

**REMEDATION INJECTION RULE
AUTHORIZATION APPLICATION**

**KERR-MCGEE OIL AND GAS ONSHORE LP
HSR-DREYER 5-5 FORMER TANK BATTERY
SWNW SEC 5-T1S-R65W
ADAMS COUNTY, COLORADO**

FEBRUARY 2018

Prepared for:

**U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 8
1595 Wynkoop Street
Denver, Colorado 80202-1129**

Prepared by:

**LT ENVIRONMENTAL, INC.
4600 West 60th Avenue
Arvada, Colorado 80003
(303) 433-9788**

UNDERGROUND INJECTION RULE AUTHORIZATION APPLICATION
KERR-MCGEE OIL AND GAS ONSHORE LP
HSR-DREYER 5-5 FORMER TANK BATTERY
SWNW SEC 5-T1S-R65W
ADAMS COUNTY, COLORADO

FEBRUARY 2018

1. Property owner of facility including a physical and mailing address; phone and fax numbers.

Jody and Rick Hunton
15400 W 64th Ave, No. E9-174
Arvada, CO 80007
303-857-4436 (phone)

Jody and Rick Hunton own the land where the facility is located. Kerr-McGee Oil and Gas Onshore LP operated the production facility at the Site. The facility has been removed, and the associated oil and gas wells has been plugged and abandoned.

2. Operator of facility including a physical and mailing address; phone and fax numbers.

Kerr-McGee Oil and Gas Onshore LP
1099 18th Street, Suite 1800
Denver, Colorado 80202
(970) 515-1161 phone
Contact: Mr. Phil Hamlin

3. Responsible party for the operation, maintenance, and closure of the injection system including a physical and mailing address and phone number.

Kerr-McGee Oil and Gas Onshore LP
1099 18th Street, Suite 1800
Denver, Colorado 80202
(970) 515-1161 phone
Contact: Mr. Phil Hamlin

- 4. Contact persons representing any other regulatory agencies that have an interest in the site; include a physical and mailing address and phone number.**

Mr. Chris Canfield
Environmental Protection Specialist
Colorado Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, Colorado 80203
(303) 894-2100 ext. 5183
chris.canfield@state.co.us

- 5. Briefly outline the type of contamination and when it occurred.**

Historical petroleum hydrocarbon impacts from oil and gas production activities were discovered beneath the produced water sump following removal of the sump. The volume of the release is unknown. Impacted soil was excavated, and impacted groundwater was removed from the open excavation. Prior to backfilling the excavation, MicroBlaze® Emergency Liquid Spill Control was applied to the excavation as an initial remedial measure.

- 6. Map of the site location (1:24,000 topographic map or similar)**

A topographic Site Location / Water Well Location Map is attached as Figure 1. The site is located at a latitude/longitude of 39.996994/-104.693622.

- 7. Analysis of groundwater from the receiving formation (up gradient from the contamination) and from the contaminated formation (near the source) include tabular data and a map of the contamination plume with the local groundwater flow direction shown.**

Groundwater analytical results are provided in Table 1. The monitoring well locations, areal extent of the contaminant plume, and surveyed groundwater flow direction are depicted on Figure 2.

- 8. Analysis of contaminants. Include BTEX and MTBE if fuel spill related.**

Benzene, toluene, ethylene, and total xylenes (BTEX) concentrations for the quarterly groundwater monitoring events are presented in Table 1. Methyl tertiary butyl ether (MTBE) is not a potential contaminant. The released product was unrefined and did not contain any fuel additives.

- 9. Type of proposed injection well. (example: water well, trench, injection gallery, etc.)**

The proposed air injection, or air sparging (AS), wells will be constructed with 2.0-inch polyvinyl chloride (PVC) casing and have 2 feet of 0.010-slot PVC screen attached to the bottom of the well casing. The well screen will be surrounded by a 10/20 silica sand pack that extends 6 inches above the well screen. The AS wells

will be installed using a truck-mounted hollow-stem auger rig to a depth of approximately 10 feet below the static groundwater table. The total depth of the AS wells will be between 20 feet and 24 feet below ground surface (bgs), but may be adjusted in the field at the time of installation based on observed lithology changes and stained intervals. A 3-foot hydrated bentonite seal will be installed above the sand pack followed by cement grout (90%) with bentonite (10%) to 2 feet bgs. The annulus will be completed from 2 feet bgs to the ground surface with native fill. The proposed AS well network is shown on Figure 3.

10. Analysis of the proposed injectate.

The AS system is designed to introduce ambient air into the subsurface water column to promote volatilization and aerobic microbial decomposition of dissolved-phase petroleum hydrocarbons.

11. Hydrogeologic description, location, depth, and current use (if any) of the receiving formations. Include hydrological studies if available.

The depth to the observed water table at the site ranges from 8 feet to 14 feet bgs, indicating a shallow, unconfined aquifer. The surveyed groundwater flow direction at the site is generally to the northwest. Soil at the site consists of sandy clay (surface to ~10 feet bgs) and medium to fine-grained sand (10 feet to 16 feet bgs).

A monitoring well (permit #53988-MH) is located 780 feet northwest of the site and is completed to a total depth of 60 feet with no screening data available. A domestic water well (permit #11471) is located 1,108 feet southeast of the site and is screened from 21 feet to 46 feet bgs. A monitoring well (permit #300836) is located 1,145 feet northwest of the site and is screened from 4 feet to 10 feet bgs.

Soil boring logs and excavation field notes indicate the presence of staining and elevated photoionization detector headspace measurements in the saturated and smear zone soil from approximately 8 feet to 15 feet bgs.

12. Location of existing monitoring wells (if any) and the location of proposed monitoring wells.

The existing monitoring well locations are presented in Figure 2, and the most recent groundwater analytical results are summarized on Table 1.

13. Explain how the monitoring system proposed will be able to track contaminant migration and how the proposed remediation system will minimize further migration.

The existing monitoring well network is sampled on a quarterly basis. Quarterly groundwater monitoring will be conducted until site-wide BTEX concentrations are in compliance with Colorado Oil and Gas Conservation Commission (COGCC) allowable levels (COGCC Table 910-1) for four consecutive quarters. The four

compliant sampling events used to close the site will occur with the AS and soil vapor extraction (SVE) system off to allow for static monitoring.

In order to prevent further migration of the contaminant plume, the AS/SVE system will operate within the groundwater plume, applying pressurized ambient air to the saturated zone until dissolved-phase BTEX concentrations achieve cleanup goals. Established monitoring wells will be monitored on a quarterly basis to ensure no further plume migration is occurring. The AS and SVE well layouts are presented on Figure 3 and Figure 4, respectively.

14. If injection is into an alluvial aquifer, provide locations of surface water bodies, i.e. rivers, streams, and lakes, within one mile of injection site (may substitute topographic map).

The injection zone is not in an alluvial aquifer. A topographic Site Location / Water Well Location Map showing the geographical setting of the site is provided as Figure 1. The East Burlington Extension Canal is located approximately 868 feet west-northwest (downgradient) of the site. The Neres Canal and the Denver Hudson Canal, located 806 feet and 3,384 feet southeast (upgradient) of the site, respectively. Calhoun Reservoir is located 2,658 feet southwest of the facility, and the Beepe Seep Canal is located 4,370 feet west of the site, both cross-gradient to the flow.

15. Provide location and description of any drinking water wells within ¼ mile that may be impacted by the proposed injection.

According to the Colorado Division of Water Resources (DWR) water well database, there are four domestic water wells located downgradient of the injection site, one of which is plugged and abandoned (permit #184509). The remaining three wells (permit #225907, #214466, and #191954) are screened within the Lower Arapahoe Aquifer, which is estimated between 370 feet and 640 feet bgs in the vicinity of the site. Based on the proposed depths of injection (between 18 and 24 feet bgs), the domestic water wells downgradient of the site will not be impacted by the proposed injection of ambient air. The water well locations are shown on Figure 1.

16. Description of the remediation system including operational procedures.

Description of the Remediation System

The AS system is designed to introduce ambient air into the subsurface water column to promote volatilization and aerobic microbial decomposition of dissolved-phase petroleum hydrocarbons. The SVE system is designed to extract volatilized hydrocarbons from the subsurface.

LT Environmental, Inc. has installed and operated numerous AS/SVE systems in the region and within similar geology. Data from the operation of these systems

indicate that a conservative, but reliable, radius of influence of 20 feet for the AS wells and 30 feet for the SVE wells can be anticipated.

The AS/SVE system is proposed to operate through a network of 27 AS wells and 10 SVE wells. The AS/SVE wells will be connected to a remediation trailer that houses the equipment and controls for the AS/SVE systems. The layout of the proposed AS injection well network is depicted on Figure 3. The layout of the proposed SVE well network is depicted on Figure 4.

Equipment

The final remediation system will include the following equipment or an equivalent replacement powered by a utility electric drop:

- AS blower (Gardner Denver DLR-150 – claw style blower);
- SVE blower (Roots 47 U-RAI DSL – rotary lobe style blower);
- Air conveyance high density polyethylene piping and flow control valves; and various gauges and sensors.

Operational Procedure

The AS system is designed to operate continuously. AS air flow will be directed to the subsurface at an approximate rate of 100 cubic feet per minute and an expected pressure of approximately 10 pounds per square inch (psi) with a maximum pressure of approximately 25 psi.

System parameters, including AS air flow rates, monitoring well pressure, monitoring well volatile organic compound head space concentrations, groundwater dissolved oxygen (DO) concentrations, and/or monitoring well depth to water will be monitored on a regular basis in order to optimize system operations.

17. If injectate is treated water, is it expected to meet current drinking water standards? If not, what exceedances are expected?

The injectate is ambient air.

18. Describe effect of injectate on groundwater: reaction products or by-products that are anticipated.

The AS system is designed to introduce ambient air into the subsurface water column to volatilize and promote aerobic microbial decomposition of dissolved-phase petroleum hydrocarbons. The injection of ambient air is expected to increase groundwater DO concentrations.

19. Bench scale-testing results if available.

A bench scale-test will not be performed.

20. A specific closure plan for the removal, closure, or plugging of the injections system.

All monitoring wells and injection holes will be abandoned following DWR guidelines.

21. An executive summary of the approved Corrective Action Plan.

Following a heavy rain event, the produced water sump at the site floated. The produced water sump was removed, and during removal, it was discovered that the piping threads were partially stripped, which resulted in a release of an unknown volume of oil and produced water. The area was excavated, and approximately 230 cubic yards of petroleum hydrocarbon impacted soil were removed and transported to the Waste Management Buffalo Ridge Landfill for disposal. Approximately 49 barrels of petroleum hydrocarbon impacted groundwater were removed from the excavation using a vacuum truck and transported to a licensed injection facility for disposal. Prior to backfilling the excavation, 10 gallons of MicroBlaze® Emergency Liquid Spill Control were applied to the excavation. Microblaze® is a water-soluble solution of cultured, non-pathogenic *Bacillus* bacteria (400 billion/gallon), water, nutrients, and surfactants designed for an in-situ remediation of organic compounds and hydrocarbons under aerobic and anaerobic conditions. This constituted the first phase of remediation.

