BTX MTBE / TMBs (8021)

TPH:8015D(GRO / DRO / MRO)

8081 Pesticides/8082 PCB's

EDB (Method 504.1)

PAHs by 8310 or 8270SIMS

RCRA 8 Metals

Cl, F, Br, NO₂, NO₃, PO₄, SO₄

8260 (VOA)

8270 (Semi-VOA)

Total Coliform (Present/Absent)

Analysis Request

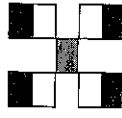
Remarks:

Received by: Charlotte Wanda Date: 10/9/19 Time: 1705

Received by: Jim Foster Date: 10/10/19 Time: 1755

Via: carrier

Any sub-contracted data will be clearly notated on the analytical report.



HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Appendix E

Incoming Waste Log – IEI

DATE _____

11/8/19

Soil (Solids) Multiple Loads - Material Tracking Sheet

COMPANY NAME: Holcom

ORIGIN OF MATERIAL(LOCATION): Kau Emari

TYPE OF MATERIAL: Contaminated Soil

TRUCKING COMPANY: Misc.

COMPANY REP. Jennifer Deal Hrg 02

PHONE # _____

H2S GAS ☒ NON DETECT ☐ DETECT

↓ Chlorides PH

Paint Filter Test: ☒ Passed ☐ Failed

188 yds
1 Test

[illegible]

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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

Form C-138
Revised August 1, 2011

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

* Surface Waste Management Facility Operator
and Generator shall maintain and make this
documentation available for Division inspection

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. **Generator Name and Address:**
Hilcorp Energy Company
382 Rd 3100
Aztec, NM 87410

2. **Originating Site:**
KAUFMAN 1 (Other) API# 3004510174 Area:02

Billing Information: Requested by: Jennifer Deal

3. **Location of Material (Street Address, City, State or ULSTR):**
Unit H, Section 33, T031N, R013W
SAN JUAN, NM

4. **Source and Description of Waste:**
Impacted Soil From condensed fluids spill (produced water/condensate)
Estimated Volume 200 yd3 Known Volume (to be entered by the operator at the end of the haul) 188 yd3 bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, Jennifer Deal, representative or authorized agent for Hilcorp Energy Company do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☒ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste. Operator Use Only: Waste Acceptance Frequency ☒ Monthly ☐ Weekly ☐ Per Load

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

I, Jennifer Deal, representative for Hilcorp Energy Company authorize JFJ/IEI to complete the required testing/sign the Generator Waste Testing Certification.

I, Roger Tingley, representative for Industrial Ecosystems, Inc. do hereby certify that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content and that the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 NMAC. The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of Section 15 of 19.15.36 NMAC.

6. **Transporter:** Sierra Oil Field Services

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #: JFJ Landfarm / Industrial Ecosystems, Inc. * Permit #: NM 01-0010B

Address of Facility: # 49 CR 3150 Aztec, NM 87410

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☒ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status: ☒ APPROVED ☐ DENIED (Must Be Maintained As Permanent Record)

