

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109



FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe):

GENERAL INFORMATION

OGCC Operator Number: 47120		Contact Name and Telephone	
Name of Operator: Kerr-McGee Oil and Gas Onshore LP		Name: Phillip Hamlin	
Address: P.O. Box 173779		No: (970) 336-3500	
City: Denver State: CO Zip: 80217-3779		Fax: (970) 336-3656	
API/Facility No: Spill/Release ID: 447556		County: Weld	
Facility Name: Herman 1, L32-13JI, L32-14		Facility Number:	
Well Name:		Well Number:	
Location (QtrQtr, Sec, Twp, Rng, Meridian): SWSW Sec 32-T3N-R66W		Latitude: 40.177310 Longitude: -104.806134	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Oil, Condensate, and Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☒ Y ☐ N If yes, attach evaluation. Groundwater < 20 ft.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Cropland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Well-graded sands (SW)

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Surface water approximately 170' NE, water well approximately 925' SW, wetlands approximately 1,120' NW, livestock approximately 1,040' S, building approximately 1,200' SW, and excavation groundwater approx. 6' below ground surface (bgs).

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	20' N-S x 28' E-W x 6.5' bgs (maximum extent)	Collected soil samples for laboratory analysis
<input type="checkbox"/> Vegetation		
<input checked="" type="checkbox"/> Groundwater	See attached data	Collected groundwater samples for laboratory analysis
<input type="checkbox"/> Surface water		

REMEDIALATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

While performing an emissions upgrade at the Herman 1, L32-13JI, L32-14 facility, soil and groundwater with historical petroleum hydrocarbon impacts were encountered adjacent to the dumphines. There were no indications that the dumphines were leaking. The volume of the release is unknown. The petroleum hydrocarbon impacted soil was excavated. Groundwater was encountered in the excavation at approximately 6 feet bgs. A topographic Site Location Map showing the geographic setting of the release is provided as Figure 1.

Describe how source is to be removed:

On August 31, 2016, four soil samples (N01@4', E01@4', S01@4', and W01@4') were collected from the excavation sidewalls and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) by United States Environmental Protection Agency (USEPA) Methods 8015C and 8260C, benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260C, pH by USEPA Method 9045D, and specific conductivity (EC) by USEPA Method 9050D. Laboratory analytical results indicated that TPH, BTEX, pH, and EC concentrations were in compliance with COGCC Table 910-1 allowable levels at the lateral extent of the excavation. An excavation groundwater sample (GW01) was collected for BTEX analysis. Laboratory analytical results for GW01 indicated that benzene and total xylenes exceeded Colorado Groundwater Quality Standards (CGWQS) at concentrations of 180 micrograms per liter (µg/L) and 4,890 µg/L, respectively. Approximately 55 barrels of impacted groundwater were removed from the excavation and transported to a licensed injection facility for disposal.

Impacted soil was excavated into the phreatic zone to address potential hydrocarbon impacts that may have been present below the current water table due to past seasonal fluctuations. Approximately 110 cubic yards of impacted soil were excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. Prior to backfilling, 100 pounds of COGAC[®], an activated carbon-based bioremediation product, was applied to the groundwater and clean backfill in a series of lifts to ensure distribution through the phreatic and capillary zones. The general site layout, excavation dimensions, and soil and groundwater sample locations are depicted on the Excavation Site Map provided as Figure 2. The excavation soil and groundwater sample analytical results are summarized in Tables 1 and 2, respectively.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

The impacted soil was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The impacted groundwater was transported to a licensed injection facility for disposal.

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REMEDIATION WORKPLAN (CONT.)