Following the first phase of remediation, a site assessment was conducted to determine the extent of the residual dissolved-phase groundwater impact. Per COGCC rules, petroleum hydrocarbon impacts in groundwater must be remediated to the current COGCC Table 910-1 Concentration Levels for BTEX. The second phase of remediation, conducted between June 2013 and October 2014, involved bi-weekly manual bailing of free product present in monitoring wells MW01, MW07, MW09, MW10, MW16, MW19, and MW20. The free product recovery was discontinued in October 2014 due to lack of measurable product.

The third phase of site remediation will consist of using AS/SVE technology to promote dissolved-phase petroleum hydrocarbon volatilization and aerobic microbial decomposition, as described herein.

22. Estimate the time period required to complete the task covered in this Rule authorization request.

It is estimated that the AS/SVE system will operate for a period of 1.5 years following system startup.

FIGURES

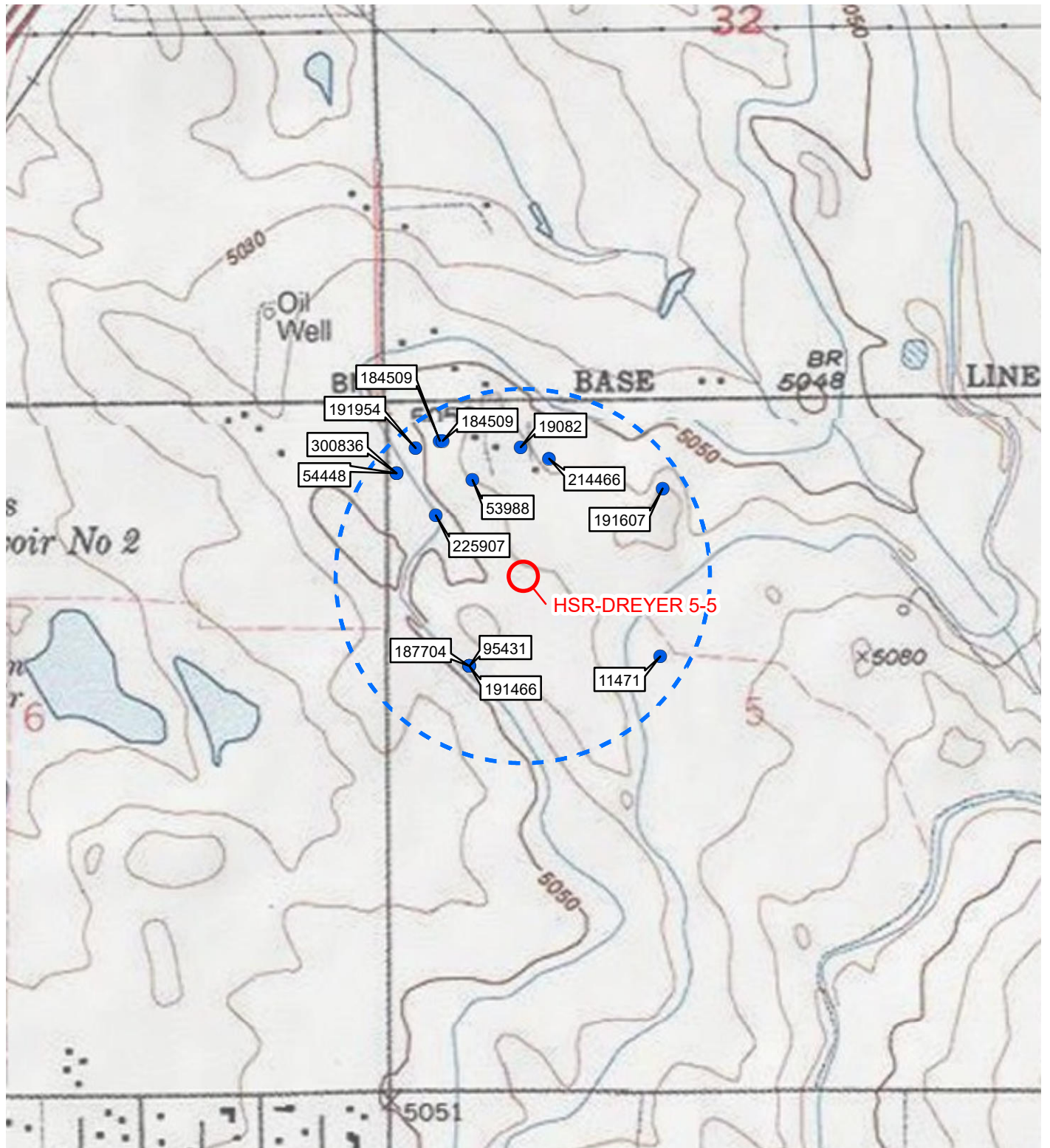


IMAGE COURTESY OF ESRI/USGS

LEGEND

- SITE LOCATION
- WATER WELL
- ⊙ QUARTER MILE RADIUS

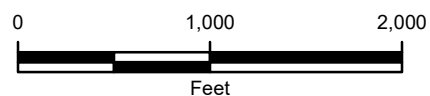
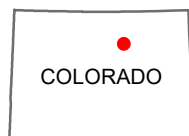
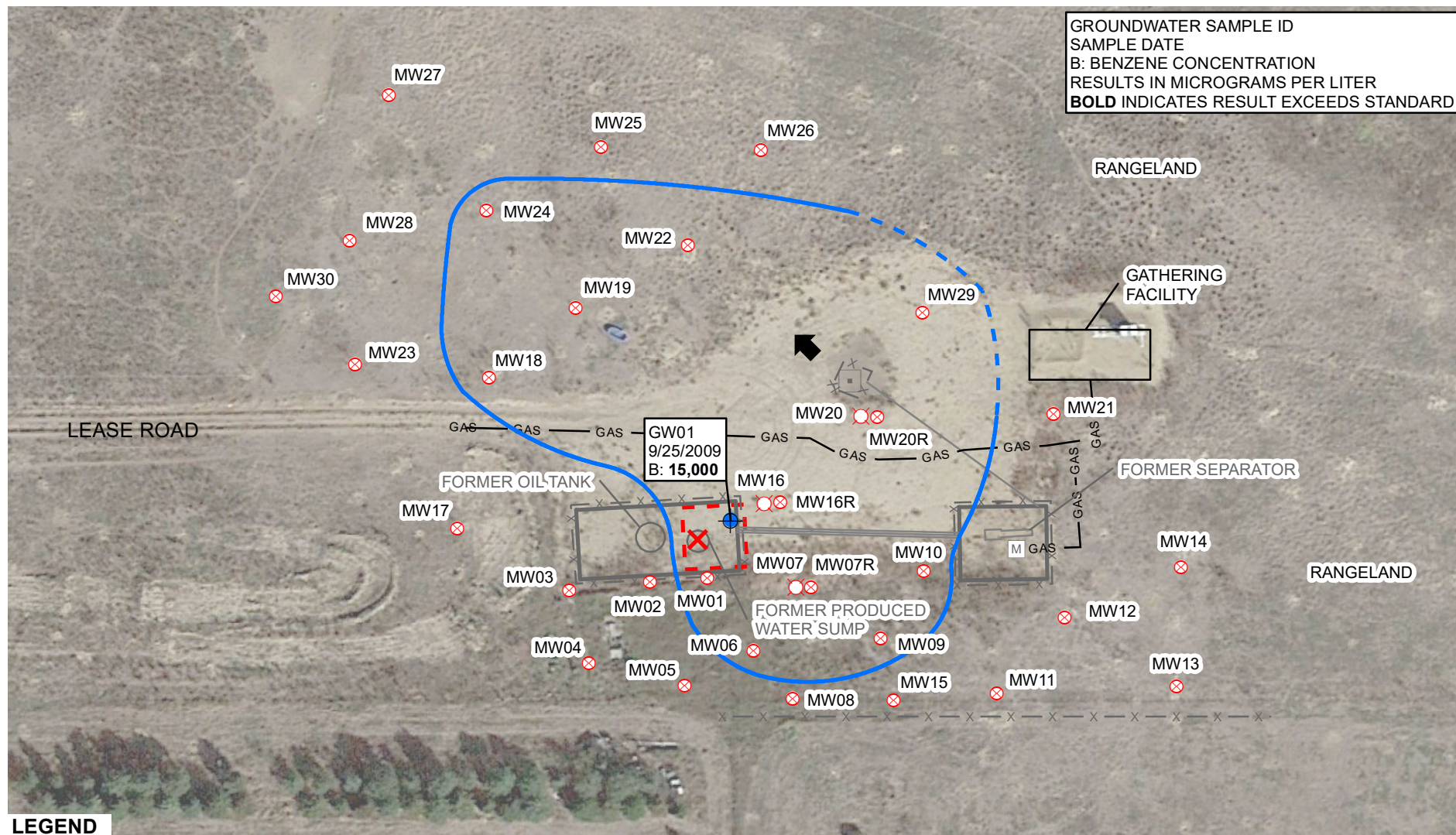


FIGURE 1
SITE LOCATION/WATER WELL LOCATION MAP
 HSR-DREYER 5-5
 SWNW SEC 5-T1S-R65W
 ADAMS COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP





LEGEND

- | | | | |
|--|---------------------------|--|-----------------------|
| | RELEASE LOCATION | | FLOW LINE |
| | MONITORING WELL | | IRRIGATION DITCH |
| | DESTROYED MONITORING WELL | | GAS GATHERING LINE |
| | GROUNDWATER SAMPLE | | FORMER FENCE |
| | FORMER WELLHEAD | | CONTAMINANT PLUME |
| | FORMER METER HOUSE | | DASHED WHERE INFERRED |
| | | | EXCAVATION EXTENT |
| | | | FORMER BERM |