PRINT NAME: Roger Tingley TITLE: Trans Coord. DATE: 11/8/19

SIGNATURE: Roger Tingley TELEPHONE NO.: 505-632-1782

Surface Waste Management Facility Authorized Agent

11/5/19



Industrial Ecosystems Inc.
Soil Reclamation Center

Soil (Solids) Multiple Loads - Material Tracking Sheet

COMPANY NAME: Hilcorp

ORIGIN OF MATERIAL (LOCATION): Kaufman 1

TYPE OF MATERIAL: Contaminated Soil

TRUCKING COMPANY: Misc

DATE 11/11/19

COMPANY REP. Jennifer Deal

PHONE # Area 02

H2S GAS ☐ NON DETECT ☐ DETECT

Chlorides ☒ PH ☐

Paint Filter Test: ☐ Passed ☐ Failed

Page 1

324 yds
108
432 yds

	Date	Time In	Transported by	Truck#	Yards	Virgin Soil Out	Driver's Name (Print)	Driver's Signature	Time Out
1	11/11	900 A	L+L	25	12		And Benally	And Benally	
2		900 A	L+L	19	12		Eric Betanc	Eric Betanc	
3		901 A	CF+M	5779	12	60	Eugene Benally	Eugene Benally	
4		901 A	OFT	100	12		Deamon Eldridge	Deamon Eldridge	
5		956 A	Sierra	35	12		Mike Otis	Mike Otis	
6		9:57 A	CF+M	5077	12		Ralph Serrano	Ralph Serrano	
7		10:19	Adobe	125	12		Jason Orin	Jason Orin	
8		1020 A	CMS	201	12	60	Eugene Benally	Eugene Benally	
9			CF+M	5779	12		Eric Betanc	Eric Betanc	
10		1105 A	L+L	19	12		And Benally	And Benally	
11		1105 A	L+L	25	12		Eugene Benally	Eugene Benally	
12		1200 P	OFT	100	12	60	Deamon Eldridge	Deamon Eldridge	
13		1228 P	Sierra	35	12		Mike Otis	Mike Otis	
14		1230 P	CF+M	5077	12		Ralph Serrano	Ralph Serrano	
15		1255	CMS	201	12		And Benally	And Benally	
16		100 P	Adobe	125	12		Eric Betanc	Eric Betanc	
17		105 P	L+L	25	12		Eugene Benally	Eugene Benally	
18		106 P	L+L	17	12	60	Deamon Eldridge	Deamon Eldridge	
19		149 P	CF+M	5779	12		Eric Betanc	Eric Betanc	
20		150 P	OFT	100	12		Eugene Benally	Eugene Benally	
21		2:45 P	Sierra	35	12		Deamon Eldridge	Deamon Eldridge	
22		2:45 P	CF+M	5077	12		Mike Otis	Mike Otis	
23		2:08 P	CMS	201	12	60	Ralph Serrano	Ralph Serrano	
24		3:02 P	Cooper	125	12		And Benally	And Benally	
25			L+L	19	12		Eric Betanc	Eric Betanc	
26			L+L	25	12		And Benally	And Benally	
27		3:46	CF+M	5779	12	24	Eugene Benally	Eugene Benally	

District I
1625 N. French Dr., Hobbs, NM 88240
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1000 Rio Brazos Road, Aztec, NM 87410
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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-138
Revised August 1, 2011

*Surface Waste Management Facility Operator
and Generator shall maintain and make this
documentation available for Division inspection

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. Generator Name and Address:	Hilcorp Energy Company 382 Rd 3100 Aztec, NM 87410
2. Originating Site:	KAUFMAN 1 (Other) API# 3004510174 Area:02 Billing Information: Requested by: Jennifer Deal
3. Location of Material (Street Address, City, State or ULSTR):	Unit H, Section 33, T031N, R013W SAN JUAN, NM
4. Source and Description of Waste:	Impacted Soil From condensed fluids spill (produced water/condensate) Estimated Volume <u>200 yd3</u> Known Volume (to be entered by the operator at the end of the haul) <u>432 yds 11/11/19</u> <u>188 yd3</u> bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, Jennifer Deal, representative or authorized agent for Hilcorp Energy Company do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☒ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste. Operator Use Only: Waste Acceptance Frequency ☒ Monthly ☐ Weekly ☐ Per Load

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

I, Jennifer Deal, representative for Hilcorp Energy Company authorize JFJ/IEI to complete the required testing/sign the Generator Waste Testing Certification.

I, Roger Tingling, representative for Industrial Ecosystems, Inc. do hereby certify that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content and that the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 NMAC. The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of Section 15 of 19.15.36 NMAC.