OGCC Employee:

Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No.: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):
Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the dissolved-phase groundwater impact. The monitoring wells will be surveyed to determine the groundwater flow direction. Quarterly groundwater monitoring activities will be conducted and samples will be submitted for laboratory analysis of BTEX.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
The dumphines adjacent to the historical petroleum hydrocarbon impacts will be replaced and the site will be restored to pre-release grade.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.
Is further site investigation required? ☒ Y ☐ N If yes, describe:
After installing the monitoring wells and establishing points of compliance, groundwater monitoring will be conducted.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):
The impacted soil was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The impacted groundwater was transported to a licensed injection facility for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	8/31/2016	Date Site Investigation Completed:	Active	Remediation Plan Submitted:	
Remediation Start Date:	9/1/2016	Anticipated Completion Date:	TBD	Actual Completion Date:	

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Phillip Hamlin

Signed: _____ Title: Senior HSE Representative Date: 11/30/16

OGCC Approved: _____ Title: _____ Date: _____

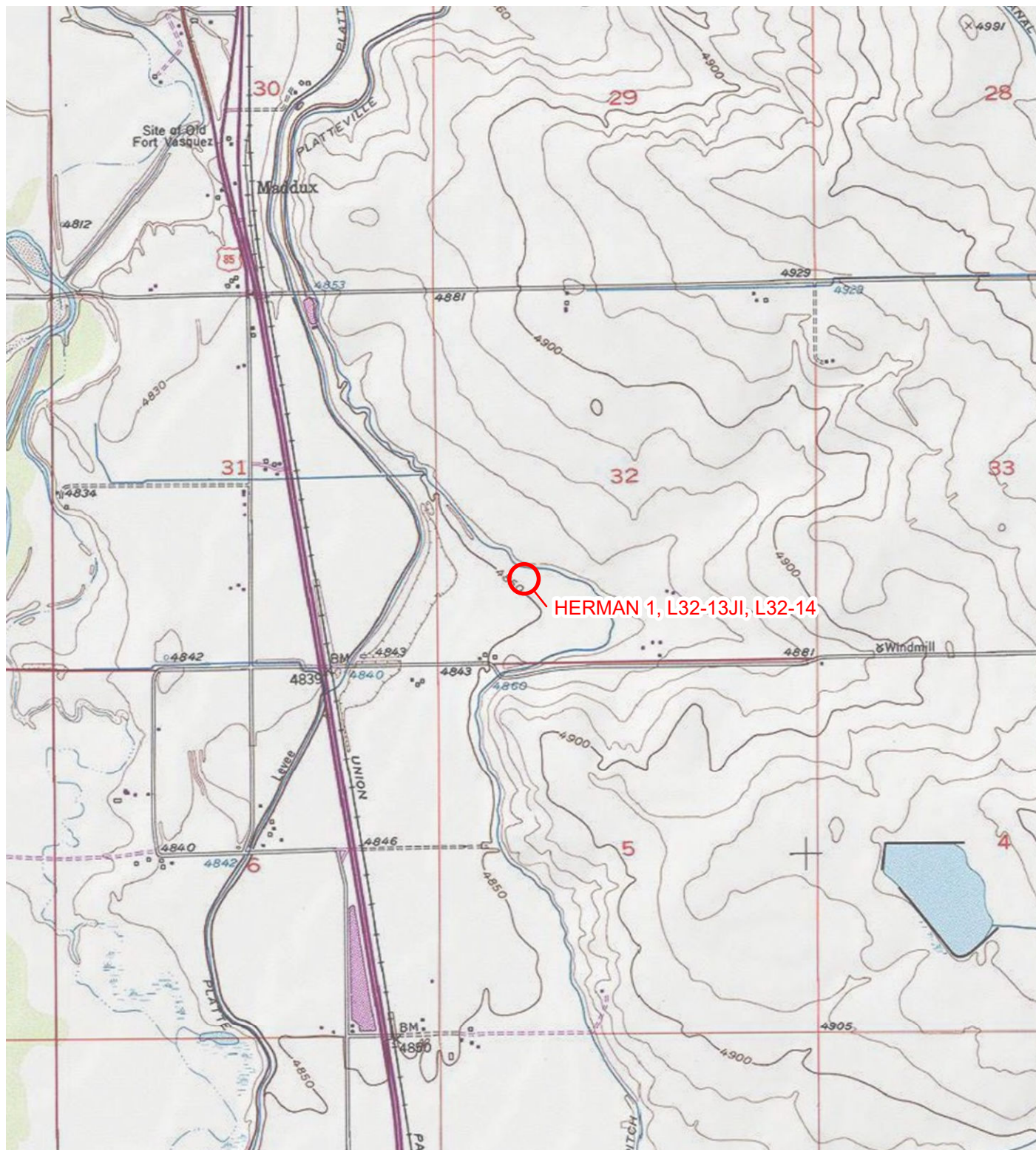


IMAGE COURTESY OF ESRI/USGS

LEGEND

○ SITE LOCATION

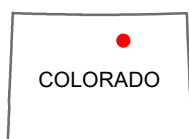
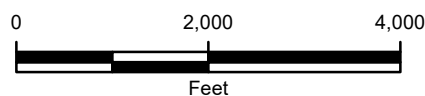


FIGURE 1
SITE LOCATION MAP
 HERMAN 1, L32-13JI, L32-14
 SWSW SEC 32-T3N-R66W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



GROUNDWATER SAMPLE ID
 SAMPLE DATE
 B: BENZENE CONCENTRATION
 X: TOTAL XYLENE CONCENTRATION
 RESULTS IN MICROGRAMS PER LITER
BOLD INDICATES RESULT EXCEEDS STANDARD