IMAGE COURTESY OF GOOGLE EARTH 2015

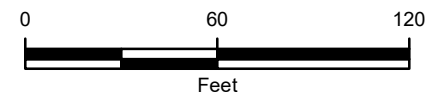
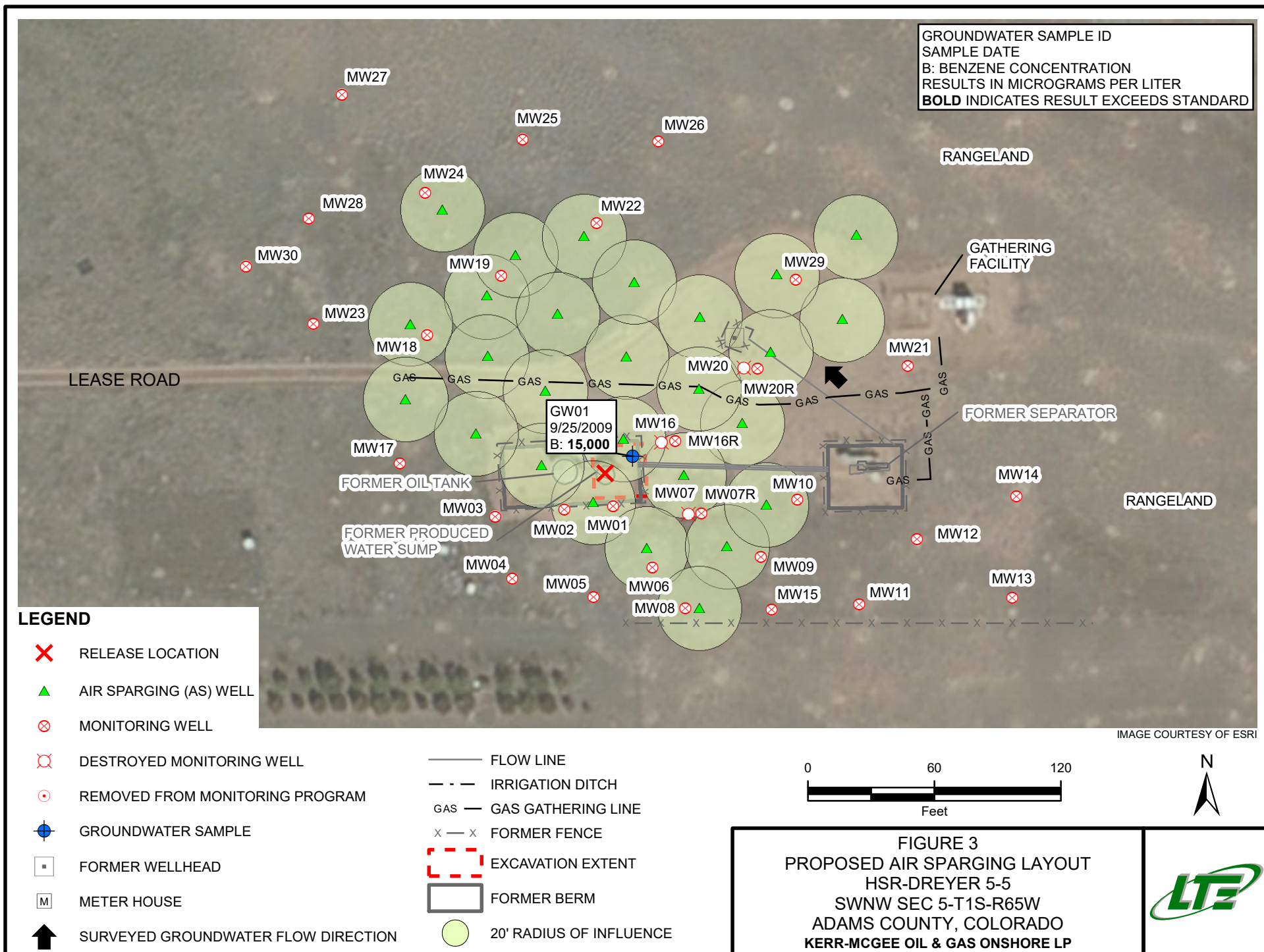
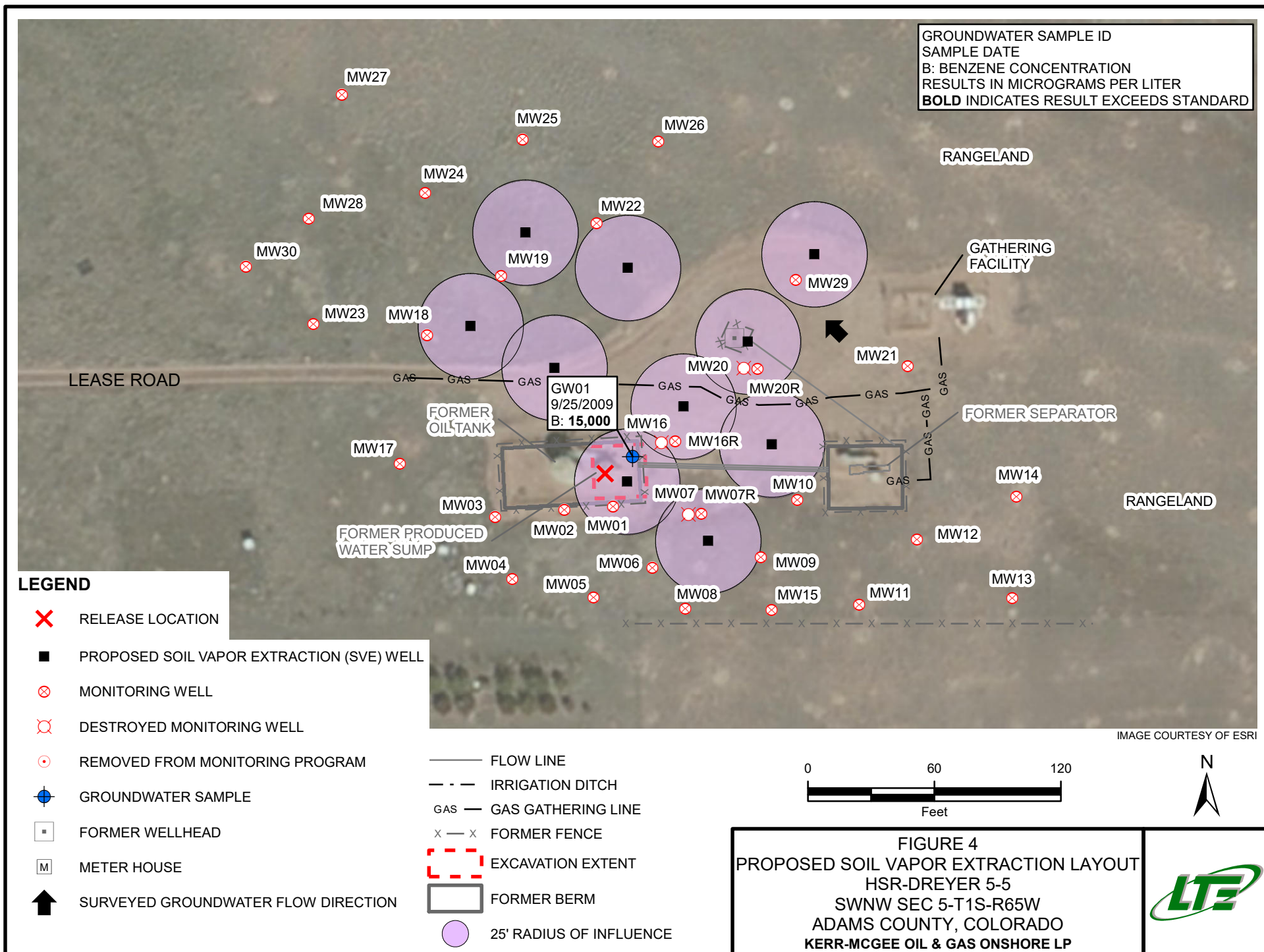


FIGURE 2
 SITE MAP
 HSR-DREYER 5-5
 SWNW SEC 5-T1S-R65W
 ADAMS COUNTY, COLORADO
 KERR-MCGEE OIL & GAS ONSHORE LP







TABLE

TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
GW01	9/25/2009	15000	21000	290	7200	9.0	NA
MW01	12/17/2009	19000	23000	570	7600	8.38	88.05
	3/12/2010	34000	44000	460	5100	10.83	85.60
	6/15/2010	40000	67000	410	5200	9.08	87.35
	9/16/2010	22000	34000	830	8900	8.83	87.60
	12/7/2010	20000	31000	670	7900	9.84	86.59
	3/15/2011	34000	47000	390	5200	11.24	85.19
	6/27/2011	Product - Not Sampled				11.47 (0.50)	84.96
	9/14/2011	27000	42000	1000	12000	9.17	87.26
	12/16/2011	21000	36000	880	12000	9.68	86.75
	3/7/2012	19000	38000	600	10000	10.68	85.75
	6/25/2012	6400	16000	390	5100	11.44	84.99
	9/24/2012	11000	17000	330	4800	11.78	84.65
	12/28/2012	Product - Not Sampled				14.33 (2.10)	82.10
	3/28/2013	Product - Not Sampled				15.73 (1.90)	80.70
	6/5/2013	Product - Not Sampled				13.37 (0.16)	83.06
	9/5/2013	6600	16000	340	6400	11.68	84.75
	12/3/2013	Surveyed - Not Sampled				9.85	86.55
	12/17/2013	15000	31000	325	9430	10.04	86.39
	3/4/2014	14500	30400	696	10100	10.64	85.79
	6/5/2014	15200	31500	594	8520	9.93	86.47
	9/24/2014	16400	35500	665	8710	8.60	87.80
	12/10/2014	8570	16900	313	4640	9.62	86.78
	3/12/2015	13300	29900	565	7280	9.91	86.49
	6/18/2015	13200	37400	666	8690	8.73	87.67
	9/2/2015	10700	36900	718	9070	8.33	88.07
	12/10/2015	6910	24400	510	5600	8.55	87.85
	3/2/2016	9030	40100	765	8840	9.01	87.39
	9/19/2016	2,960	7,400	<500	3,780	8.40	88.00
	12/15/2016	2,330	9,990	361	3,800	9.48	86.92
	3/20/2017	3,890	27,200	712	8,430	10.73	85.67
	6/12/2017	2,770	47,400	570	7,690	9.90	86.50
	9/29/2017	1,420	8,000	<500	3,550	9.50	86.90
	12/18/2017	1,310	13,800	516	4,710	10.21	86.19
MW02	12/17/2009	2100	3100	150	1400	8.99	87.19



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	3/12/2010	160	160	57	100	10.61	85.57
	6/15/2010	390	900	24	170	8.97	87.21
	9/16/2010	23	1.5	38	4.4	8.56	87.62
	12/7/2010	89	70	13	24	9.60	86.58
	3/15/2011	77	23	100	11	11.04	85.14
	6/27/2011	1700	5700	560	2800	11.06	85.12
	9/14/2011	17	2.9	29	46	9.06	87.12
	12/16/2011	160	200	39	150	9.63	86.55
	3/7/2012	180	450	39	190	10.56	85.62
	6/25/2012	14	<1.0	27	12	11.06	85.12
	9/24/2012	17	2.9	7.2	<1.0	11.26	84.92
	12/28/2012	14	1.2	5.5	<1.0	12.91	83.27
	3/28/2013	<1.0	<1.0	<1.0	25	13.96	82.22
	6/5/2013	190	64	43	270	12.95	83.23
	9/5/2013	250	5.8	18	210	11.52	84.66
	12/3/2013	Surveyed - Not Sampled				9.84	86.53
	12/17/2013	219	41.9	16.8	397	9.84	86.34
	3/4/2014	251	28.9	66.7	601	10.40	85.78
	6/5/2014	126	20.2	93.3	827	10.00	86.37
	9/24/2014	37.8	<10.0	30.6	184	8.65	87.72
	12/10/2014	3.8	<1.0	21.6	24.5	9.65	86.72
	3/12/2015	38.4	1.4	63.4	373	9.97	86.40
	6/18/2015	31.6	8.5	104	867	8.67	87.70
	9/2/2015	18.4	32.8	27.4	260	8.28	88.09
	12/10/2015	7.3	<4.0	27.3	170	8.57	87.80
	3/2/2016	15.5	12.8	194	1240	9.01	87.36
	9/19/2016	<4.00	<4.00	<4.00	<4.00	8.40	87.97
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.39	86.98
	3/20/2017	<1.00	<1.00	3.28	3.62	10.73	85.64
	6/12/2017	<1.00	5.47	20.6	213	9.87	86.50
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.47	86.90
	12/18/2017	<1.00	1.22	<1.00	5.77	10.16	86.21
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MW03	12/17/2009	<1.0	3.4	<1.0	1.3	8.72	87.03
	3/12/2010	<1.0	<1.0	<1.0	<1.0	10.36	85.39
	6/15/2010	<1.0	<1.0	<1.0	<1.0	8.76	86.99
	9/16/2010	<1.0	<1.0	<1.0	<1.0	8.36	87.39