6. Transporter: Sierra Oil Field Services

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #: JFJ Landfarm / Industrial Ecosystems, Inc. * Permit #: NM 01-0010B

Address of Facility: # 49 CR 3150 Aztec, NM 87410

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☒ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status: ☒ APPROVED ☐ DENIED (Must Be Maintained As Permanent Record)

PRINT NAME: Roger Tingling TITLE: Tram Conced DATE: 11/18/19

SIGNATURE: Roger Tingling TELEPHONE NO.: 505-632-1782

Surface Waste Management Facility Authorized Agent

DATE _____

11/12/19

Soil (Solids) Multiple Loads - Material Tracking Sheet

COMPANY NAME: Hilcorp

ORIGIN OF MATERIAL(LOCATION): Kaufman 1

TYPE OF MATERIAL: Contaminated Soil

TRUCKING COMPANY: MSC

COMPANY REP. Jennifer Neal

PHONE # Area 02

H2S GAS ☐ NON DETECT(☒ DETECT

Chlorides PH

Paint Filter Test: ☒ Passed ☐ Failed

164 yds

[illegible]

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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

Form C-138
Revised August 1, 2011

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

* Surface Waste Management Facility Operator
and Generator shall maintain and make this
documentation available for Division inspection

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. Generator Name and Address:	Hilcorp Energy Company 382 Rd 3100 Aztec, NM 87410
2. Originating Site:	KAUFMAN 1 (Other) API# 3004510174 Area:02
Billing Information: Requested by: Jennifer Deal	
3. Location of Material (Street Address, City, State or ULSTR):	Unit H, Section 33, T031N, R013W SAN JUAN, NM
4. Source and Description of Waste:	Impacted Soil From condensed fluids spill (produced water/condensate) Estimated Volume 200 yd3 Known Volume (to be entered by the operator at the end of the haul)

1164 yds - 11/12/19
432 yds 11/11/19
188 yd3/bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, Jennifer Deal, representative or authorized agent for Hilcorp Energy Company do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

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☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

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6. Transporter: Sierra Oil Field Services

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #: JFJ Landfarm / Industrial Ecosystems, Inc. * Permit #: NM 01-0010B

Address of Facility: # 49 CR 3150 Aztec, NM 87410

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☒ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status:

☒ APPROVED

☐ DENIED (Must Be Maintained As Permanent Record)

PRINT NAME: Roger Tingley

TITLE: Trans. Coord.

DATE: 11/18/19

SIGNATURE: Roger Tingley

TELEPHONE NO.: 505-632-1782

Surface Waste Management Facility Authorized Agent

11/15/19

Appendix F

Banks Public Record Search – Water Wells

Prepared for:

TIMBERWOLF ENVIRONMENTAL
1920 West Villa Maria Road, STE 305-2
Bryan, TX 77507



Water Well Report

Kaufman No. 1

NM

ES-131502

Monday, July 8, 2019

Table of Contents

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Disclaimer	10

Geographic Summary

Location

NM

Coordinates

Longitude & Latitude in Degrees Minutes Seconds -108° 12' 12", 36° 51' 36"

Longitude & Latitude in Decimal Degrees -108.203312°, 36.859914°

X and Y in UTM 749323, 4082983.49 (Zone 12)

Elevation

Target Property lies 5537.39 feet above sea level.

Zip Codes Searched

Search Distance **Zip Codes (historical zip codes included)**
Target Property 87401, 87499