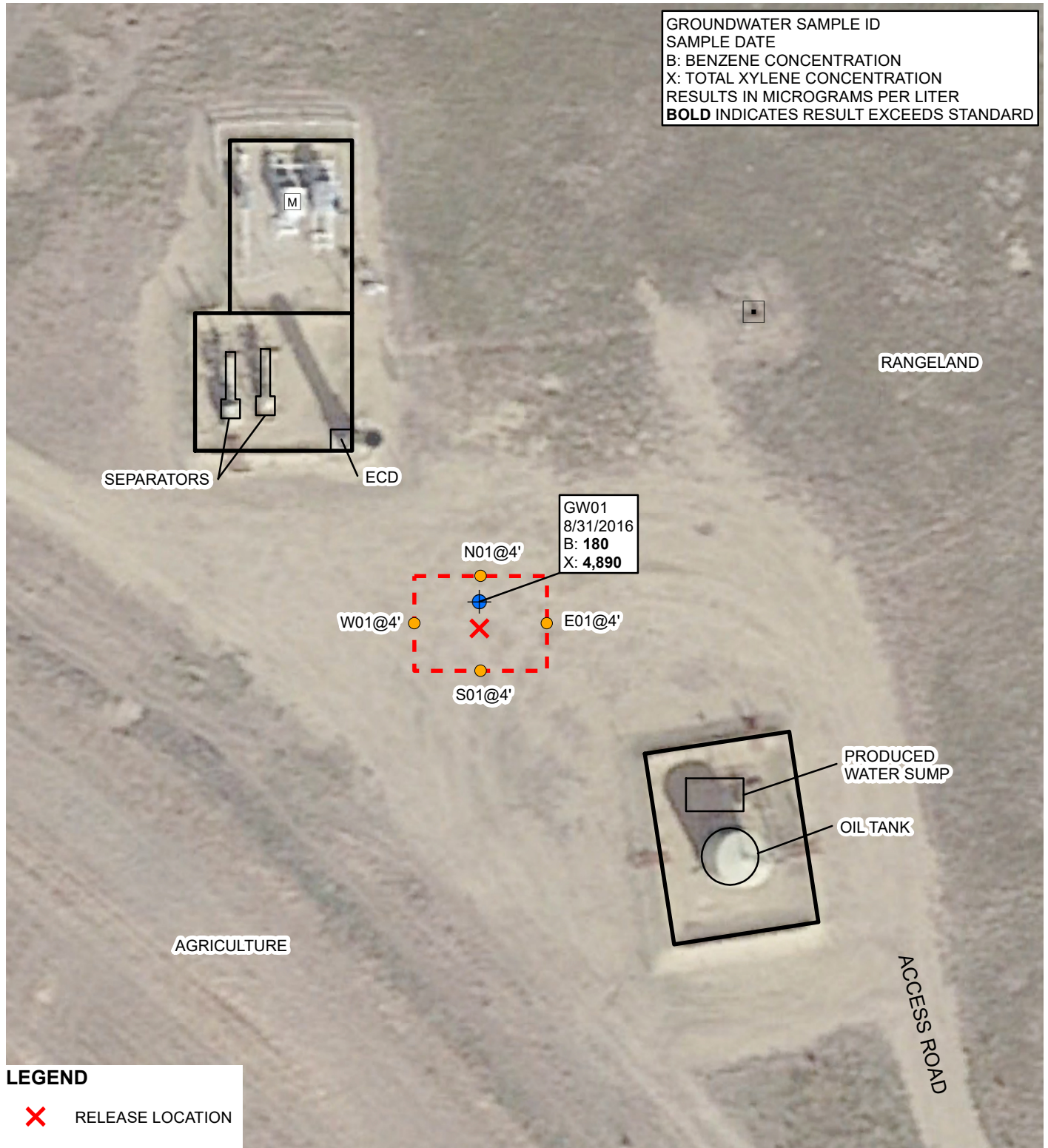


IMAGE COURTESY OF GOOGLE EARTH 2015

LEGEND

- ✕ RELEASE LOCATION
- SOIL SAMPLE
- ⊕ GROUNDWATER SAMPLE
- WELLHEAD
- M METER HOUSE
- EXCAVATION EXTENT
- BERM
- ECD: EMISSION CONTROL DEVICE

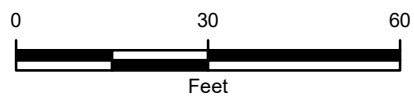


FIGURE 2
 EXCAVATION SITE MAP
 HERMAN 1, L32-13JI, L32-14
 SWSW SEC 32-T3N-R66W
 WELD COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP



TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
HERMAN 1, L32-13JI, L32-14
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Soil Sample ID	Depth (bgs)	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	DRO (mg/kg)	GRO (mg/kg)	ORO (mg/kg)	pH (su)	Specific Conductance (mmhos/cm)
E01 @ 4'	4'	08/31/2016	<0.050	<0.050	<0.050	<0.050	<25.0	<5.00	<100	7.38	0.174
N01 @ 4'	4'	08/31/2016	<0.050	<0.050	<0.050	<0.050	<25.0	<5.00	<100	7.46	0.189
S01 @ 4'	4'	08/31/2016	<0.050	<0.050	<0.050	<0.050	<25.0	<5.00	<100	7.41	0.150
W01 @ 4'	4'	08/31/2016	<0.050	<0.050	<0.050	<0.050	<25.0	<5.00	<100	7.93	0.211
COGCC Allowable Levels			0.17	85	100	175	500*	500*	500*	6-9	4

Notes: bgs - below ground surface

COGCC - Colorado Oil and Gas Conservation Commission

DRO - diesel range organics

GRO - gasoline range organics

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed/not available

ORO - oil range organics

su - standard units

* - Standard applies to combined DRO-GRO-ORO

< - less than laboratory reporting limit

Bold indicates result exceeds allowable level



TABLE 2
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HERMAN 1, L32-13JI, L32-14
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Well Name	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth Water/ (Product Thickness) (ft bgs)
GW01	08/31/2016	180	220	316	4890	6.00
CGWQS		5	1000	700	1400	

Notes: CGWQS - Colorado Groundwater Quality Standards
ft bgs - feet below ground surface
NA - not analyzed/not available
NM - not measured

µg/L - micrograms per liter
< - less than laboratory reporting limit
Bold indicates result exceeds allowable level
Excavation groundwater depth is approximate