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	12/7/2010	<1.0	<1.0	<1.0	<1.0	9.36	86.39
	3/15/2011	<1.0	<1.0	<1.0	<1.0	10.80	84.95
	6/27/2011	2.5	14	1.0	8.1	10.86	84.89
	9/14/2011	<1.0	<1.0	<1.0	<1.0	8.82	86.93
	12/16/2011	1.3	3.8	<1.0	2.3	9.36	86.39
	3/7/2012	<1.0	1.8	<1.0	<1.0	10.36	85.39
	6/25/2012	<1.0	<1.0	<1.0	<1.0	10.74	85.01
	9/24/2012	<1.0	1.3	<1.0	<1.0	10.99	84.76
	12/28/2012	Insufficient Water - Not Sampled				12.71	83.04
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Insufficient Water - Not Sampled				12.73	83.02
	9/5/2013	<1.0	<1.0	<1.0	<1.0	11.20	84.55
	12/3/2013	Surveyed - Not Sampled				9.53	86.39
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.53	86.22
	3/4/2014	<1.0	<1.0	<1.0	<1.0	10.15	85.60
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.72	86.20
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.32	87.60
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.45	86.47
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.73	86.19
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.41	87.51
	9/2/2015	<1.0	<1.0	<1.0	<1.0	8.03	87.89
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.34	87.58
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.70	87.22
	9/19/2016	<1.00	<1.00	<1.00	<1.00	8.12	87.80
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.20	86.72
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.61	85.31
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.63	86.29
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.33	86.59
	12/18/2017	<1.00	<1.00	<1.00	<1.00	9.91	86.01
<hr/>							
MW04	12/17/2009	1.1	6.8	<1.0	7.4	8.14	87.37
	3/12/2010	<1.0	<1.0	<1.0	<1.0	10.29	85.22
	6/15/2010	<1.0	<1.0	<1.0	<1.0	8.19	87.32
	9/16/2010	<1.0	<1.0	<1.0	<1.0	7.94	87.57
	12/7/2010	<1.0	<1.0	<1.0	<1.0	8.96	86.55
	3/15/2011	<1.0	<1.0	<1.0	<1.0	10.38	85.13
	6/27/2011	2.6	8.2	<1.0	2.8	10.37	85.14



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Well Name	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth Water/ (Product Thickness) (ft bgs)	Relative GW Elev. (ft)
	9/14/2011	1.8	11	<1.0	6.9	8.45	87.06
	12/16/2011	<1.0	<1.0	<1.0	<1.0	10.16	85.35
	3/7/2012	<1.0	<1.0	<1.0	<1.0	9.94	85.57
	6/25/2012	Dry - Not Sampled				Dry	NA
	9/24/2012	<1.0	<1.0	<1.0	<1.0	10.95	84.56
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Insufficient Water - Not Sampled				10.77	84.74
	12/3/2013	Surveyed - Not Sampled				9.32	86.47
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.07	86.44
	3/4/2014	<1.0	<1.0	<1.0	<1.0	9.73	85.78
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.34	86.45
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.04	87.75
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.12	86.67
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.40	86.39
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.04	87.75
	9/2/2015	<1.0	<1.0	<1.0	<1.0	7.82	87.97
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.05	87.74
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.40	87.39
	9/19/2016	<1.00	<1.00	<1.00	<1.00	7.86	87.93
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.93	86.86
	3/20/2017	<4.00	<4.00	<4.00	<4.00	11.22	85.57
	6/12/2017	<1.00	<1.00	<1.00	<1.00	10.27	86.52
	9/29/2017	<1.00	<1.00	<1.00	<1.00	10.03	86.76
	12/18/2017	<1.00	<1.00	<1.00	<1.00	11.64	85.15
<hr/>							
MW05	12/17/2009	<1.0	5.4	<1.0	5.4	7.93	87.73
	3/12/2010	<1.0	<1.0	<1.0	<1.0	9.60	86.06
	6/15/2010	<1.0	<1.0	<1.0	<1.0	8.00	87.66
	9/16/2010	<1.0	<1.0	<1.0	<1.0	8.90	86.76
	12/7/2010	<1.0	<1.0	<1.0	<1.0	8.88	86.78
	3/15/2011	<1.0	<1.0	<1.0	<1.0	10.36	85.30
	6/27/2011	11	69	3.7	49	10.30	85.36
	9/14/2011	<1.0	8.3	<1.0	11	8.42	87.24
	12/16/2011	<1.0	<1.0	<1.0	<1.0	8.91	86.75
	3/7/2012	<1.0	<1.0	<1.0	<1.0	9.90	85.76



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	6/25/2012	<1.0	<1.0	<1.0	<1.0	9.96	85.70
	9/24/2012	<1.0	2.2	<1.0	<1.0	10.40	85.26
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	1.1	16	<1.0	14	10.76	84.90
	12/3/2013	Surveyed - Not Sampled				9.05	86.79
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.08	86.58
	3/4/2014	<1.0	<1.0	<1.0	<1.0	9.74	85.92
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.18	86.66
	9/24/2014	<1.0	<1.0	<1.0	<1.0	7.85	87.99
	12/10/2014	<1.0	<1.0	<1.0	<1.0	8.92	86.92
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.12	86.72
	6/18/2015	<1.0	<1.0	<1.0	<1.0	7.84	88.00
	9/2/2015	<1.0	<1.0	<1.0	<1.0	7.58	88.26
	12/10/2015	<1.0	<1.0	<1.0	<1.0	7.84	88.00
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.25	87.59
	9/19/2016	<1.00	<1.00	<1.00	<1.00	7.70	88.14
	12/15/2016	<1.00	<1.00	<1.00	<1.00	8.76	87.08
	3/20/2017	<4.00	<4.00	<4.00	<4.00	10.02	85.82
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.14	86.70
	9/29/2017	<1.00	<1.00	<1.00	<1.00	8.78	87.06
	12/18/2017	<1.00	<1.00	<1.00	<1.00	9.49	86.35
<hr/>							
MW06	3/12/2010	1500	13000	<1.0	<1.0	9.95	86.43
	6/15/2010	1700	28000	550	7300	8.60	87.78
	9/16/2010	680	15000	680	7800	8.50	87.88
	12/7/2010	1200	23000	690	9000	9.51	86.87
	3/15/2011	920	26000	500	7100	10.99	85.39
	6/27/2011	220	7600	310	3500	10.95	85.43
	9/14/2011	120	15000	570	6900	9.07	87.31
	12/16/2011	14	18000	700	8400	9.97	86.41
	3/7/2012	190	19000	430	6900	10.45	85.93
	6/25/2012	8.6	3200	240	4000	10.80	85.58
	9/24/2012	20	7100	310	3900	10.73	85.65
	12/28/2012	8.9	38	97	1500	12.40	83.98
	3/28/2013	61	200	57	1600	13.43	82.95



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	6/5/2013	94	280	170	2200	12.91	83.47
	9/5/2013	81	350	230	2600	11.35	85.03
	12/3/2013	Surveyed - Not Sampled				9.53	86.84
	12/17/2013	<4.0	400	112	4700	9.76	86.62
	3/4/2014	5.1	1800	449	4450	10.34	86.04
	6/5/2014	<4.0	13.5	379	4580	9.59	86.78
	9/24/2014	<4.0	168	508	5580	8.26	88.11
	12/10/2014	<1.0	52.4	525	6350	9.29	87.08
	3/12/2015	<4.0	8.7	495	6050	9.53	86.84
	6/18/2015	<4.0	<4.0	232	2950	8.23	88.14
	9/2/2015	<4.0	<4.0	595	7230	7.98	88.39
	12/10/2015	<1.0	2.1	517	6020	8.21	88.16
	3/2/2016	<4.0	<4.0	314	4710	8.65	87.72
	9/19/2016	<1.00	<1.00	622	7,410	8.10	88.27
	12/15/2016	<1.00	<1.00	<1.00	6,800	9.12	87.24
	3/20/2017	<4.00	<4.00	629	6,250	10.33	86.03
	6/12/2017	<4.00	<4.00	420	5,100	9.49	86.87
	9/29/2017	<4.00	<4.00	487	4,870	9.14	87.22
	12/18/2017	<4.00	14.4	466	4,540	9.87	86.49
MW07	3/12/2010	9900	17000	600	8100	PVC Blocked	NA
	6/15/2010	28000	48000	450	5500	9.22	NA
	9/16/2010	21000	34000	1100	12000	9.05	NA
	12/7/2010	23000	40000	980	12000	10.03	NA
	3/15/2011	23000	44000	600	4700	10.29	NA
	6/27/2011	Product - Not Sampled				PVC Blocked	NA
	9/14/2011	24000	34000	640	15000	9.60	NA
	12/16/2011	20000	31000	920	16000	10.02	NA
	3/7/2012	15000	27000	510	12000	PVC Blocked	NA
	6/25/2012	12000	22000	490	10000	PVC Blocked	NA
	9/24/2012	Dry - Not Sampled				Dry	NA
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				Dry	NA
	MW07 destroyed as of 12/17/2013						



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
MW07R	3/4/2014	Insufficient Water - Not Sampled				10.63	NA
	3/27/2014	7840	22000	377	5300	NM	NA
	6/5/2014	8300	28800	540	6500	9.90	NA
	9/24/2014	12200	35900	725	10900	8.50	NA
	12/10/2014	7820	26000	444	7540	9.52	NA
	3/12/2015	6660	27300	<500	6920	9.74	NA
	6/18/2015	4420	19800	307	4820	8.68	NA
	9/2/2015	5520	27200	422	6110	8.27	NA
	12/10/2015	3160	20000	<500	3560	8.44	NA
	3/2/2016	3010	23700	338	4840	8.96	NA
	9/19/2016	1,390	18,600	363	5,540	8.38	NA
	12/15/2016	1,010	15,600	211	5,180	9.34	NA
	3/20/2017	868	11,400	480	6,730	10.55	NA
	6/12/2017	479	7,810	299	4,050	9.91	NA
	9/29/2017	308	4,310	266	3,660	9.48	NA
	12/18/2017	254	1,670	314	4,330	10.11	NA
MW08	4/27/2010	5.9	23	2.4	8.1	9.43	86.86
	6/15/2010	<1.0	<1.0	<1.0	<1.0	8.31	88.02
	9/16/2010	<1.0	<1.0	<1.0	<1.0	8.29	88.04
	12/7/2010	<1.0	<1.0	18	1.6	9.32	87.01
	3/15/2011	<1.0	<1.0	38	12	10.77	85.56
	6/27/2011	1.4	11	1.2	9.2	10.62	85.71
	9/14/2011	<1.0	<1.0	<1.0	<1.0	8.84	87.49
	12/16/2011	1.9	6.3	1.7	4.2	9.29	87.04
	3/7/2012	1.4	3.6	<1.0	2.0	10.49	86.04
	6/25/2012	<1.0	<1.0	<1.0	<1.0	10.74	85.79
	9/24/2012	<1.0	<1.0	<1.0	<1.0	10.79	85.74
	12/28/2012	<1.0	3.0	<1.0	<1.0	12.33	84.20
	3/28/2013	<1.0	<1.0	<1.0	<1.0	13.46	83.07
	6/5/2013	<1.0	64	6.2	86	12.85	83.68
	9/5/2013	<1.0	<1.0	<1.0	<1.0	11.33	85.20
	12/3/2013	Surveyed - Not Sampled				9.38	87.04
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.72	86.81
	3/4/2014	<1.0	<1.0	<1.0	<1.0	10.36	86.17
	6/5/2014	<1.0	3.0	<1.0	<1.0	9.30	87.12