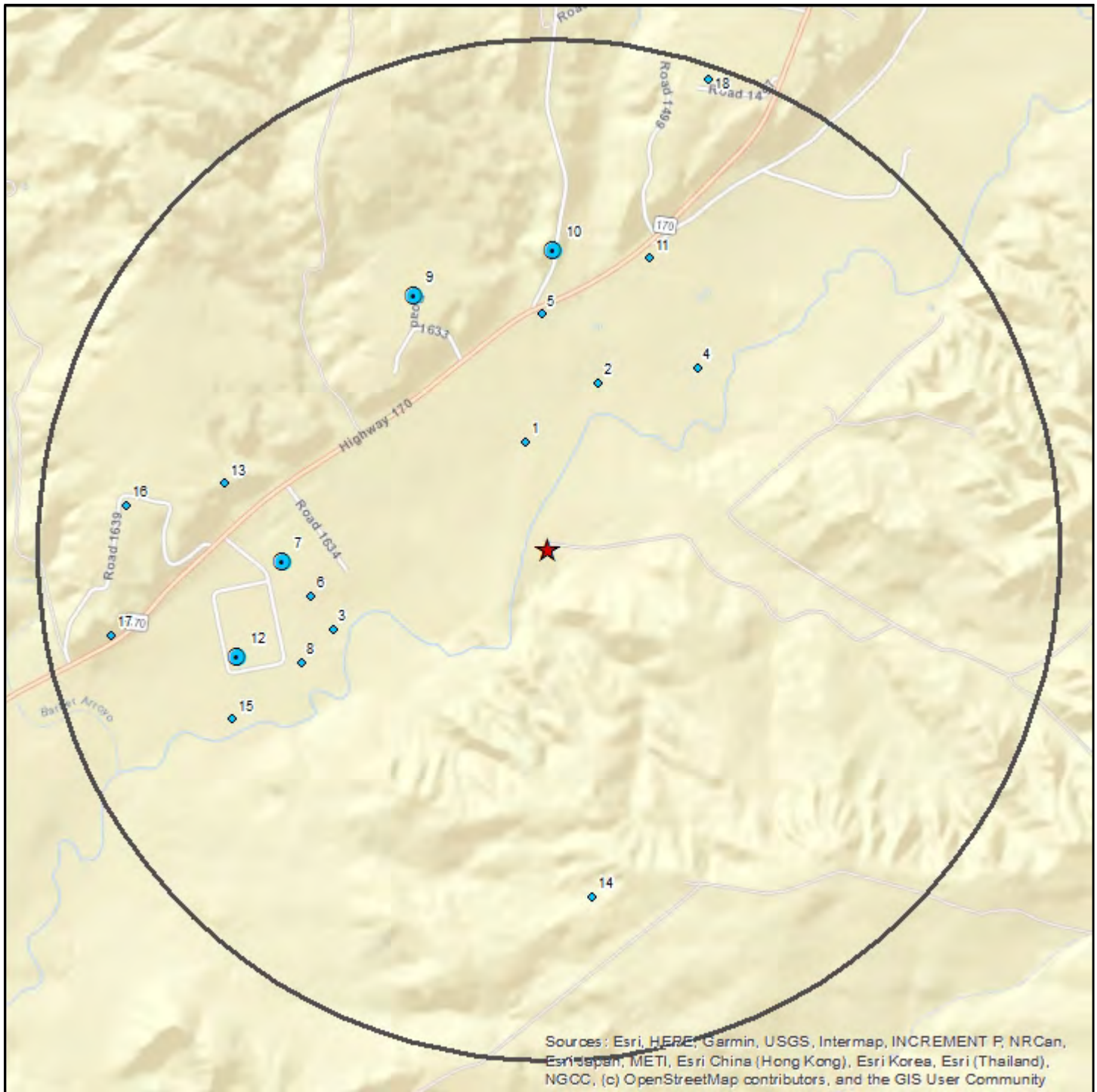
1 mile 87401, 87499, 87418

Topos Searched

Search Distance **Topo Name**
Target Property Farmington North (1980)

1 mile Farmington North (1980)

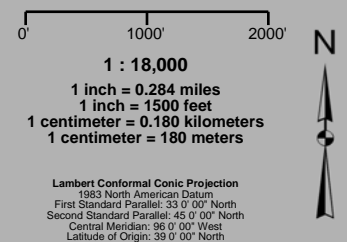
Summary Map - 1 Mile Radius



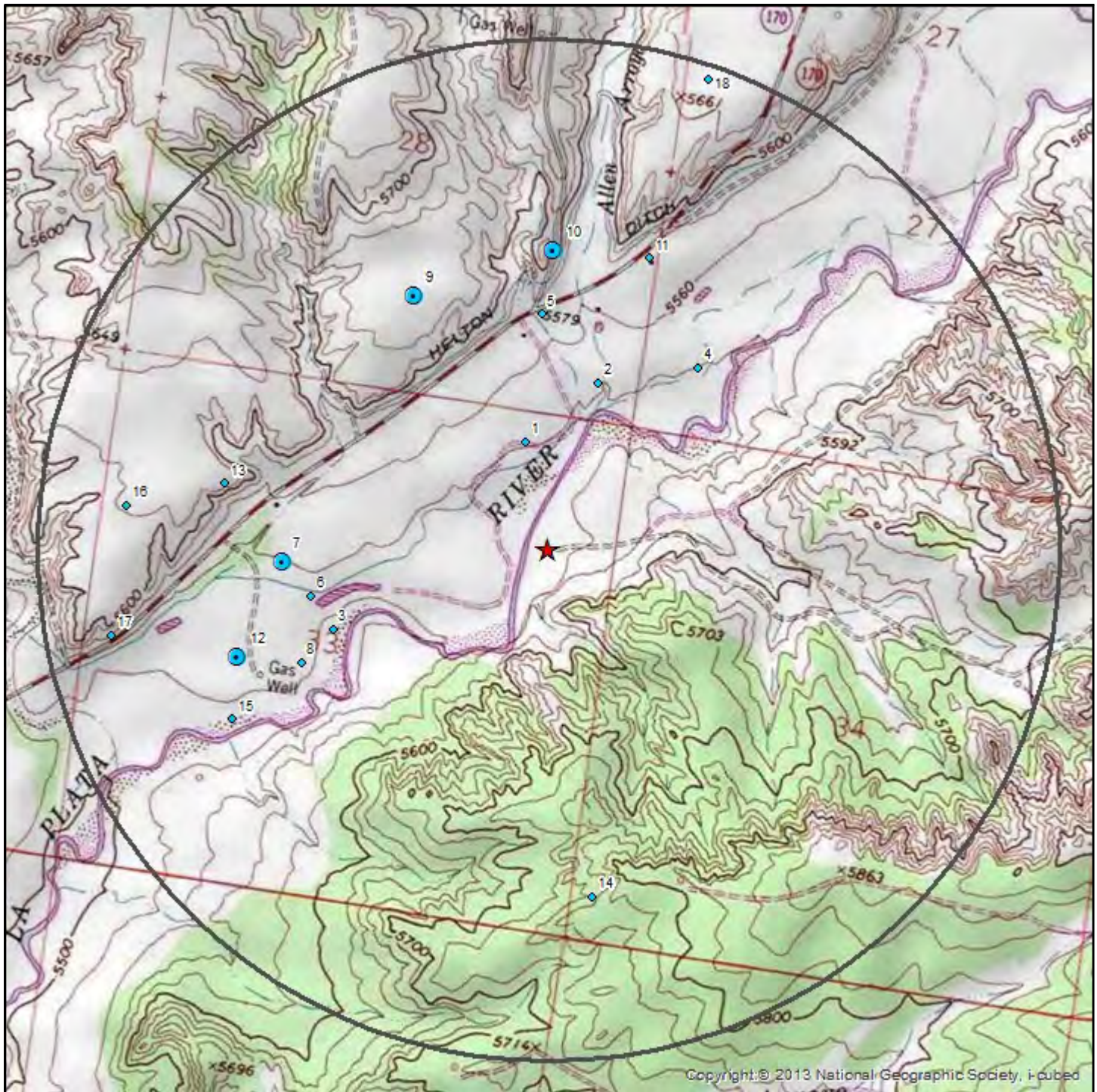
Kaufman No. 1

- Well
- Well Cluster

- ★ Target Property
- Search Buffer



Topographic Overlay Map - 1 Mile Radius



Kaufman No. 1

- Well
- Well Cluster

- ★ Target Property
- Search Buffer

Target Property Quad Name(s)
Farmington North (1980)

0' 1000' 2000'

1 : 18,000

1 inch = 0.284 miles
1 inch = 1500 feet

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33° 0' 00" North
Second Standard Parallel: 45° 0' 00" North
Central Meridian: 96° 0' 00" West
Latitude of Origin: 39° 0' 00" North



Current Imagery Overlay Map - 1 Mile Radius



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

Kaufman No. 1

- Well
- Well Cluster

- ★ Target Property
- Search Buffer

0' 1000' 2000'

1 : 18,000

1 inch = 0.284 miles
1 inch = 1500 feet
1 centimeter = 0.180 kilometers
1 centimeter = 180 meters