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.12	88.30
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.17	87.25
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.32	87.10
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.09	88.33
	9/2/2015	<1.0	<1.0	<1.0	<1.0	7.79	88.63
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.06	88.36
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.49	87.93
	9/19/2016	<1.00	<1.00	<1.00	<1.00	7.96	88.46
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.01	87.41
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.23	86.19
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.29	87.13
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.03	87.39
	12/18/2017	8.48	222	57.4	205	9.74	86.68
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MW09	4/27/2010	5100	20000	790	7200	9.80	86.98
	6/15/2010	3200	57000	450	5600	8.55	88.15
	9/16/2010	2800	34000	900	11000	8.49	88.21
	12/7/2010	2000	37000	740	8900	9.56	87.14
	3/15/2011	1300	49000	620	8700	11.01	85.69
	6/27/2011	740	52000	760	9200	10.92	85.78
	9/14/2011	540	40000	860	11000	9.15	87.55
	12/16/2011	15	25000	560	6400	9.55	87.15
	3/7/2012	150	35000	610	8700	10.49	86.21
	6/25/2012	49	16000	370	4600	10.72	85.98
	9/24/2012	34	20000	400	4800	10.94	85.76
	12/28/2012	5.6	4200	200	3300	12.39	84.31
	3/28/2013	120	7200	<1.0	2900	13.49	83.21
	6/5/2013	Product - Not SampledNA				13.69 (1.05)	83.01
	9/5/2013	170	17000	360	7700	11.32	85.30
	12/3/2013	Surveyed - Not Sampled				9.68	87.12
	12/17/2013	17.2	8020	221	4290	9.72	86.90
	3/4/2014	32.9	12400	493	6080	10.37	86.25
	6/5/2014	12.7	8020	330	4150	9.70	87.10
	9/24/2014	12.9	18100	1010	12000	8.37	88.43
	12/10/2014	7.7	15000	667	8000	9.40	87.40
	3/12/2015	<4.0	10100	629	7580	9.60	87.20
	6/18/2015	<4.0	5750	564	7490	8.39	88.41



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	9/2/2015	<4.0	4690	543	6770	8.06	88.74
	12/10/2015	<4.0	2780	475	6290	8.27	88.53
	3/2/2016	<4.0	4790	994	13000	8.72	88.08
	9/19/2016	<4.00	347	610	10,300	8.22	88.58
	12/15/2016	<1.00	53.5	760	11,100	9.23	87.57
	3/20/2017	<4.00	54.9	846	10,900	10.39	86.41
	6/12/2017	<4.00	19.4	740	10,800	9.54	87.26
	9/29/2017	<4.00	<4.00	799	10,500	9.22	87.58
	12/18/2017	<4.00	15.6	643	8,410	10.00	86.80
MW10	4/27/2010	11000	18000	1000	8700	10.03	86.93
	6/15/2010	27000	51000	360	4400	9.07	88.03
	9/16/2010	9600	35000	880	10000	8.95	88.15
	12/7/2010	10000	33000	700	9700	9.92	87.18
	3/15/2011	9300	48000	450	7000	11.42	85.68
	6/27/2011	12000	44000	710	11000	11.35	85.75
	9/14/2011	3200	18000	460	7200	9.65	87.45
	12/16/2011	3200	15000	1700	5400	10.00	87.10
	3/7/2012	2500	18000	370	5500	11.00	86.10
	6/25/2012	2700	17000	400	4900	11.11	85.99
	9/24/2012	2400	11000	270	3800	11.30	85.80
	12/28/2012	Product - Not Sampled				14.00 (0.35)	83.10
	3/28/2013	Product - Not Sampled				14.90 (1.55)	82.20
	6/5/2013	Product - Not Sampled				14.60 (1.70)	82.50
	9/5/2013	3100	17000	290	4800	12.42 (0.77)	84.70
	12/3/2013	Surveyed - Not Sampled				10.07	87.02
	12/17/2013	Product - Not Sampled				10.29 (0.08)	86.81
	3/4/2014	349	6510	462	4650	10.87	86.23
	6/5/2014	331	3440	214	2160	10.07	87.02
	9/24/2014	435	3250	198	1680	8.70	88.39
	12/10/2014	839	9760	523	6440	9.70	87.39
	3/12/2015	1780	23600	1470	24300	9.83	87.26
	6/18/2015	111	1320	312	3810	8.74	88.35
	9/2/2015	30.8	1890	74.6	821	8.40	88.69
	12/10/2015	63.4	2530	184	1220	8.58	88.51
	3/2/2016	312	8590	368	5410	8.08	89.01
	9/19/2016	60.6	2,360	115	1,750	8.54	88.55



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	12/15/2016	77.4	7,290	140	2,620	9.54	87.55
	3/20/2017	57.8	9,070	435	5,710	10.70	86.39
	6/12/2017	24.0	7,200	467	3,380	9.93	87.16
	9/29/2017	14.0	2,470	171	2,030	9.57	87.52
	12/18/2017	69.6	7,620	422	5,220	10.30	86.79
MW11	5/25/2010	<1.0	1.2	<1.0	2.8	NM	NA
	6/15/2010	<1.0	<1.0	<1.0	<1.0	7.54	88.67
	9/16/2010	<1.0	<1.0	<1.0	<1.0	7.75	88.46
	12/7/2010	<1.0	<1.0	<1.0	<1.0	8.84	87.37
	3/15/2011	<1.0	<1.0	<1.0	<1.0	10.31	85.90
	6/27/2011	<1.0	<1.0	<1.0	<1.0	10.16	86.05
	9/14/2011	<1.0	<1.0	<1.0	<1.0	8.41	87.80
	12/16/2011	<1.0	<1.0	<1.0	<1.0	8.82	87.39
	3/7/2012	<1.0	<1.0	<1.0	<1.0	9.80	86.41
	6/25/2012	<1.0	<1.0	<1.0	<1.0	9.94	86.27
	9/24/2012	<1.0	<1.0	<1.0	<1.0	10.25	85.96
	12/28/2012	1.0	6.1	<1.0	2.0	11.73	84.48
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	<1.0	2.8	<1.0	2.3	11.00	85.61
	12/3/2013	Surveyed - Not Sampled				9.73	87.39
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.46	87.15
	3/4/2014	<4.0	<4.0	<4.0	<4.0	10.15	86.46
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.65	87.47
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.25	88.87
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.40	87.72
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.48	87.64
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.33	88.79
	9/2/2015	<1.0	<1.0	<1.0	<1.0	8.11	89.01
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.29	88.83
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.69	88.43
	9/19/2016	<1.00	<1.00	<1.00	<1.00	8.30	88.82
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.28	87.84
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.36	86.76
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.53	87.59
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.23	87.89
	12/18/2017	<1.00	<1.00	<1.00	<1.00	10.12	87.00



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
MW12	5/25/2010	<1.0	2000	250	4100	NM	NA
	6/15/2010	<1.0	810	120	1400	10.21	88.48
	9/16/2010	<1.0	140	130	1400	10.20	88.49
	12/7/2010	<1.0	56	130	370	11.25	87.44
	3/15/2011	<1.0	340	290	650	12.68	86.01
	6/27/2011	<1.0	530	250	3400	12.60	86.09
	9/14/2011	<1.0	90	170	900	10.87	87.82
	12/16/2011	<1.0	4.4	23	90	10.23	88.46
	3/7/2012	<1.0	110	190	1500	12.20	86.49
	6/25/2012	<1.0	51	110	840	12.20	86.49
	9/24/2012	<1.0	46	130	1100	12.72	85.97
	12/28/2012	Insufficient Water - Not Sampled				13.60	85.09
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	<1.0	3.6	10	3300	13.08	85.61
	12/3/2013	Surveyed - Not Sampled				10.68	87.39
	12/17/2013	<4.0	<4.0	<4.0	1030	11.51	87.18
	3/4/2014	<1.0	1.3	162	1390	12.18	86.51
	6/5/2014	<4.0	<4.0	62.8	723	10.95	87.12
	9/24/2014	<1.0	<1.0	13.1	60.2	9.39	88.68
	12/10/2014	<1.0	<1.0	4.8	8.0	10.28	87.79
	3/12/2015	<1.0	<1.0	6.1	42.0	10.39	87.68
	6/18/2015	<1.0	<1.0	1.6	<1.0	9.23	88.84
	9/2/2015	<1.0	<1.0	4.6	17.0	9.08	88.99
	12/10/2015	<1.0	<1.0	1.0	<1.0	9.18	88.89
	3/2/2016	<1.0	<1.0	<1.0	<1.0	9.64	88.43
	9/19/2016	<1.00	<1.00	<1.00	<1.00	9.23	88.84
	12/15/2016	<1.00	<1.00	<1.00	<1.00	10.17	87.90
	3/20/2017	<1.00	<1.00	<1.00	<1.00	11.28	86.79
	6/12/2017	<1.00	<1.00	<1.00	<1.00	10.47	87.60
	9/29/2017	<1.00	<1.00	<1.00	<1.00	10.14	87.93
	12/18/2017	<1.00	1.75	<1.00	2.12	10.99	87.08
MW13	6/15/2010	<1.0	<1.0	<1.0	<1.0	6.66	89.22
	9/16/2010	<1.0	<1.0	<1.0	<1.0	6.92	88.96
	12/7/2010	<1.0	<1.0	<1.0	<1.0	8.10	87.78



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Well Name	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth Water/ (Product Thickness) (ft bgs)	Relative GW Elev. (ft)
	3/15/2011	<1.0	<1.0	<1.0	<1.0	9.54	86.34
	6/27/2011	<1.0	<1.0	<1.0	<1.0	9.39	86.49
	9/14/2011	<1.0	<1.0	<1.0	<1.0	7.66	88.22
	12/16/2011	<1.0	<1.0	<1.0	<1.0	7.78	88.10
	3/7/2012	<1.0	<1.0	<1.0	<1.0	9.10	86.78
	6/25/2012	<1.0	<1.0	<1.0	<1.0	8.48	87.40
	9/24/2012	<1.0	<1.0	<1.0	<1.0	9.60	86.28
	12/28/2012	<1.0	<1.0	<1.0	<1.0	11.00	84.88
	3/28/2013	Insufficient Water - Not Sampled				12.02	83.86
	6/5/2013	Insufficient Water - Not Sampled				PVC Blocked	NA
	9/5/2013	<1.0	<1.0	<1.0	<1.0	8.80	87.08
	12/3/2013	Surveyed - Not Sampled				9.88	87.73
	12/17/2013	<4.0	<4.0	<4.0	<4.0	8.34	87.54
	3/4/2014	<4.0	<4.0	<4.0	<4.0	9.06	86.82
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.70	87.91
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.35	89.26
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.42	88.19
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.42	88.19
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.30	89.31
	9/2/2015	<1.0	<1.0	<1.0	<1.0	8.13	89.48
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.30	89.31
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.77	88.84
	9/19/2016	<1.00	<1.00	<1.00	<1.00	8.38	89.23
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.35	88.26
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.33	87.28
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.51	88.10
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.25	88.36
	12/18/2017	<1.00	1.13	<1.00	<1.00	10.29	87.32
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MW14	6/15/2010	<1.0	<1.0	<1.0	<1.0	10.59	88.70
	9/16/2010	<1.0	<1.0	<1.0	<1.0	10.52	88.77
	12/7/2010	<1.0	<1.0	<1.0	<1.0	11.61	87.68
	3/15/2011	<1.0	<1.0	<1.0	<1.0	13.07	86.22
	6/27/2011	<1.0	<1.0	<1.0	<1.0	12.94	86.35
	9/14/2011	<1.0	<1.0	<1.0	2.3	11.28	88.01
	12/16/2011	<1.0	<1.0	<1.0	<1.0	11.30	87.99
	3/7/2012	<1.0	<1.0	<1.0	<1.0	12.70	86.59