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33° 0' 00" North
Second Standard Parallel: 45° 0' 00" North
Central Meridian: 96° 0' 00" West
Latitude of Origin: 39° 0' 00" North

Water Well Details

Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
1	SJ-02681	NM WW	STEPHEN C. THOMAS	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.204621	36.862876	5545 ft (+8)	N/A
2	SJ-02766	NM WW	VICKI RINEHART	DOMESTIC ONE HOUSEHOL D	50	5/22/1997	-108.202336	36.864803	5545 ft (+8)	N/A
3	SJ-02292	NM WW	BILL MUSGROVE	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.210502	36.856833	5522 ft (-15)	N/A
4	SJ-02761	NM WW	JEFFREY P. GUYER	DOMESTIC ONE HOUSEHOL D	80	12/1/1996	-108.198916	36.865625	5543 ft (+6)	N/A
5	SJ-02811	NM WW	ED RISENHOOVER	DOMESTIC ONE HOUSEHOL D	50	8/16/1997	-108.204651	36.866542	5575 ft (+37)	N/A
6	SJ-02042	NM WW	DARRELL AHLERS	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.211435	36.857691	5535 ft (-2)	N/A
7	SJ-02072	NM WW	DICK MANLEY	DOMESTIC ONE HOUSEHOL D	42	7/20/1986	-108.212582	36.85857	5543 ft (+5)	N/A
7	SJ-02050	NM WW	VICTOR GRIZZLE	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.212582	36.85857	5543 ft (+5)	N/A
8	SJ-03083	NM WW	CAROLINE HARTSELL	DOMESTIC ONE HOUSEHOL D	25	3/5/2002	-108.211456	36.855771	5526 ft (-12)	N/A
9	SJ-02579	NM WW	WALTER G. LUCAS	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.209206	36.866591	5649 ft (+112)	N/A
9	SJ-03730-POD1	NM WW	STEPHEN L. HALE	DOMESTIC ONE HOUSEHOL D	190	8/29/2006	-108.209206	36.866591	5649 ft (+112)	N/A
10	SJ-02724	NM WW	ELIZABETH GOULD	DOMESTIC ONE HOUSEHOL D	40	5/16/1997	-108.204505	36.868412	5608 ft (+71)	N/A
10	SJ-02294	NM WW	EDGAR L. RISENHOOVER	DOMESTIC ONE HOUSEHOL D	42	7/25/1990	-108.204505	36.868412	5608 ft (+71)	N/A
11	SJ-03883-POD1	NM WW	JIM NORTH	NON 72-12-1 DOMESTIC & LIVESTOCK	0	N/A	-108.201145	36.868536	5577 ft (+39)	N/A
12	SJ-02618	NM WW	MARK BAILEY	DOMESTIC ONE HOUSEHOL D	500	N/A	-108.213696	36.85571	5529 ft (-9)	N/A
12	SJ-01755	NM WW	JERREL ARNETT	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.213696	36.85571	5529 ft (-9)	N/A
13	SJ-02139	NM WW	SAM ELDRIDGE	DOMESTIC ONE HOUSEHOL D	0	N/A	-108.215009	36.86055	5628 ft (+90)	N/A
14	SJ-03751-POD1	NM WW	RONALD INGRAHAM	DOMESTIC ONE HOUSEHOL D	205	8/29/2006	-108.200136	36.850269	5753 ft (+215)	N/A
15	SJ-02374	NM WW	MICHAEL J. HALEY	DOMESTIC ONE HOUSEHOL D	18	3/20/1993	-108.21362	36.85391	5521 ft (-17)	N/A

Water Well Details

Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
16	SJ-03284	NM WW	BRYAN DOHERTY	DOMESTIC ONE HOUSEHOLD	160	N/A	-108.218353	36.85954	5624 ft (+87)	N/A
17	SJ-01591	NM WW	PLESANT L. GAINES	DOMESTIC ONE HOUSEHOLD	70	7/25/1982	-108.218275	36.855812	5568 ft (+31)	N/A
18	SJ-03191	NM WW	GARY BEES	DOMESTIC ONE HOUSEHOLD	100	N/A	-108.199908	36.873798	5672 ft (+134)	N/A