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	6/25/2012	<1.0	<1.0	<1.0	<1.0	12.61	86.68
	9/24/2012	<1.0	<1.0	<1.0	<1.0	13.18	86.11
	12/28/2012	<1.0	1.0	<1.0	<1.0	14.50	84.79
	3/28/2013	<1.0	<1.0	<1.0	<1.0	15.55	83.74
	6/5/2013	<1.0	<1.0	<1.0	<1.0	14.90	84.39
	9/5/2013	<1.0	<1.0	<1.0	<1.0	13.42	85.87
	12/3/2013	Surveyed - Not Sampled				11.34	87.57
	12/17/2013	<4.0	<4.0	<4.0	<4.0	11.89	87.40
	3/4/2014	<1.0	<1.0	<1.0	<1.0	12.59	86.70
	6/5/2014	<1.0	<1.0	<1.0	<1.0	11.30	87.61
	9/24/2014	<1.0	<1.0	<1.0	<1.0	9.83	89.08
	12/10/2014	<1.0	<1.0	<1.0	<1.0	10.82	88.09
	3/12/2015	<1.0	<1.0	<1.0	<1.0	10.90	88.01
	6/18/2015	<1.0	<1.0	<1.0	<1.0	9.83	89.08
	9/2/2015	<1.0	<1.0	<1.0	<1.0	9.62	89.29
	12/10/2015	<1.0	<1.0	<1.0	<1.0	9.75	89.16
	3/2/2016	<1.0	<1.0	<1.0	<1.0	10.20	88.71
	9/19/2016	<1.00	<1.00	<1.00	<1.00	9.86	89.05
	12/15/2016	<1.00	<1.00	<1.00	<1.00	10.73	88.18
	3/20/2017	<1.00	<1.00	<1.00	<1.00	11.77	87.14
	6/12/2017	<1.00	<1.00	<1.00	<1.00	11.04	87.87
	9/29/2017	<1.00	<1.00	<1.00	<1.00	10.72	88.19
	12/18/2017	<1.00	<1.00	<1.00	<1.00	11.57	87.34
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MW15	6/29/2010	4.6	50	130	1400	8.76	88.29
	9/16/2010	<1.0	1.3	16	230	8.78	88.27
	12/7/2010	<1.0	<1.0	16	210	9.86	87.19
	3/15/2011	<1.0	<1.0	17	280	11.18	85.87
	6/27/2011	<1.0	<1.0	8.9	39	11.15	85.90
	9/14/2011	<1.0	<1.0	5.9	3.1	9.37	87.68
	12/16/2011	<1.0	<1.0	6.0	2.6	9.83	87.22
	3/7/2012	<1.0	<1.0	<1.0	<1.0	10.83	86.22
	6/25/2012	<1.0	<1.0	<1.0	<1.0	11.69	85.36
	9/24/2012	<1.0	<1.0	<1.0	<1.0	12.85	84.20
	12/28/2012	1.1	2.8	<1.0	<1.0	12.87	84.18
	3/28/2013	<1.0	<1.0	<1.0	<1.0	13.78	83.27
	6/5/2013	<1.0	<1.0	2.8	4.2	13.18	83.87



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	9/5/2013	<1.0	2.1	2.2	7.5	11.63	85.42
	12/3/2013	Surveyed - Not Sampled				9.58	87.24
	12/17/2013	<4.0	<4.0	<4.0	<4.0	10.01	87.04
	3/4/2014	<1.0	<1.0	<1.0	<1.0	10.70	86.35
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.58	87.24
	9/24/2014	<1.0	<1.0	1.2	1.0	8.26	88.56
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.32	87.50
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.43	87.39
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.22	88.60
	9/2/2015	<1.0	<1.0	<1.0	<1.0	7.98	88.84
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.19	88.63
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.63	88.19
	9/19/2016	<1.00	<1.00	<1.00	<1.00	8.14	88.68
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.15	87.67
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.31	86.51
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.50	87.32
	9/29/2017	<1.00	<1.00	<1.00	<1.00	10.12	86.70
	12/18/2017	<1.00	<1.00	<1.00	<1.00	9.94	86.88
MW16	6/29/2010	48000	68000	410	4800	9.61	NA
	9/16/2010	13000	16000	660	6400	9.33	NA
	12/7/2010	9200	15000	440	6400	10.32	NA
	3/15/2011	20000	18000	170	8000	11.77	NA
	6/27/2011	26000	39000	680	17000	11.78	NA
	9/14/2011	7900	12000	360	6500	9.97	NA
	12/16/2011	6700	6500	1700	5100	10.43	NA
	3/7/2012	7500	7700	150	5000	11.33	NA
	6/25/2012	20000	21000	240	3300	11.38	NA
	9/24/2012	4300	6800	170	5500	11.55	NA
	12/28/2012	Product - Not Sampled				13.96 (1.43)	NA
	3/28/2013	Damaged - Not Sampled				Damaged	NA
	6/5/2013	Damaged - Not Sampled				Damaged	NA
	MW16 destroyed as of 9/5/2013						
MW16R	3/4/2014	16700	23100	<500	3660	11.73	NA
	6/5/2014	20100	26800	394	5430	13.82	NA
	9/24/2014	22000	30200	638	7290	9.68	NA



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	12/10/2014	17300	24300	443	6560	10.65	NA
	3/12/2015	19900	31400	<500	6560	10.94	NA
	6/18/2015	20300	29800	464	6550	9.73	NA
	9/2/2015	25200	33600	454	5940	9.51	NA
	12/10/2015	19900	29100	<500	4940	9.58	NA
	3/2/2016	21700	33300	<500	5750	10.17	NA
	9/19/2016	7,400	11,200	424	2,800	9.49	NA
	12/15/2016	19,800	22,900	364	6,720	10.50	NA
	3/20/2017	14,800	14,200	416	5,880	11.78	NA
	6/12/2017	14,200	13,200	322	4,370	11.02	NA
	9/29/2017	18,400	9,800	472	6,770	10.64	NA
	12/18/2017	14,100	3,980	301	5,510	10.74	NA
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MW17	9/16/2010	<1.0	<1.0	1.2	4.4	8.37	87.12
	12/7/2010	<1.0	1.8	<1.0	<1.0	9.37	86.12
	3/15/2011	<1.0	<1.0	<1.0	<1.0	10.86	84.63
	6/27/2011	1.3	7.4	<1.0	<1.0	10.84	84.65
	9/14/2011	<1.0	4.1	<1.0	2.8	8.87	86.62
	12/16/2011	<1.0	<1.0	<1.0	<1.0	9.31	86.18
	3/7/2012	<1.0	<1.0	<1.0	<1.0	10.39	85.10
	6/25/2012	1.1	1.9	<1.0	<1.0	10.74	84.75
	9/24/2012	<1.0	<1.0	<1.0	<1.0	10.49	85.00
	12/28/2012	<1.0	<1.0	<1.0	<1.0	12.26	83.23
	3/28/2013	<1.0	<1.0	<1.0	<1.0	13.29	82.20
	6/5/2013	<1.0	<1.0	<1.0	<1.0	12.81	82.68
	9/5/2013	<1.0	<1.0	<1.0	<1.0	11.29	84.20
	12/3/2013	Surveyed - Not Sampled				9.40	86.12
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.57	85.92
	3/4/2014	<6.0	<1.0	<4.0	<4.0	10.15	85.34
	6/5/2014	<1.0	<1.0	<1.0	<1.0	9.70	85.82
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.29	87.23
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.34	86.18
	3/12/2015	<1.0	<1.0	<1.0	<1.0	9.78	85.74
	6/18/2015	<1.0	<1.0	<1.0	<1.0	8.43	87.09
	9/2/2015	<1.0	<1.0	<1.0	<1.0	7.90	87.62
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.26	87.26
	3/2/2016	<1.0	<1.0	<1.0	<1.0	8.75	86.77



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	9/19/2016	<1.00	<1.00	<1.00	<1.00	7.98	87.54
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.10	86.42
	3/20/2017	<1.00	<1.00	<1.00	<1.00	10.47	85.05
	6/12/2017	<1.00	<1.00	<1.00	<1.00	9.63	85.89
	9/29/2017	<1.00	<1.00	<1.00	<1.00	9.25	86.27
	12/18/2017	<1.00	<1.00	<1.00	<1.00	9.78	85.74
MW18	9/16/2010	75	<1.0	10	37	9.25	87.12
	12/7/2010	<1.0	<1.0	<1.0	<1.0	10.34	86.03
	3/15/2011	2.4	<1.0	<1.0	<1.0	10.86	85.51
	6/27/2011	23	<1.0	<1.0	<1.0	11.85	84.52
	9/14/2011	3.8	<1.0	<1.0	3.1	9.83	86.54
	12/16/2011	6.8	<1.0	16	4.9	10.30	86.07
	3/7/2012	<1.0	<1.0	<1.0	<1.0	11.50	84.87
	6/25/2012	<1.0	<1.0	<1.0	<1.0	11.60	84.77
	9/24/2012	<1.0	<1.0	<1.0	<1.0	11.53	84.84
	12/28/2012	1.1	2.5	<1.0	<1.0	13.10	83.27
	3/28/2013	<1.0	<1.0	<1.0	<1.0	14.10	82.27
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	<1.0	<1.0	<1.0	<1.0	12.16	84.21
	12/3/2013	Surveyed - Not Sampled				10.53	85.94
	12/17/2013	<4.0	<4.0	<4.0	<4.0	10.60	85.77
	3/4/2014	8470	2130	346	1850	11.15	85.22
	6/5/2014	3650	141	200	933	10.82	85.65
	9/24/2014	3520	25.8	175	796	9.37	87.10
	12/10/2014	1220	<50.0	<50.0	<50.0	10.40	86.07
	3/12/2015	876	<50.0	<50.0	<50.0	10.90	85.57
	6/18/2015	3300	<20.0	96.2	281	9.60	86.87
	9/2/2015	8860	1230	72.2	380	8.91	87.56
	12/10/2015	303	<4.0	16.6	10.3	9.31	87.16
	3/2/2016	265	<4.0	5.2	8.6	9.80	86.67
	9/19/2016	187	<4.00	4.28	<4.00	8.98	87.49
	12/15/2016	<1.00	<1.00	<1.00	<1.00	10.07	86.40
	3/20/2017	488	1.14	42.6	16.8	11.62	84.85
	6/12/2017	13,500	680	227	1,770	10.79	85.68
	9/29/2017	65.9	<4.00	<4.00	<4.00	10.26	86.21
	12/18/2017	61.2	<1.00	<1.00	<1.00	10.79	85.68



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MW19	9/16/2010	2100	2900	390	3900	10.85	87.06
	12/7/2010	5000	5600	270	2500	11.78	86.13
	3/15/2011	7300	15000	380	4400	13.33	84.58
	6/27/2011	Product - Not Sampled				13.46 (0.60)	84.45
	9/14/2011	8600	25000	860	14000	11.35	86.56
	12/16/2011	2900	13000	560	7000	11.72	86.19
	3/7/2012	4200	30000	1700	44000	12.75	85.16
	6/25/2012	3800	9000	430	12000	12.55	85.36
	9/24/2012	1300	4200	170	8000	12.90	85.01
	12/28/2012	Product - Not Sampled				14.85 (0.70)	83.06
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	22000	32000	960	14000	13.42 (0.03)	84.49
	12/3/2013	Surveyed - Not Sampled				11.93	85.98
	12/17/2013	Product - Not Sampled				12.61 (0.01)	85.42
	3/4/2014	25500	49300	930	12000	12.75	85.28
	6/5/2014	20700	40700	875	11700	12.24	85.67
	9/24/2014	21300	38200	1010	10900	10.75	87.16
	12/10/2014	13300	23600	672	8720	11.71	86.20
	3/12/2015	19600	40300	780	9660	12.21	85.70
	6/18/2015	17200	35800	672	8780	10.99	86.92
	9/2/2015	20300	44400	896	10800	10.35	87.56
	12/10/2015	13500	35100	670	7740	10.62	87.29
	3/2/2016	16900	41500	807	10300	11.17	86.74
	9/19/2016	1,680	4,150	82.5	1,100	10.36	87.55
	12/15/2016	12,700	34,700	537	10,800	11.40	86.51
	3/20/2017	17,100	36,600	906	11,600	12.88	85.03
	6/12/2017	14,000	33,800	658	8,430	12.07	85.84
	9/29/2017	12,200	27,200	612	8,860	11.57	86.34
	12/18/2017	14,600	33,000	712	9,890	12.12	85.79
MW20	9/16/2010	16000	13000	200	4800	11.32	87.47
	12/7/2010	35000	32000	400	5200	11.25	87.54
	3/15/2011	46000	42000	250	4500	12.75	86.04
	6/27/2011	29000	32000	280	4300	12.88	85.91
	9/14/2011	21000	22000	320	5500	11.30	87.49



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	12/16/2011	28000	27000	350	4600	11.29	87.50
	3/7/2012	21000	26000	580	16000	12.42	86.37
	6/25/2012	22000	22000	280	3800	12.48	86.31
	9/24/2012	24000	22000	220	3400	13.57	85.22
	12/28/2012	22000	19000	250	3400	14.22	84.57
	3/28/2013	Insufficient Water - Not Sampled				PVC Blocked	NA
	6/5/2013	Insufficient Water - Not Sampled				PVC Blocked	NA
	9/5/2013	2000	2700	13	210	PVC Blocked	NA
	12/3/2013	Surveyed - Not Sampled				11.55	86.62
	MW20 destroyed as of 12/17/2013						
MW20R	3/4/2014	25900	31700	445	5340	12.20	NA
	6/5/2014	22000	26000	<500	5020	14.58	NA
	9/24/2014	24500	32900	930	8340	10.07	NA
	12/10/2014	17500	33000	406	6620	11.05	NA
	3/12/2015	24600	31300	<500	7150	11.40	NA
	6/18/2015	17700	20800	142	4160	10.40	NA
	9/2/2015	18700	24000	344	4730	9.96	NA
	12/10/2015	14800	21300	<500	4360	9.97	NA
	3/2/2016	19300	26200	328	5560	10.52	NA
	9/19/2016	9,730	13,500	249	3,670	9.93	NA
	12/15/2016	19,600	22,000	271	7,350	10.83	NA
	3/20/2017	30,600	22,200	536	7,700	12.14	NA
	6/12/2017	24,000	17,500	334	4,610	11.51	NA
	9/29/2017	21,500	17,100	434	6,780	11.04	NA
	12/18/2017	22,200	12,400	412	6,300	11.59	NA
MW21	9/16/2010	<1.0	<1.0	<1.0	<1.0	10.75	88.07
	12/7/2010	<1.0	<1.0	<1.0	<1.0	11.52	87.30
	3/15/2011	<1.0	<1.0	<1.0	<1.0	12.98	85.84
	6/27/2011	<1.0	<1.0	<1.0	<1.0	13.00	85.82
	9/14/2011	<1.0	2.8	<1.0	<1.0	11.41	87.41
	12/16/2011	2.6	4.7	<1.0	<1.0	11.51	87.31
	3/7/2012	1.3	4.0	<1.0	14	12.60	86.22
	6/25/2012	Dry - Not Sampled				Dry	NA
	9/24/2012	<1.0	<1.0	<1.0	<1.0	12.90	85.92
	12/28/2012	Dry - Not Sampled				Dry	NA



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				11.86	86.99
	12/17/2013	<4.0	<4.0	<4.0	<4.0	11.95	86.87
	3/4/2014	Insufficient Water - Not Sampled				12.57	86.25
	6/5/2014	<1.0	<1.0	<1.0	<1.0	12.08	86.77
	9/24/2014	<1.0	<1.0	<1.0	<1.0	10.45	88.40
	12/10/2014	<1.0	<1.0	<1.0	<1.0	11.30	87.55
	3/12/2015	<1.0	<1.0	<1.0	<1.0	11.58	87.27
	6/18/2015	<1.0	<1.0	<1.0	<1.0	10.46	88.39
	9/2/2015	<1.0	<1.0	<1.0	<1.0	10.23	88.62
	12/10/2015	<1.0	<1.0	<1.0	<1.0	10.26	88.59
	3/2/2016	<1.0	<1.0	<1.0	<1.0	10.84	88.01
	6/8/2016	<1.00	<1.00	<1.00	<1.00	---	---
	9/19/2016	<1.00	<1.00	<1.00	<1.00	10.32	88.53
	12/15/2016	<1.00	<1.00	<1.00	<1.00	11.17	87.68
	3/20/2017	<1.00	<1.00	<1.00	<1.00	12.38	86.47
	6/12/2017	<1.00	<1.00	<1.00	<1.00	11.82	87.03
	9/29/2017	<1.00	<1.00	<1.00	<1.00	11.34	87.51
	12/18/2017	<1.00	<1.00	<1.00	<1.00	11.90	86.95
MW22	9/16/2010	110	<1.0	<1.0	<1.0	11.40	87.27
	12/7/2010	20	1.4	<1.0	<1.0	12.33	86.34
	3/15/2011	3.2	<1.0	<1.0	<1.0	13.88	84.79
	6/27/2011	2.6	19	1.1	11	13.95	84.72
	9/14/2011	150	2.9	<1.0	1.5	12.06	86.61
	12/16/2011	130	2.3	<1.0	2.7	12.12	86.55
	3/7/2012	<1.0	2.0	<1.0	7.7	13.40	85.27
	6/25/2012	1.4	2.2	<1.0	<1.0	12.76	85.91
	9/24/2012	<1.0	<1.0	<1.0	<1.0	13.48	85.19
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	<1.0	1.4	<1.0	1.0	14.31	84.36
	12/3/2013	Surveyed - Not Sampled				12.82	86.03
	12/17/2013	<4.0	<4.0	<4.0	<4.0	12.73	85.94



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	3/4/2014	5.6	<1.0	<1.0	<1.0	13.26	85.41
	6/5/2014	<1.0	<1.0	<1.0	<1.0	13.10	85.75
	9/24/2014	760	<1.0	<1.0	1.8	12.55	86.30
	12/10/2014	2.0	<1.0	<1.0	<1.0	12.44	86.41
	3/12/2015	20.1	<10.0	<10.0	<10.0	12.93	85.92
	6/18/2015	3340	470	84.2	419	11.78	87.07
	9/2/2015	2180	<1.0	2.3	4.8	11.14	87.71
	12/10/2015	104	<1.0	<1.0	<1.0	11.39	87.46
	3/2/2016	4.0	<1.0	<1.0	<1.0	11.95	86.90
	9/19/2016	1.24	<1.00	<1.00	<1.00	11.21	87.64
	12/15/2016	<1.00	<1.00	<1.00	<1.00	12.15	86.70
	3/20/2017	<1.00	<1.00	<1.00	<1.00	13.59	85.26
	6/12/2017	65.6	<1.00	<1.00	<1.00	12.95	85.90
	9/29/2017	17.0	<1.00	<1.00	3.32	12.43	86.42
	12/18/2017	3.12	<1.00	<1.00	<1.00	13.87	84.98
<hr/>							
MW23	10/15/2010	<1.0	<1.0	<1.0	<1.0	8.80	86.61
	12/7/2010	<1.0	<1.0	<1.0	<1.0	9.62	85.79
	3/15/2011	<1.0	<1.0	<1.0	<1.0	11.15	84.26
	6/27/2011	<1.0	<1.0	<1.0	<1.0	11.10	84.31
	9/14/2011	<1.0	1.9	<1.0	<1.0	9.00	86.41
	12/16/2011	<1.0	<1.0	<1.0	<1.0	9.60	85.81
	3/7/2012	<1.0	<1.0	<1.0	<1.0	10.75	84.66
	6/25/2012	9.7	<1.0	<1.0	<1.0	10.85	84.56
	9/24/2012	<1.0	<1.0	<1.0	<1.0	10.70	84.71
	12/28/2012	4.5	28	1.0	12	12.45	82.96
	3/28/2013	<1.0	<1.0	<1.0	<1.0	13.55	81.86
	6/5/2013	<1.0	<1.0	<1.0	<1.0	13.04	82.37
	9/5/2013	<1.0	<1.0	<1.0	<1.0	11.36	84.05
	12/3/2013	Surveyed - Not Sampled				9.82	85.72
	12/17/2013	<4.0	<4.0	<4.0	<4.0	9.81	85.60
	3/4/2014	<1.0	2.4	<1.0	<1.0	10.42	84.99
	6/5/2014	<1.0	<1.0	<1.0	<1.0	10.13	85.41
	9/24/2014	<1.0	<1.0	<1.0	<1.0	8.72	86.82
	12/10/2014	<1.0	<1.0	<1.0	<1.0	9.79	85.75
	3/12/2015	1.7	<1.0	<1.0	<1.0	10.34	85.20
	6/18/2015	<1.0	<1.0	<1.0	<1.0	9.15	86.39