Well Summary

Water Well Dataset	# of Wells
NM WW	22
Total Count	22

Dataset Descriptions and Sources



Dataset	Source	Dataset Description	Update Schedule	Data Requested	Data Obtained	Data Updated	Source Updated
NM WW - New Mexico Water Wells	New Mexico Office of the State Engineer	This WATERS dataset contains all groundwater records and water rights applications compiled by New Mexico Office of the State Engineer (OSE). OSE is in the process of digitizing all records, all wells have not yet been plotted.	Quarterly	08/24/2017	08/24/2017	08/27/2017	08/03/2017
NM WW HIST - New Mexico Historical Water Wells	New Mexico Office of the State Engineer	This dataset contains all groundwater records found at the New Mexico Office of the State Engineer Water Rights Division district office. Groundwater rights are administered and filed at the district level: Albuquerque (District I), Roswell (District II),		N/A	N/A	N/A	N/A
WW USGS - USGS Water Wells	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Semi-annually	06/17/2019	06/17/2019	06/17/2019	06/17/2019

Disclaimer

The Banks Environmental Data Water Well Report was prepared from existing state water well databases and/or additional file data/records research conducted at the state agency and the U.S. Geological Survey. Banks Environmental Data has performed a thorough and diligent search of all groundwater well information provided and recorded. All mapped locations are based on information obtained from the source. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the records and mapped well locations could possibly be traced to the appropriate regulatory authority or the actual driller. It may be possible that some water well schedules and logs have never been submitted to the regulatory authority by the water driller and, thus, may explain the possible unaccountability of privately drilled wells. It is uncertain if the above listing provides 100% of the existing wells within the area of review. Therefore, Banks Environmental Data cannot fully guarantee the accuracy of the data or well location(s) of those maps and records maintained by the regulatory authorities.

Appendix G

Groundwater Stabilization Parameters

**Table G-1. Groundwater Stabilization Parameters
Kaufman No. 1 Release
Hilcorp Energy Company
San Juan County, New Mexico**

Well ID	Date	Time	Amount Purged (gallons)	Depth to Water (ft bgs)	Temperature (°C)	Dissolved Oxygen (mg/L)	Electric Conductivity (mS/cm)	pH ¹	Oxidation Reduction Potential (mV)
MW1	10/09/19	1516	4	4.02	17	0.04	3.28	--	-85.7
		1518	5	4.02	17	0.05	3.28	--	-85.6
		1520	6	4.02	17	0.05	3.28	--	-85.7
MW2	10/09/19	1259	7	5.02	16.7	0.06	3.81	--	-57.5
		1301	8	5.04	16.7	0.06	3.81	--	-59.6
		1303	9	5.06	16.7	0.06	3.81	--	-61.9
MW3	10/09/19	1200	8	4.91	14.1	0.37	3.02	--	-4.4
		1202	9	4.91	14.1	0.36	3.02	--	-4.3
		1204	10	4.91	14.1	0.36	3.02	--	-4.2
MW4	10/09/19	1441	6	6.16	13.6	0.03	3.11	--	-106.5
		1444	7	6.15	13.6	0.01	3.11	--	-109.6
		1447	8	6.10	13.6	0.00	3.11	--	-112.4
MW5	10/09/19	1359	4	6.18	9.2	0.26	3.94	--	-2.7
		1401	5	6.2	8.7	0.22	3.94	--	-4.6
		1403	6	6.24	8.6	0.21	3.94	--	-5.6
MW6	10/09/19	1329	4	6.05	17	0.05	3.62	--	-300
		1332	5	6.2	17	0.05	3.62	--	-304
		1335	6	6.15	17	0.05	3.62	--	-312

* - 10 gallons were purged prior to low flow to develop the monitor wells

ft bgs - feet below ground surface

°C - degrees celsius

mg/L - milligrams per liter

mS/cm - millisiemens per centimeter

mV - millivolts

¹ - Not recorded, pH probe error