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	9/2/2015	22.4	<1.0	<1.0	<1.0	8.09	87.45
	12/10/2015	<1.0	<1.0	<1.0	<1.0	8.74	86.80
	3/2/2016	<1.0	<1.0	<1.0	<1.0	9.15	86.39
	9/19/2016	<1.00	<1.00	<1.00	<1.00	8.17	87.37
	12/15/2016	<1.00	<1.00	<1.00	<1.00	9.51	86.03
	3/20/2017	2.92	<1.00	<1.00	<1.00	11.04	84.50
	6/12/2017	198	<1.00	<1.00	<1.00	9.95	85.59
	9/29/2017	<4.00	<4.00	<4.00	<4.00	9.63	85.91
	12/18/2017	<1.00	<1.00	<1.00	<1.00	10.13	85.41
MW24	10/15/2010	2000	<1.0	<1.0	5.6	11.28	86.74
	12/7/2010	3200	<1.0	<1.0	2.8	12.11	85.91
	3/15/2011	Insufficient Water - Not Sampled				13.61	84.41
	6/27/2011	48	230	19	240	13.68	84.34
	9/14/2011	5500	1.7	<1.0	1.5	11.57	86.45
	12/16/2011	1600	<1.0	<1.0	<1.0	12.09	85.93
	3/7/2012	<1.0	<1.0	<1.0	<1.0	13.17	84.85
	6/25/2012	<1.0	<1.0	<1.0	<1.0	13.09	84.93
	9/24/2012	<1.0	<1.0	<1.0	<1.0	13.27	84.75
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	230	37	<1.0	5.3	13.98	84.04
	12/3/2013	Surveyed - Not Sampled				12.54	85.67
	12/17/2013	<4.0	<4.0	<4.0	<4.0	12.47	85.55
	3/4/2014	<1.0	1.6	<1.0	<1.0	13.00	85.02
	6/5/2014	1370	862	<100	132	12.88	85.33
	9/24/2014	3.0	<1.0	2.8	2.5	11.34	86.87
	12/10/2014	3920	5.4	13.7	26.2	12.32	85.89
	3/12/2015	1.8	2.0	6.9	18.4	12.89	85.32
	6/18/2015	10200	7470	334	2940	11.60	86.61
	9/2/2015	10800	156	410	350	10.81	87.40
	12/10/2015	2130	760	154	<100	11.23	86.98
	3/2/2016	5880	373	286	420	11.78	86.43
	9/19/2016	14,400	13,600	690	5,730	10.85	87.36
	12/15/2016	4,690	437	267	1,890	11.95	86.26
	3/20/2017	71.8	<20.0	122	163	13.51	84.70



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	6/12/2017	2,730	654	88.2	737	12.66	85.55
	9/29/2017	11,000	5,520	525	3,980	12.15	86.06
	12/18/2017	3,610	1,580	229	1,390	12.68	85.53
MW25	10/15/2010	<1.0	<1.0	<1.0	<1.0	11.69	86.90
	12/7/2010	<1.0	<1.0	<1.0	<1.0	12.52	86.07
	3/15/2011	<1.0	<1.0	<1.0	<1.0	13.98	84.61
	6/27/2011	<1.0	<1.0	<1.0	<1.0	14.14	84.45
	9/14/2011	<1.0	<1.0	<1.0	<1.0	12.19	86.40
	12/16/2011	<1.0	<1.0	<1.0	<1.0	10.57	88.02
	3/7/2012	<1.0	<1.0	<1.0	<1.0	13.58	85.01
	6/25/2012	<1.0	<1.0	<1.0	<1.0	13.48	85.11
	9/24/2012	<1.0	<1.0	<1.0	<1.0	13.48	85.11
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				12.99	85.76
	12/17/2013	<4.0	<4.0	<4.0	<4.0	12.91	85.68
	3/4/2014	<1.0	<1.0	<1.0	<1.0	13.44	85.15
	6/5/2014	<1.0	<1.0	<1.0	<1.0	13.32	85.43
	9/24/2014	<1.0	<1.0	<1.0	<1.0	11.75	87.00
	12/10/2014	<1.0	<1.0	<1.0	<1.0	12.65	86.10
	3/12/2015	<1.0	<1.0	<1.0	<1.0	13.20	85.55
	6/18/2015	<1.0	<1.0	<1.0	<1.0	12.16	86.59
	9/2/2015	<1.0	<1.0	<1.0	<1.0	11.30	87.45
	12/10/2015	<1.0	<1.0	<1.0	<1.0	11.60	87.15
	3/2/2016	<4.0	<4.0	<4.0	<4.0	12.17	86.58
	9/19/2016	<1.00	<1.00	<1.00	<1.00	11.33	87.42
	12/15/2016	<1.00	<1.00	<1.00	<1.00	12.28	86.47
	3/20/2017	<4.00	<4.00	<4.00	<4.00	13.84	84.91
	6/12/2017	<1.00	<1.00	<1.00	<1.00	13.13	85.62
	9/29/2017	<1.00	<1.00	<1.00	<1.00	12.57	86.18
	12/18/2017	<1.00	<1.00	<1.00	<1.00	13.04	85.71
MW26	10/15/2010	<1.0	<1.0	<1.0	<1.0	12.27	87.14
	12/7/2010	<1.0	<1.0	<1.0	<1.0	12.89	86.52
	3/15/2011	Insufficient Water - Not Sampled				14.21	85.20



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	6/27/2011	Insufficient Water - Not Sampled				14.35	85.06
	9/14/2011	<1.0	<1.0	<1.0	<1.0	12.88	86.53
	12/16/2011	<1.0	<1.0	<1.0	<1.0	10.92	88.49
	3/7/2012	Insufficient Water - Not Sampled				14.02	85.39
	6/25/2012	Dry - Not Sampled				Dry	NA
	9/24/2012	<1.0	<1.0	<1.0	<1.0	14.07	85.34
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				13.57	85.97
	12/17/2013	<4.0	<4.0	<4.0	<4.0	13.47	85.94
	3/4/2014	<1.0	<1.0	<1.0	<1.0	13.98	85.43
	6/5/2014	<1.0	<1.0	<1.0	<1.0	13.94	85.60
	9/24/2014	<1.0	<1.0	<1.0	<1.0	12.17	87.37
	12/10/2014	<1.0	1.0	<1.0	<1.0	13.03	86.51
	3/12/2015	<1.0	<1.0	<1.0	<1.0	13.52	86.02
	6/18/2015	<1.0	<1.0	<1.0	<1.0	12.52	87.02
	9/2/2015	<1.0	<1.0	<1.0	<1.0	11.85	87.69
	12/10/2015	<1.0	<1.0	<1.0	<1.0	11.99	87.55
	3/2/2016	<1.0	<1.0	<1.0	<1.0	12.63	86.91
	9/19/2016	<1.00	<1.00	<1.00	<1.00	11.86	87.68
	12/15/2016	<1.00	<1.00	<1.00	<1.00	12.77	86.77
	3/20/2017	<4.00	<4.00	<4.00	<4.00	14.12	85.42
	6/12/2017	<1.00	<1.00	<1.00	<1.00	13.69	85.85
	9/29/2017	<1.00	<1.00	<1.00	<1.00	13.03	86.51
	12/18/2017	<1.00	<1.00	<1.00	<1.00	13.47	86.07
MW27	12/7/2010	<1.0	1.6	<1.0	<1.0	12.88	85.70
	3/15/2011	Insufficient Water - Not Sampled				13.83	84.16
	6/27/2011	Insufficient Water - Not Sampled				13.86	84.13
	9/14/2011	<1.0	<1.0	<1.0	<1.0	11.87	86.12
	12/16/2011	<1.0	<1.0	<1.0	<1.0	11.09	86.90
	3/7/2012	<1.0	<1.0	<1.0	<1.0	13.41	84.58
	6/25/2012	Dry - Not Sampled				Dry	NA
	9/24/2012	<1.0	<1.0	<1.0	<1.0	14.01	83.98
	12/28/2012	Dry - Not Sampled				Dry	NA



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				12.78	85.33
	12/17/2013	<4.0	<4.0	<4.0	<4.0	12.73	85.26
	3/4/2014	<1.0	<1.0	<1.0	<1.0	13.30	84.69
	6/5/2014	<1.0	<1.0	<1.0	<1.0	13.12	84.99
	9/24/2014	<1.0	<1.0	<1.0	<1.0	11.58	86.53
	12/10/2014	<1.0	<1.0	<1.0	<1.0	12.54	85.57
	3/12/2015	<1.0	<1.0	<1.0	<1.0	13.18	84.93
	6/18/2015	<1.0	<1.0	<1.0	<1.0	11.96	86.15
	9/2/2015	<1.0	<1.0	<1.0	<1.0	10.93	87.18
	12/10/2015	<1.0	<1.0	<1.0	<1.0	11.72	86.39
	3/2/2016	<1.0	<1.0	<1.0	<1.0	12.04	86.07
	9/19/2016	<1.00	<1.00	<1.00	<1.00	11.02	87.09
	12/15/2016	<1.00	<1.00	<1.00	<1.00	12.24	85.87
	3/20/2017	<4.00	<4.00	<4.00	<4.00	13.71	84.40
	6/12/2017	<1.00	<1.00	<1.00	<1.00	12.84	85.27
	9/29/2017	<1.00	<1.00	<1.00	<1.00	12.31	85.80
	12/18/2017	<1.00	<1.00	<1.00	<1.00	12.86	85.25
MW28	12/7/2010	<1.0	<1.0	<1.0	<1.0	11.75	85.69
	3/15/2011	<1.0	<1.0	<1.0	<1.0	12.10	84.20
	6/27/2011	<1.0	<1.0	<1.0	<1.0	12.14	84.16
	9/14/2011	<1.0	<1.0	<1.0	<1.0	9.98	86.32
	12/16/2011	1.2	<1.0	<1.0	<1.0	10.66	85.64
	3/7/2012	Insufficient Water - Not Sampled				11.76	84.54
	6/25/2012	1.1	<1.0	<1.0	<1.0	11.72	84.58
	9/24/2012	<1.0	<1.0	<1.0	<1.0	11.70	84.24
	12/28/2012	Dry - Not Sampled				Dry	NA
	3/28/2013	Dry - Not Sampled				Dry	NA
	6/5/2013	Dry - Not Sampled				Dry	NA
	9/5/2013	Dry - Not Sampled				Dry	NA
	12/3/2013	Surveyed - Not Sampled				10.91	85.52
	12/17/2013	<4.0	<4.0	<4.0	<4.0	10.58	85.36
	3/4/2014	<1.0	<1.0	<1.0	<1.0	11.11	84.83
	6/5/2014	<1.0	<1.0	<1.0	<1.0	11.29	85.14



TABLE
GROUNDWATER ANALYTICAL AND FIELD RESULTS
HSR-DREYER 5-5
ADAMS 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)	Relative GW Elev. (ft)
	9/24/2014	<1.0	<1.0	<1.0	<1.0	9.78	86.65
	12/10/2014	<1.0	<1.0	<1.0	<1.0	10.83	85.60
	3/12/2015	<1.0	<1.0	<1.0	<1.0	11.41	85.02
	6/18/2015	<1.0	<1.0	<1.0	<1.0	10.10	86.33
	9/2/2015	<1.0	<1.0	<1.0	<1.0	8.17	88.26
	12/10/2015	<1.0	<1.0	<1.0	<1.0	9.77	86.66
	3/2/2016	<1.0	<1.0	<1.0	<1.0	10.26	86.17
	9/19/2016	<1.00	<1.00	<1.00	<1.00	9.21	87.22
	12/15/2016	<1.00	<1.00	<1.00	<1.00	10.52	85.91
	3/20/2017	<1.00	<1.00	<1.00	<1.00	12.00	84.43
	6/12/2017	<1.00	<1.00	<1.00	<1.00	11.10	85.33
	9/29/2017	<1.00	<1.00	<1.00	<1.00	11.34	85.09
	12/18/2017	<1.00	<1.00	<1.00	<1.00	11.19	85.24
MW29	12/18/2017	2,980	31,600	1,160	13,600	12.06	NA
MW30	12/18/2017	Insufficient Water - Not Sampled				10.13	NA
COGCC Allowable Levels		5	1000	700	1400		

Notes: COGCC - Colorado Oil and Gas Conservation Commission

Elev. - elevation

ft bgs - feet below ground surface

GW - groundwater

NA - not analyzed/not available

NM - not measured

µg/L - micrograms per liter

< - less than laboratory reporting limit

Bold indicates result exceeds allowable leve

Excavation groundwater depth is approxima

